Operation and Maintenance Report
January 2012 to December 2012
McCormick and Baxter
Superfund Site
Portland, Oregon

Prepared for
Oregon Department of
Environmental Quality

May 6, 2013
15670-06/Task 5

GSI Water Solutions, Inc.

HARTCROWSER

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Prepared by

GSI Water Solutions, Inc.

Expires: 12-31-2013

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ACRONYMS

ACB	articulated concrete block
ACL	alternate concentration limits
AWQC	Ambient Water Quality Criteria
BES	Bureau of Environmental Services
CD	compact disc
cPAH	carcinogenic polynuclear aromatic hydrocarbons
DEQ	Oregon Department of Environmental Quality
DNAPL	dense nonaqueous-phase liquid
ESD	Explanation of Significant Difference
EPA	U.S. Environmental Protection Agency
FWDA	Former Waste Disposal Area
GSI	GSI Water Solutions, Inc.
IC	institutional controls
IGA	Intergovernmental Agreement
MCL	maximum contaminant level
µg/L	microgram per liter
mg/Kg	milligram per kilogram
ng/L	nanograms per liter
NAPL	nonaqueous-phase liquid
NAVD	North American Vertical Datum of 1988
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRWQC	National Recommended Water Quality Criteria
O&M	Operation and Maintenance
PAH	polynuclear aromatic hydrocarbons
PCP	pentachlorophenol
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
Site	McCormick & Baxter Creosoting Company Site
SPME	solid phase micro-extraction
TRM	turf reinforced matting

OPERATION AND MAINTENANCE REPORT
JANUARY 2012 THROUGH DECEMBER 2012
MCCORMICK & BAXTER SUPERFUND SITE

1.0 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 & Baxter Superfund Site (Site) located in Portland, Multnomah County, Oregon, between January 1, 2012, and December 31, 2012. The location of the Site is shown on Figure 1. Figure 2 presents the Site layout and features, and Figure 3 presents the Site layout with surface elevations. Figure 4 presents historical nonaqueous-phase liquid (NAPL) distribution, Figure 5 presents Site capping components, and Figure 6 presents historical contaminant source areas. This report has been prepared by DEQ's contractor team, Hart Crowser, Inc., and GSI Water Solutions, Inc. (GSI).

O&M activities are identified in the *Draft O&M Plan* (DEQ, 2012), prepared by DEQ and the U.S. Environmental Protection Agency (EPA). The *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* (Hart Crowser/GSI, 2011a) specifies the sampling and monitoring procedures, quality assurance and quality control, technical information, and data necessary for implementing O&M activities. The *O&M Manual* is a living document that is periodically modified to reflect necessary monitoring and maintenance needs at the Site. The scope and frequency of O&M activities conducted at the Site were reduced in 2011, compared to activities conducted between 2005 and 2010. The 2012 *Draft O&M Plan* reflects the reduction in monitoring requirements.

This O&M Report documents the operation, monitoring, and maintenance activities that occurred in calendar year 2012. The O&M performance standards and activities are provided in Section 2, and the O&M activities conducted at the Site in 2012 are summarized in Section 3. Section 4 discusses planned activities for 2013. Detailed presentations of the 2012 O&M activities are provided in the following appendices.

- Appendix A – Groundwater and NAPL Monitoring
- Appendix B – Site Observation and Activity Summary
- Appendix C – Vegetation Management

This O&M Report has been provided to the DEQ in hard copy and in electronic format on compact disc (CD). It should be noted that the CD contains material not provided in the hard copy report (e.g., site inspection notes, status meeting summaries).

Routine operation, monitoring, and maintenance activities in 2012 were implemented primarily by DEQ's contractor, Hart Crowser, and its teaming partner GSI (under subcontract to Hart Crowser). O&M activities were also performed by the following firms under subcontract to Hart Crowser:

- Cascade Drilling, L.P. for well decommissioning;
- Instrumentation NW for data logger repair;
- Cherokee General Services for gravel overlay on the articulated concrete block and turf reinforcement mat repair; and
- Native Ecosystems NW, Inc., for noxious weed control.

Key personnel for implementation of O&M activities include:

- Scott Manzano: Oregon DEQ Project Officer
- Steve Campbell: Oregon DEQ Contract Officer
- Rick Ernst: Hart Crowser Program Manager
- Heidi Blischke: GSI Technical Manager
- Chris Martin: Hart Crowser Site Manager

Tim Skrotzki was replaced by Chris Martin as the Hart Crowser Site Manager in July 2012.

2.0 O&M PERFORMANCE STANDARDS AND ACTIVITIES

As discussed in Section 1, O&M activities are identified in the 2012 *Draft O&M Plan* and the *O&M Manual*. Performance standards and activities of the 2012 *Draft O&M Plan* are described below.

2.1 Soil Cap O&M Performance Standards

Contaminated soil removal and construction of an upland soil cap on approximately 41 acres of the Site were completed in September 2005.

Institutional controls (IC) requirements have not been completed for this portion of the Site.

Soils beneath the soil cap remain contaminated with arsenic, pentachlorophenol (PCP), polynuclear aromatic hydrocarbons (PAH), dioxins/furans, and NAPL, thus requiring the need for long-term monitoring and maintenance. The performance standards for the soil cap are:

- Maintain contaminant concentrations in surface soil below the following risk-based cleanup goals, as specified in the Record of Decision (ROD) (EPA, 1996):
  - Arsenic – 8 milligrams per kilogram (mg/Kg)
  - PCP – 50 mg/Kg
  - Total Carcinogenic PAHs (cPAHs) – 1 mg/Kg
  - Dioxins/Furans – 0.00004 mg/Kg
- Maintain the topsoil layer to within 50 percent of its design specification, by conducting periodic cap inspections to verify that vegetation coverage is preventing erosion:
  - Maintain a topsoil thickness of at least 6 inches for the area over the impermeable geomembrane cap.
  - Maintain a topsoil thickness of at least 12 inches for all areas except over the impermeable geomembrane cap.
- Minimize infiltration of rainwater within the subsurface barrier wall by maintaining the subsurface stormwater conveyance system.
- Minimize stormwater erosion and ponding outside the barrier wall 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 Services (NMFS) Biological Opinion (National Oceanic and Atmospheric Administration [NOAA], 2004).

2.2 Soil Cap O&M Activities

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. A long-term Vegetation Management Plan has been completed for the soil cap. The plan includes semiannual qualitative inspections and reporting, and is included in the *O&M*

Manual (Hart Crowser/GSI, 2011a). General routine maintenance includes 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 sediments from manholes, and replanting of unsuccessful trees and shrubs. The frequency of the planned O&M activities through September 2016 is provided in Table 1.

2.3 Sediment Cap O&M Performance Standards

A 23-acre cap was completed in 2005 to contain Willamette River sediments contaminated with arsenic, PCP, PAHs, dioxins, and NAPL. Long-term monitoring and maintenance are necessary to ensure that the sediment cap remedy remains protective over time. Monitoring, maintenance, and restrictive provisions for the sediment cap are also included in a permanent easement completed between DEQ and the Oregon Department of State Lands in 2004. The performance standards for the sediment cap are:

- 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
  - PCP – 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)
- 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):
  - Arsenic (III) – 190 micrograms per liter (µg/L)
  - Chromium (III) – 210 µg/L
  - Copper – 12 µg/L
  - Zinc – 110 µg/l
  - PCP – 13 µg/L
  - Acenaphthene – 520 µg/L
  - Fluoranthene – 54 µg/L

- Naphthalene – 620 µg/L
- Total Carcinogenic PAHs – 0.031 µg/L
- Dioxins/Furans – 1.4×10^{-5} nanograms per liter (ng/L)

- Maintain the armoring layer to within 50 percent of the design specification throughout the cap. The design specifications are:
  - 6-inch rock armoring – maintain thickness of at least 6 inches
  - 12-inch rock armoring – maintain thickness of at least 7.5 inches
  - 24-inch rock armoring – maintain thickness of at least 12 inches
- Maintain uniformity and continuity of articulated concrete block (ACB) armoring.
- Assess performance of organophilic clay to ensure it is preventing the release of mobile NAPL to the Willamette River (potential assessment parameters include sorption capacity, measure of NAPL currently sorbed, and permeability).

The AWQCs listed above are the surface water criteria in effect at the time of the ROD (EPA, 1996). Since completion of the ROD, additional recommended EPA water quality criteria were published in 2007, and more stringent AWQCs were adopted by DEQ and approved by EPA in 2011. During meetings in August 2007 between stakeholders (DEQ, EPA, NOAA, Warm Springs Tribe, and the Yakama Nation), it was agreed that for comparison purposes, the following five criteria would be referenced in the analytical results summary tables included in the *Annual O&M Reports*:

- Two AWQCs in effect at the time the ROD was issued
  - 1996 criteria for chronic effects to aquatic life
  - 1996 criteria for human health based on fish consumption
- Two 2007 National Recommended Water Quality Criteria (NRWQC)
  - 2007 criteria for chronic effects to aquatic life
  - 2007 criteria for human health (consumption of organisms)
- Current EPA maximum contaminant levels (MCLs) for drinking water

  Values for these five criteria, in addition to the 2011 AWQCs and current MCLs are presented in Table 2.

2.4 Sediment Cap O&M Activities

Monitoring activities for the sediment cap in 2012 include periodic visual inspections of near-shore areas to determine the extent and retention of the sediment cap sand overlay (i.e., biotic layer), large wood debris accumulating along the shoreline, condition of boulder clusters and rock mound, and deposition of fine-grained substrate from the water column. Retention of small diameter gravel (1½ inch-minus), placed in November 2012 to fill all shoreline ACB voids, will also be included in future inspections. No surface water, inter-armoring water, or sub-armoring water quality samples were collected in 2012. As outlined in Tables 3, the next sediment cap water quality sampling event is planned for the spring of 2015.

A multibeam bathymetric survey will be conducted in 2015, and a diver inspection may be conducted if areas of concern are identified from the bathymetry survey. Future sediment cap performance monitoring activities may include porewater sampling using solid phase micro-extraction (SPME) passive samplers and/or other appropriate sampling methods. Biota sampling will be considered as part of the next Five-Year Review process, planned for 2016. Although the sediment cap is designed to be generally maintenance free, unplanned or non-routine maintenance may include: replacement of warning buoys, placement of additional armoring to address erosion, and placement of additional Organoclay™ Reactive Core Mats if new releases of creosote are discovered. Monitoring and maintenance of the riparian zone are addressed as part of the soil cap. The frequency of the planned O&M activities through September 2016 is provided in Table 3.

2.5 Groundwater O&M Performance Standards

The groundwater remedy consists of groundwater monitoring, NAPL recovery, a subsurface barrier wall surrounding approximately 18 acres within the upland soil cap, and ICs. ICs to restrict groundwater use beneath the Site have yet to be completed. NAPL recovery was terminated by EPA and DEQ in 2011.

Groundwater both within and outside of the subsurface barrier wall remain contaminated with metals, PCP, PAHs, dioxins, and NAPL into the foreseeable future. Contaminated groundwater within the barrier wall is contained and is not migrating to the river. Outside the barrier wall, residual product in soils results in elevated concentrations of PCP, PAHs, and NAPL in groundwater within the Former Waste Disposal Area (FWDA). Despite the groundwater contamination in this area, monitoring of downgradient wells, surface water, and the sediment cap (inter-armoring, sub-armoring, and porewater in the organophilic clay) has indicated that the groundwater remedy is performing as designed and that

groundwater is not adversely affecting the river. The performance standards for the subsurface barrier wall and NAPL recovery are:

- Continue to recover NAPL from outside the subsurface barrier wall until recovery rates become minimal; alternate 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 the Alternate Concentration Limits (ACL) set forth in the ROD (EPA, 1996):
  - Arsenic (III) – 1,000 µg/L
  - Chromium (III) – 1,000 µg/L
  - Copper – 1,000 µg/L
  - Zinc – 1,000 µg/L
  - PCP – 5,000 µg/L
  - Total PAHs – 43,000 µg/L
  - Dioxins/Furans – 0.2 ng/L
- Minimize the transport of NAPL and communication of groundwater zones across the subsurface barrier wall.
- Minimize further vertical migration of creosote to the deep groundwater aquifer.
- 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.

As discussed in the *Second Five-Year Review* (EPA, 2006), EPA determined that ACLs were not valid as substitutes for EPA's MCLs in groundwater. As a result of this determination, DEQ and EPA anticipate that amended groundwater cleanup goals for the Site will be established in a ROD Amendment or an Explanation of Significant Difference (ESD). After new groundwater cleanup goals are established, the *O&M Plan* will be revised to reflect the new cleanup goals.

2.6 Groundwater O&M Activities

Monitoring activities for the groundwater remedy include groundwater elevation monitoring and groundwater sampling. As described in Section 3.1, DEQ and EPA

terminated NAPL recovery in late April 2011. NAPL gauging will be conducted in conjunction with the semiannual Site-wide groundwater elevation monitoring events. Groundwater samples will be collected from the monitoring well downgradient of the infiltration pond (monitoring well MW-59s) and select Site-wide wells every 5 years (to support the Five-Year Review process). Routine maintenance of transducer dataloggers and other monitoring equipment is also included for groundwater O&M. The schedule for planned O&M activities from January through December 2013 is provided in Table 4. The frequency of planned O&M activities through September 2016 is provided in Table 5.

3.0 O&M ACTIVITIES SUMMARY

Performance standards and activities conducted in 2012 are described below. More detailed discussions of the 2012 O&M activities are provided in the Appendices A, B, and C.

3.1 NAPL Monitoring Assessment

Between February 1993 and April 2011, approximately 6,550 gallons of NAPL were extracted from Site wells. Based on the findings from the NAPL investigation in the FWDA outside the barrier wall (*Dense Non-Aqueous Phase Liquid (DNAPL) Data Gap Investigation*; Hart Crowser/GSI, 2011b) and extensive monitoring of the sediment cap (described in the *Third Five-Year Review Report*; EPA/DEQ, 2011), DEQ and EPA decided to discontinue NAPL extraction on April 20, 2011. Subsequent monitoring in 2011 of NAPL thicknesses in the FWDA extraction wells confirmed that the residual NAPL in the FWDA is isolated and stable, and does not pose a risk to the Willamette River. NAPL presence and thickness monitoring was also conducted during the semiannual low-tide monitoring events in existing Site-wide wells, including four wells in the Willamette Cove in June and October 2012. As described in Section 3.4, five monitoring wells were decommissioned in 2012.

In 2012, NAPL was found in 13 wells (EW-1s, EW-2s, EW-8s, EW-9s, EW-10s, EW-15s, EW-18s, MW-10r, MW-20i, MW-22i, MW-56s, MW-Ds, and MW-Gs). The locations and thicknesses of NAPL remain consistent with previous year's monitoring since remedy construction completion in September 2005.

3.2 Groundwater Flow Direction and Gradient Assessment

Manual measurements of static groundwater levels were conducted during low tide on June 19 and October 22, 2012. Shallow groundwater elevations and gradients collected during these monitoring periods are fairly consistent with

conditions observed during the same monitoring periods in 2011. In general, horizontal gradients are the greatest during periods of high precipitation and decrease during periods of low precipitation. Groundwater flow inside the barrier wall remains relatively flat, while outside the wall, shallow groundwater flow is diverted around the barrier wall to the northwest and south. When the Willamette River reaches peak stage (more than about 12 feet North American Vertical Datum of 1988 [NAVD88]), which typically occurs in June each year, it can induce a partial reversal of gradient within the northwest corner of the barrier wall.

The 2012 groundwater data continue to demonstrate that shallow groundwater within the barrier is isolated from groundwater outside the barrier wall based on the independent groundwater elevations, flow directions, and gradients. Precipitation can enter inside the barrier wall only through the riparian area, and also between the connection of the Resource Conservation and Recovery Act (RCRA) cap and the top of the barrier wall. A decrease in water levels inside the barrier wall since 2005 suggests that there is a hydraulic connection with groundwater outside the riverward portion of barrier wall. The shallow water-bearing zone inside the barrier wall has reached equilibrium with the river and minimal net groundwater migration is expected from within the barrier wall or into the barrier wall.

Groundwater elevation data also were collected from selected monitoring wells surrounding the barrier wall using pressure transducers to monitor groundwater level fluctuations on a half-hour basis. Hydrographs were prepared for monitoring well clusters MW-36/37, MW-44/45, and MW-52/53 inside and outside the barrier wall to document groundwater elevation level differences and assess barrier wall performance. The hydrographs illustrate a net vertical gradient between the shallow and intermediate and deep water-bearing zones, which continues to be slightly downward, similar to the vertical gradient measured in 2008 through 2011.

The transducer data from one interior shallow well, EW-1s, show that groundwater elevations in the interior area of the barrier wall are more comparable to interior well MW-52s located on the upgradient (bluff) side of the barrier wall than interior well MW-36s on the downgradient side in the western corner. This indicates a confining silt layer is present in the vicinity of EW-1s by showing a muted response to groundwater conditions outside of the barrier wall.

Based on the evaluation of groundwater data from 2005 through 2012, the barrier wall and impermeable soil cap are functioning as designed to divert groundwater flow around and prevent rainwater infiltration into NAPL source areas contained within the barrier wall.

3.3 Site Observation and Activity Summary

Tables 1 and 3 outline the planned inspections for the soil and sediment caps, respectively, through September 2016. Hart Crowser conducted soil and sediment cap inspections three times in 2012. The inspections were conducted in conjunction with three quarterly Site meetings.

No sheens were observed along the shoreline during the three Site inspection visits in 2012. Moderate erosion of soil mulch and vegetation cover on the green turf reinforced matting (TRM) was observed in October 2011 along the lower riparian area where the TRM is attached to the ACB. This erosion was the result of high Willamette River levels (up to 22 feet NAVD88) in June 2011. In October 2012, Cherokee Construction Services (Cherokee) of Vancouver, Washington, filled areas of erosion under the TRM with crushed gravel and re-secured the TRM to the ACB using concrete anchor nails. During the same field effort, Cherokee also filled void spaces within the ACB along the shoreline using rounded-1½ inch-minus gravel. The general public uses the shoreline for recreation, most commonly for walking dogs. The gravel overlay creates a more stable substrate for wildlife and for a consistent and safer walking surface for public use.

Significant amounts of large woody debris, consistent with previous years, remain along the length of the shoreline and help create wildlife habitat. Wildlife commonly seen at the Site includes Canada geese, blue herons, ospreys, crawfish, squirrels, and rabbits; evidence of coyotes also has been observed.

Four dilapidated boats were seen beached in Willamette Cove during the October 2012 Site inspection. During low tide, boat anchors could be seen resting on the sediment cap portion of the cove. No visible effects to the sediment cap were observed from the resting anchors. Although an existing Oregon Marine Board rule prohibits any anchoring on the sediment cap, damage to the ACB armoring was not observed or expected, and therefore no action was taken to enforce the anchoring prohibition. DEQ did notify Metro, which has taken action in the past to respond to transient boaters and encampments in the Willamette Cove.

No upland soil cap subsidence occurred in 2012 (as determined by the inner and outer casing measurements at well MW-23d). Sealing monitoring well EW-1s in May 2009 appears to have stopped or significantly slowed the rate of aerobic degradation that is believed to be a key factor, along with declining groundwater levels that are now stabile, in causing the subsidence observed in 2008 and 2009. The impermeable cap stormwater drainage system continues to operate effectively.

In March 2012, one of the five permanent buoys installed by Northwest Underwater Construction in August 2011, was beneath the surface of the Willamette River and, therefore, not visible. In June and October 2012, all five of the buoys were visible in the designed locations. The buoys mark the outer boundary of the sediment cap and warn boaters of potential underwater hazards.

In the summer of 2012, monitoring wells EW-9s, MW-2s, MW-3s, MW-Ks, and MW-18s were decommissioned by over-drilling, with the exception of MW-Ks which was abandoned in-place in accordance with Oregon Water Resources Department and DEQ procedures and regulations.

All Site transducers were temporarily removed for maintenance and repair (conducted by Instrumentation Northwest, Inc.) and reinstalled in select wells in October 2012 in accordance with the 2012 *Draft O&M Plan*.

3.4 Vegetation Management

The Site was planted and an irrigation system was installed by the City of Portland, Bureau of Environmental Services (BES) in February 2006. Through an Intergovernmental Agreement (IGA) with the DEQ, BES provided vegetation management services at the Site from 2006 through 2010. Now that the vegetation on the soil cap is fully established and the irrigation system is no longer needed, BES no longer manages vegetation at the Site. Vegetation management activities were conducted in accordance with the *Vegetation Management Plan* (Hart Crowser/GSI, 2011c), which is provided in the *O&M Manual*.

A baseline reconnaissance site visit was conducted on June 10, 2011, by a Hart Crowser ecologist to confirm the vegetation conditions described in the final 2010 BES report. The baseline inspection included visual observation of vegetation planting areas, species identification (native, non-native, and invasive), growth, density, and general coverage throughout the Site. In general, the upland and riparian components were observed to be performing well, the installed trees and shrubs looked healthy and spreading. On October 16, 2012, a Hart Crowser ecologist conducted a field inspection comparing current conditions to the baseline. The upper and lower riparian components were performing well with trees and shrubs spreading, an abundance of large woody debris, and good ground coverage. The upland vegetative components continue to perform well with vegetation appearing healthy, with the exception of a small patch of stressed alder and willow in the perimeter pond and swale area. The poor vegetative health is attributed to the dominance of sandy soil and lack of moisture retention resulting in a notable reduction of vegetation cover in this area. It is anticipated that many of the stressed willow and alder will regenerate within this area. The

upland vegetative cover continues to meet or exceed the baseline conditions. No actions were required to address the stressed vegetation.

The potential for noxious weed problems remains high for the entire Site. Severe noxious weed problems are present at adjacent, off-site areas including Scotch broom on the Burlington North Railroad grade and butterfly bush from the Triangle Park industrial property. Native Ecosystems Northwest, under subcontract to Hart Crowser, completed semiannual noxious weed control activities in the both the spring and fall of 2012 focusing on thistle, the predominant noxious weed.

Vegetation management will continue in 2013, according to the *Vegetation Management Plan* (Hart Crowser, 2011c). Continued monitoring of vegetation stability will be assessed Site-wide, and impaired vegetation will be replaced in general accordance with the IGA and the NMFS Biological Opinion for the Site (NOAA, 2004).

4.0 SUMMARY OF PLANNED ACTIVITIES FOR 2013

Table 4 summarizes the planned O&M activities for 2013. Tasks correspond to O&M activities outlined in Tables 1, 3, and 5. Soil and sediment cap inspections will be conducted quarterly, and Site vegetation inspections and groundwater elevation monitoring will occur semiannually for the next 5 years. Sediment cap water sampling will be conducted once every 5 years, beginning in the spring of 2015.

5.0 REFERENCES

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NOAA, 2004. *Endangered Species Act – Section 7 Consultation Biological Opinion & Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation, McCormick & Baxter Creosoting Company Site, Willamette River Remediation Sediment Cap, Multnomah County, Oregon.* March 15, 2004.

Table 1: Soil Cap O&M Activities through September 30, 2016
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O&M Activity	Frequency
Visual Inspections:	
Cap surface	Quarterly
Subsidence near EW-1s	Quarterly
Stormwater conveyance system	Quarterly
Security fencing	Quarterly
Warning signs	Quarterly
Abundance and survival of vegetation	Quarterly
Routine Maintenance and Monitoring:	
Manual removal of invasive plant	Semiannually, if necessary
Targeted application of herbicides	Semiannually, if necessary
Non-Routine Maintenance – such as:	
Repairs of fence	As needed
Replacement of warning signs	As needed
Repairs of gravel roads	As needed
Filling of potential animal burrow into the earthen cap	As needed
Remove sediments from manholes	As needed
Replanting unsuccessful trees and shrubs	As needed

Table 2: Comparison of Water Quality Criteria
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			1996 AWQCs[1]		2007 NRWQCs[2]		2011 NRWQCs[3]		1996 ROD ACLs[4]	2011 MCLs[5]
Chemical		Units	Aquatic Life (chronic)	Human Health (fish consumption only)	Aquatic Life (chronic)	Human Health (consumption of organism only)	Aquatic Life (chronic)	Human Health (consumption of organism only)		
Total Arsenic		mg/L	0.19		0.15	0.00014	0.15	0.00014	1	0.01
Total Chromium		mg/L	0.21		0.074		0.074		1	0.1
Total Copper		mg/L	0.012		0.009		BLM		1	
Total Zinc		mg/L	0.11		0.12	26	0.12	26	1	
Pentachlorophenol		µg/L	13		15	3	15	3	5	0.001
Acenaphthene	L	µg/L	520			990		990		
Acenaphthylene	L	µg/L								
Anthracene	L	µg/L				40000		40000		
Benz[a]anthracene	H, C	µg/L				0.018		0.018		
Benzo[a]pyrene	H, C	µg/L						0.018		0.0002
Benzo[b]fluoranthene	H, C	µg/L				0.018		0.018		
Benzo[g,h,i]perylene	H, C	µg/L				0.018				
Benzo[k]fluoranthene	H	µg/L				0.018		0.018		
Chrysene	H, C	µg/L				0.018		0.018		
Dibenzo[a,h]anthracene	H, C	µg/L				0.018		0.018		
Fluoranthene	H	µg/L		54		140		140		
Fluorene	L	µg/L				5300		5300		
Ideno[1,2,3-cd]pyrene	H, C	µg/L				0.018		0.018		
Naphthalene	L	µg/L	620							
Phenanthrene	L	µg/L								
Pyrene	H	µg/L				4000		4000		
Total LPAHs		µg/L								
Total HPAHs		µg/L								
Total cPAHs		µg/L		0.031						
Total PAHs		µg/L							43	

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 www.epa.gov/waterscience/criteria/wqcriteria.html).

[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).

Key:

ACLs = Alternate Concentration Limits
AWQCs = Aquatic Water Quality Criteria
C = Carcinogenic PAH (cPAH)
L = Low Molecular Weight PAH (LPAH)
MCLs = Maximum Contaminant Levels
mg/L = milligrams per liter
NRWQCs = National Recommended Water Quality Criteria
H = High Molecular Weight PAH (HPAH)
µg/L = micrograms per liter

Table 3: Sediment Cap O&M Activities through September 30, 2016
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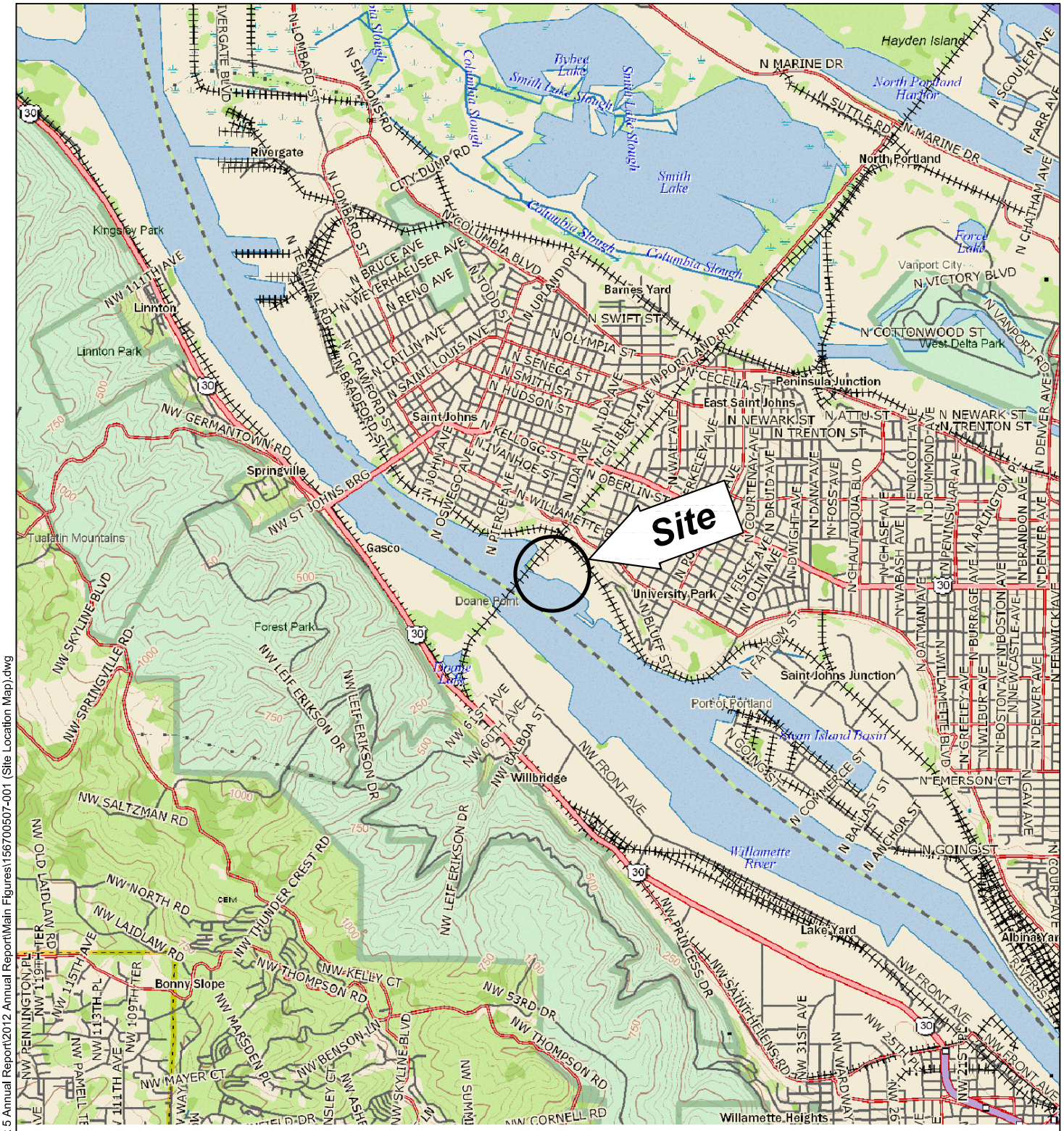
O&M Activity	Frequency
Visual Inspections (from shore)	
Warning buoys	Quarterly
Cap surface	Quarterly
Habitat quality	Annually
Routine Monitoring:	
Porewater Sampling	Every 5 years (starting in 2015)
Organoclay cores or SPME samples	In 2015, then determine frequency
Non-Routine Monitoring – such as:	
Multibeam bathymetric surveys, side-scan sonar survey	Review as available by third parties, perform as needed (flood event)
Aerial photography of shallow water area, shoreline, and riparian zone	Review as available by third parties
Diver Inspection	As needed, dependent on bathymetry or other lines of evidence
Non-Routine Maintenance – such as:	
Replacement of buoys	As needed
Additional armoring placement	As needed
Additional organoclay capping	As needed
ACB grouting	Every 5 years , or as needed based on site inspections

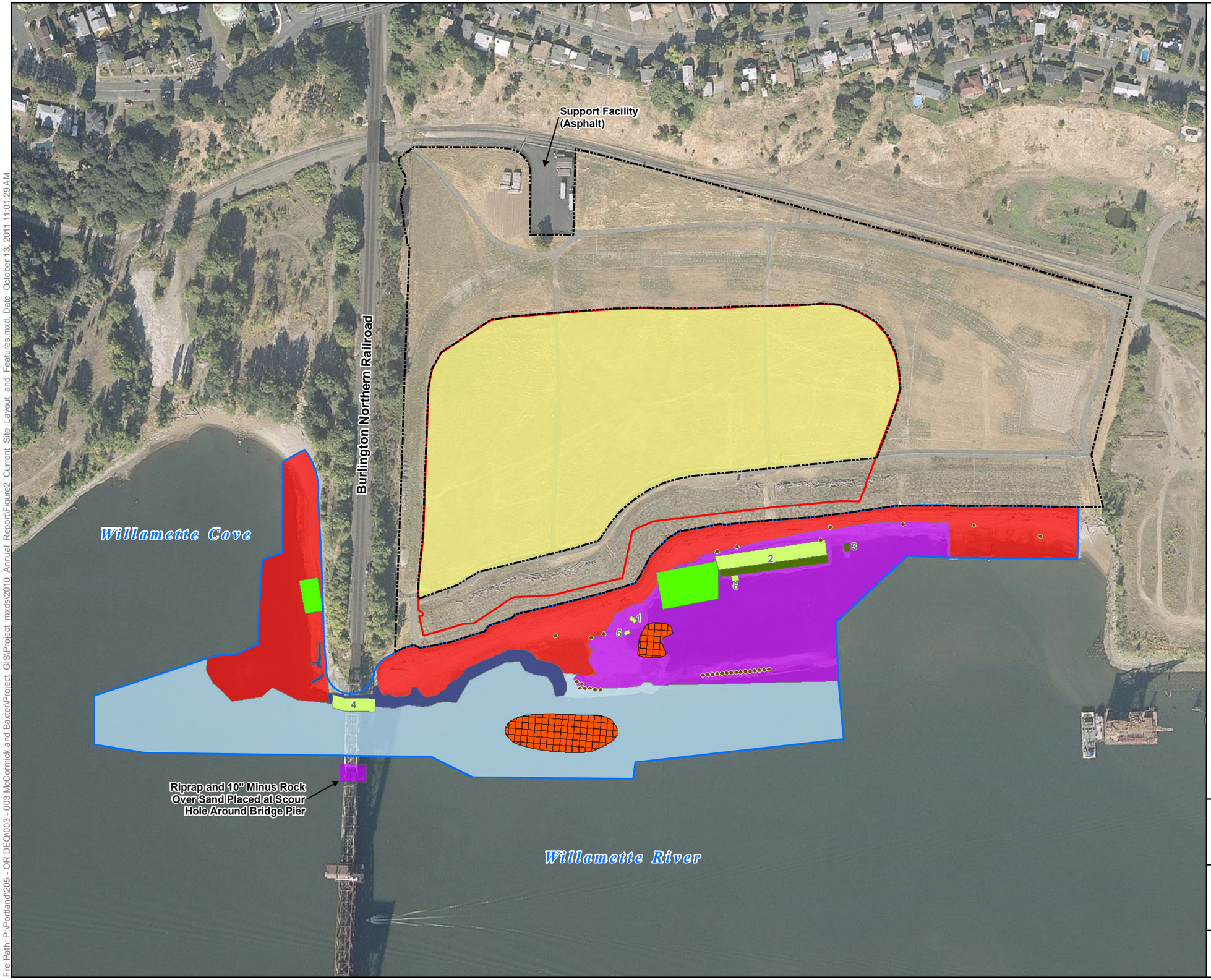
Table 4: Schedule of O&M Activities for January 2013 through December 2013
Operation and Maintenance Report
McCormick & Baxter Superfund Site

O&M Activity	Frequency
Soil Cap	
Visual Inspections:	
Cap surface	Quarterly
Subsidence near EW-1s	Quarterly
Stormwater conveyance system	Quarterly
Security fencing	Quarterly
Warning signs	Quarterly
Abundance and survival of vegetation	Quarterly
Routine Maintenance and Monitoring:	
Manual removal of invasive plant	Semiannually, if necessary
Targeted application of herbicides	Semiannually, if necessary
Non-Routine Maintenance	As needed
Sediment Cap	
Visual Inspections (from shore)	
Warning buoys	Quarterly
Cap surface	Quarterly
Habitat quality	Annually
Non-Routine Maintenance & Monitoring	As needed
Groundwater	
NAPL Monitoring	
Manual gauging of Site wells	Semiannually
Groundwater Monitoring	
Downloading continuous water level data from transducers	Semiannually
Manual water level measurements from Site wells	Semiannually
Routine Maintenance of Equipment	As needed
Utilities Service	Continuous, until decomissioned

Table 5: Groundwater O&M Activities through September 30, 2016
Operation and Maintenance Report
McCormick & Baxter Superfund Site

O&M Activity	Frequency
NAPL Monitoring	
Manual gauging of Site wells	Semiannually
Manual extraction from exterior wells	Not recommended
Groundwater Monitoring	
Downloading continuous water level data from transducers	Semiannually
Manual water level measurements from Site wells	Semiannually
Groundwater Sampling	
Site-wide	Every 5 years
Infiltration pond (MW-59s)	Every 5 years
Routine Maintenance of Equipment	
Interface probes, pumps, vehicle, data loggers/transducers, etc.	As needed
Utilities Service	
Water, electric, phone, alarm, solid waste, septic	Continuous


Site
Hayden Island
N MARINE DR
North Portland Harbor
Smith Lake
Columbia Slough
Rivergate
Kingsley Park
Linnton
Linnton Park
Barnes Yard
Vanport City
West Delta Park
Peninsula Junction
East Saint Johns
Saint Johns
Springville
Tualatin Mountains
Gasco
Doane Point
University Park
Forest Park
Saint Johns Junction
Port of Portland
Swan Island Basin
Willbridge
Willamette River
Bonny Slope
Lake Yard
Albina Yard
Willamette Heights
NW GERMANTOWN RD
NW ST JOHNS BRG
NW SKYLINE BLVD
NW SALTZMAN RD
NW LAIDLAW RD
NW THOMPSON RD
NW FRONT AVE
N COLUMBIA BLVD
N PORTLAND RD
N VICTORY BLVD
N LOMBARD ST
CITY DUMP RD
N SWIFT ST
N OLYMPIA ST
N SENECA ST
N SMITH ST
N HUDSON ST
N KELLOGG ST
N IVANHOE ST
N OBERLIN ST
N WILLAMETTE BLVD
N BURLINGTON AVE
N CHAUTAUQUA BLVD
N NEWARK ST
N TRENTON ST
N GOING ST
N EMERSON CT
N ANCHOR ST
N BALLAST ST
N COMMERCE ST
NW 53RD DR
NW 31ST AVE
NW 25TH PL
NW PRINCESS DR
NW SAINT HELENS RD
NW CORNELL RD
NW KELLY CT
NW MARSDEN PL
NW BENSON LN
NW MAYER CT
NW 119TH TER
NW 115TH AVE
NW 113TH PL
NW 111TH AVE
NW 109TH TER
NW PENNINGTON PL
NW THUNDER CREST RD
NW LEIF ERIKSON DR
NW 61ST AVE
NW 60TH AVE
NW BALTIMORE ST
N FATHOM ST
N BLUFF ST
N FISKE AVE
N OLIN AVE
N DWIGHT AVE
N DANA AVE
N FOSS AVE
N COURTENAY AVE
N DRUID AVE
N WALL AVE
N IDA AVE
N GILBERT AVE
N DA AVE
N OSWEGO AVE
N PIERCE AVE
N CATLIN AVE
N SAINT LOUIS AVE
N BRUCE AVE
N WEYERHAEUSER AVE
N RENO AVE
N TERMINAL RD
N CRAWFORD ST
N BRADFORD ST
N TODD ST
N JURUPA DR
N CECELIA ST
N ATTU ST
N ENDICOTT AVE
N DRUMMOND AVE
N CHASE AVE
N WABASH AVE
N OATMAN AVE
N WILLAMETTE BLVD
N GREELEY AVE
N WILBUR AVE
N BOSTON AVE
N NEWCASTLE AVE
N BRANDON AVE
N DENVER AVE
N FENWICK AVE
N PENINSULAR AVE
N ARLINGTON PL
N CHATHAM AVE
N FARR AVE
N SCOUTER AVE
N VANPORT RD
N GAY AVE
Columbia Slough
Smith Lake Slough
Bybee Lake
Force Lake
Doane Lake
Portland
OREGON
N
0
4,000
8,000
Scale in Feet
Source: DeLorme Topo USA.
McCormick and Baxter Superfund Site
6900 N Edgewater Street, Portland, Oregon
Site Location Map
1/13
HARTCROWSER
GSI Water Solutions, Inc.
Figure
1
F:\Data\Jobs\DEQ\15670-xx M&B\15670-06 New New O&F\Tk 5 Annual Report\2012 Annual Report\Main Figures\156700507-001 (Site Location Map).dwg



LEGEND

- Subsurface Barrier Wall
- Sediment Cap Boundary
- Granular Organophilic Clay
- Organoclay™ Reactive Core Mats (Double)
- Organoclay™ Reactive Core Mats (Single)
- Thickened Sand Layer
- Boulder Clusters
- Riprap Armor
- Articulated Concrete Block
- 6-inch Minus Rock Armor
- 10-inch Minus Rock Armor
- Impermeable Cap
- Earthen Soil Cap Boundary

NOTE: Aerial photo taken on September 22, 2006

0 250 500

Scale in feet

McCormick & Baxter Superfund Site
Portland, Oregon

Current Site Layout and Features

1/13

HARTCROWSER GSI Water Solutions, Inc.

Figure
2

File Path: P:\Portland\205 - OR DEQ\003 - 003 McCormick and Baxter\Project GIS\Project mxds\2010 Annual Report\Figure2 Current Site Layout and Features.mxd. Date: October 13, 2011 11:01:29 AM

NOTES:

1. Bathymetric survey conducted by David Evans and Associates, Inc. (DEA), 4/26/06.
2. Upland site survey conducted by David Evans and Associates, Inc. (DEA), 11/17/04 and 1/24/06.
3. Upland ground surface resurveyed and replaced by OTAK, Inc., 9/16/08.
4. Horizontal Datum: North American Datum of 1983 - 91 adj. (NAD83/91), State Plane Coordinate System (SPCS), Oregon North Zone. Units: International Feet.
5. Vertical Datum: North American Vertical Datum of 1988 (NAVD88)
6. Contour Interval: One-Foot. Bathymetric contours were derived from a Digital Terrain Model (DTM) based on a 3-foot grid of multibeam data.
7. Additional rock was placed at the 6" minus rock placement areas on 6/26/07. These areas have not been surveyed and the contours of this figure do not reflect the additional rock placement.

Burlington Northern Inc.
(Spokane, Portland, and Seattle Railway Co.)

Building

A2'

Asphalt Surface

Property Line

Fence (Typ.)

Union Pacific Railroad

EARTHEN CAP

Gravel Road

Perforated Collection Piping

Subsuface Barrier Wall

SDMH-A

SDMH-C

SDMH-D

DRAINAGE SYSTEM

Retention Pond

High Point

SDMH-E

12" Minus Rock

SDMH-B

IMPERMEABLE CAP

8" Corrugated HDPE (High Density Polyethylene)

Rock Pile

Spillway

12" PVC Outfall

Sand Pile

Willamette Cove

SEDIMENT CAP

A2

A2

Sediment Cap Boundary

Willamette River

DSL Easement (#31530-EA)

0 200 400

Scale in Feet

N

-40 Elevation Contour, 1' Interval (Ft. NAVD 88)

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

A2 A2' Cross Section Line

McCormick and Baxter Superfund Site
Portland, Oregon

Current Site Layout with Surface Elevations

1/13

HARTCROWSER GSI Water Solutions, Inc.

Figure
3

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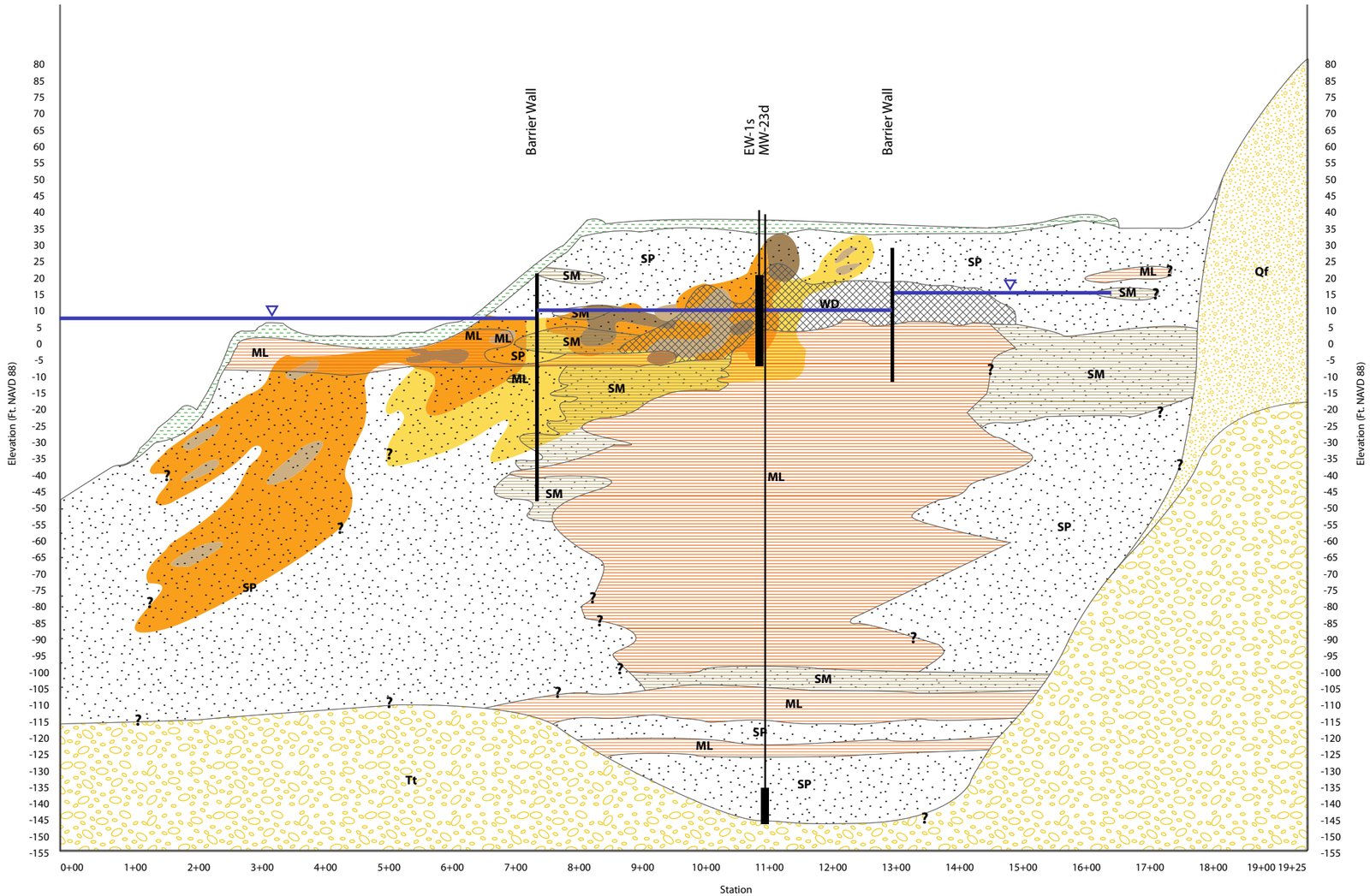

LEGEND

- SP- Sand, Fine to Medium, Poorly Graded
- SM- Silt Sand, or Thin Interbeds of Silt and Sand
- ML- Clayey Silt or Silty Clay
- WD- Wood Debris, Chips or Sawdust Occasionally
- Qf- Catastrophic Flood Deposits Consisteing of Gravels and Sands
- Tt-Troutdale Formation
- Sediment/Soil Cap
- Approximate Average Water Level 2008
- Creosote Odor
- Strong Creosote Odor
- Heavy Sheen
- Saturated

Horizontal Scale in Feet
0 200 400
0 40 80
Vertical Scale in Feet
Vertical Exaggeration = 5x

McCormick and Baxter Superfund Site
Portland, Oregon

Historical NAPL Distribution Cross Section

5/12

HARTCROWSER GSI Water Solutions, Inc.

Figure
4

W:\Projects\205 - OR DEQ\003 - 003 McCormick and Baxter\Figures

NOTES:

1. Bathymetric survey conducted by David Evans and Associates, Inc. (DEA), 4/26/06.
2. Upland site survey conducted by David Evans and Associates, Inc. (DEA), 11/17/04 and 1/24/06.
3. Upland ground surface resurveyed and replaced by OTAK, Inc., 9/16/08.
4. Horizontal Datum: North American Datum of 1983 - 91 adj. (NAD83/91), State Plane Coordinate System (SPCS), Oregon North Zone. Units: International Feet.
5. Vertical Datum: North American Vertical Datum of 1988 (NAVD88)
6. Contour Interval: One-Foot. Bathymetric contours were derived from a Digital Terrain Model (DTM) based on a 3-foot grid of multibeam data.

Asphalt Surface
Building
Fence (Typical)
Property Line
Gravel Road
Union Pacific Railroad
Burlington Northern Inc.
(Spokane, Portland, and Seattle Railway Co.)
EARTHEN CAP
Perforated Collection Piping
Barrier Wall
SDMH-A
IMPERMEABLE CAP
SDMH-C
SDMH-D
DRAINAGE SYSTEM
Retention Pond
12" Minus Rock
High Point
SDMH-B
SDMH-E
8" Corrugated HDPE
(High Density Polythene)
Rock Pile
Spillway
RIPARIAN AREA (Vegetated)
Sand Pile
12" PVC Outfall
Willamette Cove
SEDIMENT CAP
Willamette River
Sediment Cap Boundary

0 200 400
Scale in Feet

N

Underground Storm Drain Line
Storm Drain Manhole
Elevation Contour, 1' interval
(Ft. NAVD 88)
Site Capping Component Boundary

McCormick and Baxter Superfund Site
Portland, Oregon

Site Capping Components

1/13

HARTCROWSER
GSI Water Solutions, Inc.

Figure
5

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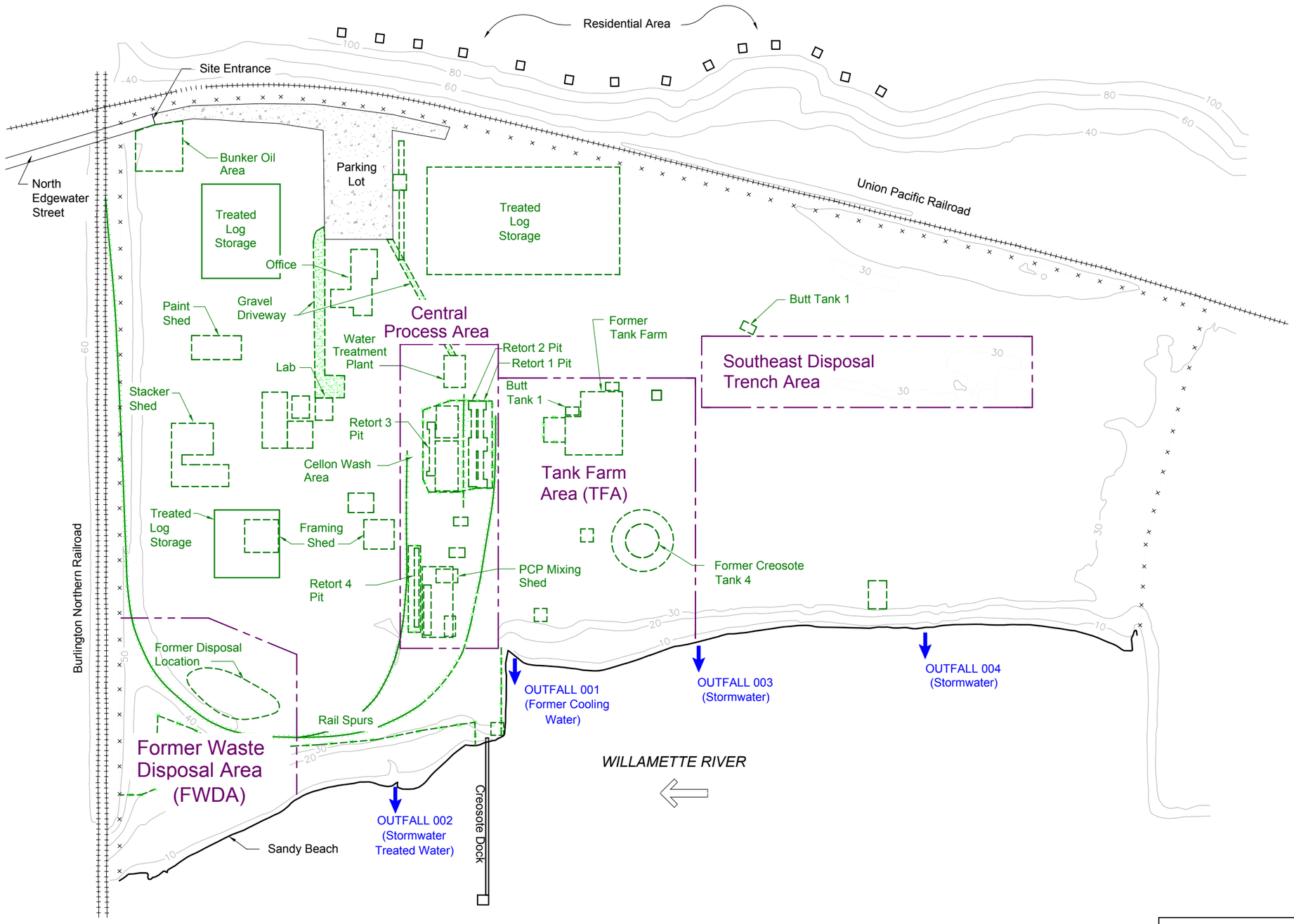

McCormick and Baxter Superfund Site
Portland, Oregon

Historic Contaminant Source Areas

1/13

HARTCROWSER | GSI Water Solutions, Inc.

Figure
6

F:\Data\Jobs\DEQ\15670-xx M&B\15670-06 New New O&F\Tk 5 Annual Report\2012 Annual Report\Main Figures\1567005O7-006 (Historic Contamination).dwg

APPENDIX A
GROUNDWATER AND NAPL MONITORING

OPERATION AND MAINTENANCE REPORT
JANUARY 2012 THROUGH DECEMBER 2012

Hart Crowser/GSI
15670-06/Task 5 May 6, 2013

APPENDIX A
CONTENTS

TABLES

APPENDIX A
CONTENTS CONTINUED

FIGURES

ACRONYMS

°C	degrees Celsius
DEQ	Oregon Department of Environmental Quality
DNAPL	dense nonaqueous-phase liquid
EPA	U.S. Environmental Protection Agency
ft/ft	feet per foot
FWDA	Former Waste Disposal Area
LNAPL	light nonaqueous-phase liquid
NAPL	nonaqueous-phase liquid
NAVD88	North American Vertical Datum of 1988
O&M	Operation and Maintenance
RCRA	Resource Conservation and Recovery Act
RM	River Mile
Site	McCormick & Baxter Superfund Site
TFA	Tank Farm Area
USGS	U.S. Geological Survey

APPENDIX A
GROUNDWATER AND NAPL MONITORING OPERATIONS AND MAINTENANCE REPORT JANUARY 2012 THROUGH DECEMBER 2012 MCCORMICK & BAXTER SUPERFUND SITE

1.0 INTRODUCTION

This Appendix A to the *January 2012 through December 2012 Operation and Maintenance (O&M) Report* (*O&M Report*) presents the nonaqueous-phase liquid (NAPL) measurement and groundwater elevation and gradient information collected at the McCormick & Baxter Superfund Site (Site) in 2012. In 2012, the NAPL and groundwater data were collected during the Site-wide semiannual monitoring events conducted on June 19, 2012, and October 22, 2012. Continuous water level monitoring was also conducted in selected wells for most of calendar year 2012. The NAPL and groundwater monitoring results are presented in Section 2 and Section 3 of this document, respectively. In addition to the semiannual monitoring activities, five wells were decommissioned in 2012, as described in Appendix B. The location of the Site, Site layout, and surface elevations are presented on Figures 1 through 3 in the *O&M Report*.

2.0 SEMIANNUAL NAPL MONITORING

Between February 1993 and April 2011, approximately 6,550 gallons of NAPL were extracted from Site wells. Based on the findings from a NAPL investigation in the Former Waste Disposal Area (FWDA) outside the barrier wall (*Dense Nonaqueous-Phase Liquid (DNAPL) Data Gap Investigation*; Hart Crowser/GSI, 2011) and extensive monitoring of the sediment cap (described in the *Third Five-Year Review Report*; DEQ, 2011), the Oregon Department of Environmental Quality (DEQ) and the U.S. Environmental Protection Agency (EPA) decided to discontinue NAPL extraction on April 20, 2011. Subsequent monitoring of the post-extraction NAPL thicknesses in the FWDA was conducted in 2011 (Hart Crowser/GSI, 2011) and the results supported the regulatory decision and confirmed that the residual NAPL in the FWDA is isolated and stable and does not pose a risk to the Willamette River. To confirm that this remains the case and to continue to evaluate the functional performance of the barrier wall and soil cap, NAPL measurements were collected as part of the Site-wide semiannual monitoring events in 2012.

2.1 NAPL Gauging

Figure A-1 shows the location of the 74 onsite wells and 5 offsite wells included in the Site-wide NAPL gauging and water level monitoring event on June 19, 2012. Between July 30 and August 2, 2012, five monitoring wells (EW-9s, MW-2s, MW-3s, MW-18s, and MW-Ks) were decommissioned as described in Appendix B, and were not included in the second semiannual monitoring event on October 22, 2012.

Measurable NAPL was present in 14 of the Site wells gauged semiannually in 2012 (EW-1s, EW-2s, EW-8s, EW-9s, EW-10s, EW-15s, EW-18s, EW-23s, MW-10r, MW-20i, MW-22i, MW-56s, MW-Ds, and MW-Gs). The locations of wells that contained measureable quantities of light NAPL (LNAPL) and/or dense NAPL (DNAPL) for the June and October 2012 monitoring events are shown on Figures A-2 and A-3, respectively. Tables A-1 and A-2 provide semiannual NAPL gauging measurements. Figures A-4 through A-15 show the NAPL and groundwater elevations versus time in individual wells that routinely contain NAPL. The screened interval elevations and the well depth also are shown. The thickness of LNAPL can be calculated by subtracting the LNAPL elevation (when LNAPL is present) from the groundwater elevation. Similarly, the DNAPL thickness is represented by the difference between the DNAPL elevation and the well depth elevation.

2.2 LNAPL Observations

2.2.1 Outside the Barrier Wall

The only well with measureable LNAPL outside the barrier wall is EW-10s. The NAPL and groundwater elevations since 1999 in well EW-10s are shown in Figure A-4. The vertical red line denotes the date at which NAPL recovery was discontinued on April 21, 2011. Historically, the LNAPL triggering the product interface probe used to measure thickness has been shown to be discrete pin-sized globules floating within the uppermost portion of the water table, not a layer of pure LNAPL floating on the water table. Nevertheless, no greater thicknesses of LNAPL have been observed in EW-10s since NAPL recovery discontinued in FWDA outside the barrier wall.

Trace amounts of LNAPL was observed in wells MW-Ds and MW-Gs in 2012 (product was observed on the probe when extracted from the well, but was not measureable).

2.2.2 Inside the Barrier Wall

During semiannual monitoring in 2012, measurable LNAPL was present in the following wells within the barrier wall: EW-15s, EW-23s, and MW-56s. Figures A-5 through A-7 show the elevation of LNAPL and shallow groundwater in these wells versus time, respectively. As can be seen in the figures, LNAPL thickness is generally greater when the groundwater elevation is low. This is the result of gravity drainage of LNAPL through the vadose zone when the water table drops. This pattern is consistent from mid-2006 through the end of 2012 because LNAPL was not recovered inside of the barrier wall in this time-frame (i.e., LNAPL thickness was not disturbed by recovery). Although the LNAPL thickness varies cyclically with changes in the groundwater elevation, the pattern and LNAPL thickness in wells EW-15s and EW-23s has remained consistent. The LNAPL thickness observed in well MW-56s has decreased since 2007.

During the June 19, 2012, semiannual monitoring event, monitoring well MW-10r had a LNAPL thickness of 0.2 foot (ft). LNAPL has not been observed in this well since March 2009. No LNAPL was observed in the October 22, 2012, semiannual monitoring event.

Overall, LNAPL appears to be stable and there is no evidence of its mobility either across the barrier wall or to the Willamette River.

2.3 DNAPL Observations

2.3.1 Outside the Barrier Wall

Measurable DNAPL was regularly present in wells MW-20i, MW-Ds, and MW-Gs, located outside the barrier wall as shown on Figures A-8, A-9, and A-10, respectively. DNAPL thickness appears to be decreasing in MW-20i and has remained stable in MW-Ds and MW-Gs since NAPL recovery was discontinued in 2011.

DNAPL also was present (less than 1 foot thick) in the sump of well EW-9s since April 2011 (Figure A-11). This is likely associated with subsurface disturbances caused during the DNAPL Data Gap Investigation. The DNAPL in the well has not increased since NAPL recovery was discontinued and the monitoring well was decommissioned on August 1, 2012.

No NAPL was observed in wells MW-34i, EW-19s, MW-60d, or in the MW-58 or MW-37 well clusters. This is consistent with historic observations and supports the conclusion that DNAPL observed in the FWDA is localized and stable. There

is no evidence of DNAPL mobility either across the barrier wall or to the Willamette River.

2.3.2 Inside the Barrier Wall

DNAPL was detected during the 2012 semiannual monitoring events within the barrier wall near the former Tank Farm Area (TFA) in wells EW-1s, MW-22i, EW-8s, and EW-18s as shown on Figures A-12 through A-15, respectively.

Figure A-12 shows the DNAPL and groundwater elevations in well EW-1s since 2009. After DNAPL extraction was discontinued in April 2011, the thickness increased to approximate 6 ft relatively quickly. Since mid-2011, it has slowly increased to approximately 7 ft in October 2012. Approximately 6 ft of DNAPL was measured in EW-1s in March 2009. As mentioned in previous reports, DNAPL extraction from this well was initiated to reduce the potential for vertical mobility resulting from decreased NAPL viscosity caused by high subterraneous temperatures (35 to 40 degrees Celsius [°C]) in this area. In May 2009, this well was sealed to prevent oxygen from reaching the unsaturated zone and feeding aerobic degradation. The temperature decreased to approximately 25°C within a year and has remained between 23°C and 25°C in 2012. The increase in temperature in the latter half of 2012 is typical of annual variations in groundwater temperature measured in the Site wells. While the groundwater temperature at EW-1s is still elevated relative to groundwater from other Site wells, it is well below the temperature observed when active aerobic degradation resulted in ground subsidence, suggesting that the well seal continues to reduce the amount of oxygen reaching the subsurface. This is discussed further in Section 3.1 of this appendix.

Figure A-13 shows the DNAPL thickness versus time for well MW-22i. The DNAPL thickness continues to be measured as approximately 6 ft; however, historically, these measurements have been shown through extraction to be triggered by the presence of floating pin-sized globules of DNAPL and not a 6-foot-thick layer of pure DNAPL.

Figure A-14 presents the DNAPL thickness versus time for well EW-8s. Unlike the previous 4 years, when the DNAPL thickness varied directly with the shallow groundwater elevation, the DNAPL thickness in EW-8s was relatively consistent during the June and October 2012 semiannual monitoring events.

The DNAPL thickness over time for monitoring well EW-18s is shown on Figure A-15. DNAPL is present in the well sump and has remained so during 2012.

Overall, DNAPL appears to be stable and there is no evidence of its mobility either across the barrier wall or to the Willamette River.

3.0 SEMIANNUAL GROUNDWATER MONITORING

Low tide groundwater monitoring was changed from quarterly to semiannual in 2010. Groundwater monitoring methodology remained the same and consisted of manual water level gauging from all monitoring wells located at the Site and on the adjacent Burlington Northern and Metro (Willamette Cove area) properties, and collecting continuous automated transducer data from a subset of the wells. In June 2012, manual measurements were collected from all 79 monitoring wells. Because five wells were decommissioned between in July and August 2012 (Appendix B), the October semiannual monitoring event was conducted on the remaining 74 monitoring wells. Groundwater monitoring data are used to understand groundwater flow conditions inside and outside of the barrier wall. This information is evaluated to determine whether the barrier wall and impermeable Resource Conservation and Recovery Act (RCRA) soil cap are functioning as designed.

3.1 Water Level Measurements

Manual measurements of static groundwater levels were conducted on June 19 and October 22, 2012. These measurements were collected during and shortly after periods of low tide in the Willamette River. Shallow groundwater elevation contour maps were developed for each semiannual event (Figures A-16 and A-17). The groundwater elevation data are included in Table A-1 for measurements collected June 19, 2012, and Table A-2 for measurements collected October 22, 2012.

In addition to the manual measurements from monitoring wells, groundwater data also were collected on a 30-minute basis using pressure transducers at select monitoring wells surrounding the barrier wall. All of the transducers from the Site were sent for servicing between mid-February and mid-April 2012. Transducers were reinstalled in the wells specified in the revised draft *Operation and Maintenance Plan* (*O&M Plan*) prepared by the DEQ in April 2012 (DEQ, 2012). This plan reflects the reduced long-term monitoring needs at the Site, and includes a reduction in the number of wells containing transducers. In accordance with the *O&M Plan*, transducers were not re-installed in interior well MW-15s, and the intermediate wells MW-36i, MW-37i, MW-44i, and MW-45i.

On April 27, 2012, transducers were reinstalled in 11 Site wells as shown on Figures A-16 and A-17. Eight wells with transducers are located along the

riverfront portion of the barrier wall, in the shallow and deep wells in well clusters MW-36, MW-37, MW-44, and MW-45. Transducers also monitored the upland side of the barrier wall in wells MW-52s and MW-53s and interior well EW-1s to monitor groundwater conditions inside the barrier wall.

Historic and annual hydrographs were prepared using the transducer data from paired monitoring wells as shown on Figures A-18 through A-25. The hydrographs compare water-level elevations for selected well sets, river stage elevation, and precipitation data. The hydrographs show water levels in wells through the October 22, 2012, semiannual monitoring event. Water level data beyond this date will be included in the 2013 Annual O&M Report.

River stage data were also recorded on a 30-minute basis from U.S. Geological Survey (USGS) station number 14211720 (USGS, 2011a). This station is located on the upstream side of the Morrison Bridge (River Mile [RM] 12.8). River stage elevation data reported by the USGS are relative to the Portland River Datum at this location. The river stage data are corrected to North American Vertical Datum of 1988 (NAVD88) at the Site (approximately RM 7) by adding 5.001 ft to the USGS reading.

Precipitation data shown on Figures A-18 through A-25 were obtained from the Astor Elementary School rain gage located approximately 0.5 mile from the Site. Daily totals were obtained from the City of Portland Hydra Network available on the USGS Web site (USGS, 2011b).

3.2 Shallow Groundwater Flow Direction and Horizontal Gradients

As shown in the shallow groundwater contour maps (Figures A-16 and A-17), the shallow horizontal groundwater gradient within the barrier wall is independent of the gradient outside the barrier wall demonstrating that the barrier wall has effectively cut off the hydraulic connection between the shallow groundwater zone inside and outside of the barrier wall.

Since the installation of the barrier wall in 2003, the upland (easterly) groundwater elevations are higher outside of the barrier wall than inside because of the impediment, which deflects groundwater flow horizontally around the barrier wall from upland areas. Before construction of the barrier wall, groundwater flowed directly from the bluff to the Willamette River. After the barrier wall construction and before installation of the impermeable soil cap, the elevation differences between the exterior upland shallow well MW-53s and its interior counterpart, MW-52s, fluctuated from approximately 0.25 ft to 2 ft (Figure A-18). After construction of the impermeable RCRA soil cap in late 2005, the elevation difference inside versus outside the barrier wall increased to a range of 3 to 6 ft as

a result of a decrease in shallow groundwater elevations inside the barrier wall. The separation observed in 2012 ranged from approximately 1.8 to 5.3 ft as shown on Figure A-19. This verifies that placement of the RCRA soil cap within the barrier wall resulted in a significant reduction in rainwater entering the barrier wall. Limited water enters into the barrier wall through precipitation infiltration within the riparian zone and water enters from beneath the barrier wall along the river between the MW-36/37 and MW-40/41 well clusters where the barrier wall is completed in sands, not the massive silt unit into which the remaining portion of the barrier wall is completed. However, it continues to be clear that the shallow groundwater inside is not directly hydraulically connected to the shallow groundwater outside the barrier wall based on the large differences in shallow groundwater elevation between the interior and exterior wells.

The shallow groundwater horizontal gradient inside the barrier wall is flat (typically less than 0.002 feet per foot [ft/ft]) compared to the shallow horizontal gradient (ranging from 0.002 ft/ft to 0.03 ft/ft) outside the barrier wall. The groundwater contour map from October 22, 2012 (Figure A-17), is representative of groundwater conditions throughout the majority of the year, as indicated by the flat westerly gradient within the barrier wall and the slightly steeper groundwater gradients outside the barrier wall directed westerly to southwesterly toward the Willamette River and Willamette Cove.

When the Willamette River reaches peak stage (greater than approximately 15 ft NAVD88), which typically occurs during one or more events each June, it induces a partial reversal of gradient within the northwest corner of the barrier wall because of the deep hydraulic connection through sands discussed above and the change in hydraulic head that the high river level induces. The semiannual monitoring event on June 19, 2012, took place between peak stage events at a low-tide elevation of 14.1 ft NAVD88 when the gradient within the barrier wall was flat (approximately 0.0003 ft/ft) (Figure A-16). The hydrographs of the interior wells EW-1s and MW-36s (Figures A-20 and A-21) confirm that there was a partial reversal in the shallow groundwater gradient as the water levels near MW-36s rose above the water levels in EW-1s in late April and early May 2012 and a generally flat gradient between May and July 2012.

The frequent fluctuations (~1-foot oscillations) observed in 2008 and 2009 in well EW-1s, shown in Figure A-20, were caused by gas produced from the degradation of the wood debris buried at the Site escaping through this well. The elevated shallow groundwater temperatures in EW-1s reflect aerobic oxidation of wood and creosote constituents observed in this area. The oxidation process was initiated via the introduction of oxygen through the well screen in the unsaturated zone of EW-1s when water levels within the barrier wall dropped after construction of the RCRA cap. To slow biodegradation and

reduce temperatures, an airtight seal was installed in the well on May 18, 2009. As shown on Figure A-20, temperatures peaked at 38.8°C on July 6, 2009, and steadily declined to between 23°C and 25°C in 2012. A reduction in oscillations indicating a reduction in gas production was noted after well EW-1s was sealed, preventing oxygen from reaching the subsurface. As discussed in Appendix B of this report, the subsidence has been insignificant since EW-1s was sealed.

3.3 Vertical Gradients

Vertical gradients inside and outside the barrier wall along the Willamette River were observed in monitoring well clusters MW-36/MW-37 and MW-44/MW-45. The hydrographs for these wells (Figures A-22 through A-25) indicate that the deep groundwater zone is in direct hydraulic connection with the river. The deep zone both inside and outside of the barrier wall closely mimics the river stage both in elevation and timing with a small vertical gradient that varies between upward and downward with the tidal changes. The exterior shallow wells, also in hydraulic connection with the river, show about a quarter cycle delay from river fluctuations and have dampened amplitude in comparison with the deeper wells.

The fact that the response of the interior shallow wells is either muted or non-existent in comparison with the intermediate and deep zone wells suggests a clear hydraulic disconnect between the shallow aquifer within the barrier wall and the deeper water-bearing zones. The location where the response is greatest, but still significantly muted, is in well MW-36s (Figures A-22 and A-23) where a hydraulic connection exists at the base of the barrier wall. In contrast to the muted response of MW-36s to changes in daily river stage elevation, water levels in the shallow interior well MW-44s (Figures A-24 and A-25) are virtually non-responsive to the tidal changes in Willamette River stage. This is reflective of the presence of a confining layer between the shallow and intermediate zones in the vicinity of MW-44s.

Although precipitation in the Willamette River watershed ultimately affects the stage of the river, direct precipitation near the Site appears to play a minor role in determining the water levels of wells within the barrier wall and along the river. The RCRA soil cap was designed to divert precipitation so that little infiltration occurs within the barrier wall. Although some infiltration occurs along the fringes of the soil cap and within the riparian zone, the amount of infiltration is minimal. Between the barrier wall and the river, precipitation inputs are vastly overshadowed by the response of groundwater to variations in river stage. The shallow zone upgradient or cross-gradient from the barrier wall appears to react subtly to precipitation and is less connected to the river because of its distance from the river and the presence of barrier wall, which is sealed into the

underlying silt. One location where infiltration may influence groundwater elevations and flow paths is in the infiltration pond that receives diverted runoff from the soil cap. Figure A-16 shows that the groundwater gradient in this area is flat, and that there may be a slight groundwater mound in this area east of the soil cap.

The net vertical gradients between the shallow and deep zones have been calculated (when possible) using the transducer data available for each well cluster between January 1, 2012, to October 22, 2012, and are presented in Table A-3. In interior well clusters MW-36 and MW-44, the net annual vertical gradient is downward between the shallow zone and deep zones. The net downward gradient is greater inside the barrier wall (MW-36 and MW-44 clusters) because the net shallow groundwater elevation inside the barrier wall continues to be slightly elevated compared to the net river elevation. While outside the barrier wall, in well cluster MW-37, the net annual vertical gradient is slightly upward between the shallow zone and deep zone, whereas in MW-45, the vertical gradient is slightly downward. The net vertical gradient outside the barrier wall is small and varies between upward and downward according to the trends of the Willamette River. Upward vertical gradients were observed when the river stage was at a higher elevation for a prolonged period of time during 2012. The vertical gradients in 2012 were comparable (in both direction and magnitude) to the gradients observed in 2008 through 2011, but the lack of transducer data for the entire year results in calculated net gradients that differ somewhat from those reported in previous annual reports.

4.0 SUMMARY

Hydraulic conditions at the Site in 2012 are consistent with previous years verifying that the remedy continues to function as designed.

Based on the findings from the *DNAPL Data Gap Investigation* (Hart Crowser/GSI, 2011), subsequent monitoring of the post-extraction NAPL thicknesses in wells in the FWDA, extensive monitoring of the sediment cap (described in the *Third Five-Year Review Report*; DEQ, 2011), and the 2012 monitoring data, the decision to discontinue NAPL recovery at the Site is justified, and residual NAPL remaining in the FWDA does not pose a threat to the Willamette River. NAPL gauging and water level monitoring are conducted semiannually.

The June 2012 shallow groundwater elevations and gradients were slightly flatter than other years because there were several discrete peak flow periods in the Willamette River between April and July 2012, rather than one prolonged peak stage that has been characteristic of the river of the past several years. During

this time period, partial gradient reversals were observed inside the barrier wall. By October 2012, the river levels had subsided and groundwater elevations and gradients returned to conditions similar to previous findings at the Site. Horizontal gradients outside the barrier wall are greatest during periods of high precipitation and decrease during periods of low precipitation. Groundwater gradients inside the barrier wall remain flat and generally to the west (except when peak river stage causes a reversal in gradient), while outside and upgradient of the wall, shallow groundwater flow is diverted from around the barrier wall towards the Willamette River and Willamette Cove. While most of the monitoring wells mimic the stage variations in the Willamette River, the oscillations in the shallow interior walls are delayed and muted and likely are the result of changes in pressure at depth rather than a hydraulic connection to the river. The large differences in shallow groundwater elevations within the barrier wall compared to directly outside the barrier wall indicate that these zones are hydraulically separate. Under stable river conditions, vertical groundwater gradients generally are downward inside the barrier wall in the FWDA and former TFA, with the exception of upward gradients observed during high river levels in the former TFA.

Based on the observations made through calendar year 2012, it appears that the barrier wall and impermeable soil cap are functioning as designed: groundwater flow and rainwater infiltration are diverted around source areas contained within the barrier wall, and NAPL contained within the barrier wall is prohibited from migrating to the Willamette River.

5.0 RECOMMENDATIONS AND NEXT STEPS

In September 2011, DEQ and EPA determined that the remedy is performing as designed and is protective of human health and the environment. As a result, long-term monitoring needs have been reduced as specified in the revised 2012 *Draft O&M Plan* (DEQ, 2012). The semiannual monitoring events in 2012 were conducted in accordance with this revised *O&M Plan*. Future monitoring will continue according to this plan.

6.0 REFERENCES

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Table A-1 - Groundwater and NAPL Elevations: June 19, 2012
McCormick and Baxter Superfund Site
Portland, Oregon

Well ID	Date	Time	Measuring Point Elevation (ft NAVD88)	Depth to LNAPL (ft)	Depth to water (ft)	Depth to DNAPL (ft)	LNAPL Thickness (ft)	DNAPL Thickness (ft)	Groundwater Elevation LNAPL Corrected (ft NAVD88)
EW-1s	6/19/2012	16:08	40.1		24.2	41.3		5.6	15.9
EW-2s	6/19/2012	15:06	42.4		27.9				14.5
EW-8s	6/19/2012	16:02	40.5		24.7	52.7		2.0	15.8
EW-9s	6/19/2012	15:00	40.8		26.4	45.8		0.6	14.4
EW-10s	6/19/2012	14:37	29.4	15.2	16.8		1.6		14.2
EW-15s	6/19/2012	15:14	43.0	27.7	28.9		1.2		15.3
EW-18s	6/19/2012	16:20	40.7		25.0	42.7		2.0	15.8
EW-19s	6/19/2012	14:35	25.9		11.6				14.3
EW-23s	6/19/2012	15:21	37.6	22.5	23.4		1.0		15.1
MW-1r	6/19/2012	15:50	37.6		21.8				15.8
MW-2s	6/19/2012	16:53	38.3		22.2				16.1
MW-3s	6/19/2012	16:43	30.6		12.7				17.9
MW-7 WC	6/19/2012	17:01	36.7		20.9				15.8
MW-10r	6/19/2012	15:36	41.9		26.1				15.8
MW-15s	6/19/2012	15:33	43.3		27.5				15.7
MW-17s	6/19/2012	16:08	41.3		22.5[a]				18.7[a]
MW-18s	6/19/2012	14:27	43.1		28.8				14.3
MW-20i	6/19/2012	14:52	41.4		27.3	71.5		3.2	14.1
MW-22i	6/19/2012	15:48	42.3		28.0	52.2		6.8	14.3
MW-23d	6/19/2012	15:31	41.1		26.4				14.6
MW-32i	6/19/2012	14:28	39.3		23.7				15.6
MW-34i	6/19/2012	15:54	32.7		18.5				14.1
MW-35r	6/19/2012	17:07	32.3		17.6				14.6
MW-36d	6/19/2012	14:55	30.5		16.4				14.1
MW-36i	6/19/2012	14:53	30.2		16.1				14.0
MW-36s	6/19/2012	14:50	30.7		15.5				15.3
MW-37d	6/19/2012	14:47	26.1		12.0				14.1
MW-37i	6/19/2012	14:44	25.9		11.8				14.1
MW-37s	6/19/2012	14:40	24.9		10.7				14.2
MW-38d	6/19/2012	15:02	31.8		17.7				14.1
MW-38i	6/19/2012	14:59	32.1		17.8				14.2
MW-38s	6/19/2012	14:57	32.3		17.0				15.3
MW-39d	6/19/2012	15:10	29.8		15.7				14.1
MW-39i	6/19/2012	15:07	30.1		16.0				14.1
MW-39s	6/19/2012	15:05	29.8		15.5				14.2
MW-40d	6/19/2012	15:59	28.7		14.7				14.0
MW-40i	6/19/2012	15:56	28.7		14.6				14.2
MW-40s	6/19/2012	15:53	28.3		12.8				15.5
MW-41d	6/19/2012	16:08	27.4		13.5				14.0
MW-41i	6/19/2012	16:05	27.1		13.0				14.1
MW-41s	6/19/2012	16:02	27.8		13.5				14.3
MW-42d	6/19/2012	15:40	32.2		18.1				14.1
MW-42i	6/19/2012	15:38	32.7		18.5				14.1
MW-42s	6/19/2012	15:35	32.4		16.7				15.7
MW-43d	6/19/2012	15:48	28.3		14.2				14.2
MW-43i	6/19/2012	15:45	30.3		16.2				14.1
MW-43s	6/19/2012	15:43	31.1		16.9				14.2
MW-44d	6/19/2012	15:19	29.6		15.1				14.5
MW-44i	6/19/2012	15:16	29.3		15.3				14.0
MW-44s	6/19/2012	15:14	29.6		13.9				15.7
MW-45d	6/19/2012	15:27	27.9		13.7				14.2
MW-45i	6/19/2012	15:30	28.0		13.9				14.1

Table A-1 - Groundwater and NAPL Elevations: June 19, 2012
McCormick and Baxter Superfund Site
Portland, Oregon

Well ID	Date	Time	Measuring Point Elevation (ft NAVD88)	Depth to LNAPL (ft)	Depth to water (ft)	Depth to DNAPL (ft)	LNAPL Thickness (ft)	DNAPL Thickness (ft)	Groundwater Elevation LNAPL Corrected (ft NAVD88)
MW-45s	6/19/2012	15:24	28.2		13.9				14.3
MW-46s	6/19/2012	16:35	35.5		19.8				15.8
MW-47s	6/19/2012	16:30	35.5		21.0				14.5
MW-48s	6/19/2012	17:05	38.7		23.2				15.5
MW-49s	6/19/2012	17:03	37.6		17.5				20.1
MW-50s	6/19/2012	15:29	39.3		23.2				16.0
MW-51s	6/19/2012	15:27	39.5		19.1				20.4
MW-52s	6/19/2012	16:42	40.7		24.9				15.8
MW-53s	6/19/2012	16:40	40.4		20.9				19.5
MW-54s	6/19/2012	16:25	41.8		26.0				15.8
MW-55s	6/19/2012	16:30	41.0		23.8				17.3
MW-56s	6/19/2012	15:20	43.5	28.0	28.0		Trace		15.5
MW-57s	6/19/2012	16:15	42.0		27.3				14.8
MW-58d	6/19/2012	17:16	41.4		27.1				14.3
MW-58i	6/19/2012	17:15	41.0		27.0				14.0
MW-58s	6/19/2012	17:15	41.5		27.2				14.3
MW-59s	6/19/2012	16:48	35.9		18.0				17.9
MW-60d	6/19/2012	14:33	40.1		25.9				14.1
MW-61s	6/19/2012	16:58	43.6		25.7				17.9
MW-62i	6/19/2012	17:24	42.6		28.3				14.4
MW-As	6/19/2012	14:26	39.3		20.0				19.3
MW-Ds	6/19/2012	15:10	42.9	26.5[b]	26.5[b]	36.6	Trace	2.1	16.4[b]
MW-Gs	6/19/2012	14:40	40.2	25.0	25.0	42.5	Trace	2.2	15.2
MW-Ks	6/19/2012	16:46	44.1		25.9				18.2
MW-Os	6/19/2012	14:57	40.9		20.7				20.2
PW-1d	6/19/2012	14:47	44.0		28.4				15.6
PW-2d	6/19/2012	14:52	41.8		26.2				15.6

LNAPL specific gravity estimated as 0.981 g/cm^3

[a] This measurment in MW-17s is suspect and appears to be about 3 feet off from surrounding wells. This well was not included in construction of the contour map (Figure A-16).

[b] This measurment in MW-Ds is suspect and appears to be about 2 feet off from surrounding wells. This well was not included in construction of the contour map (Figure A-16).

Table A-2 - Groundwater and NAPL Elevations: October 22, 2012
McCormick and Baxter Superfund Site
Portland, Oregon

Well ID[a]	Date	Time	Measuring Point Elevation (ft NAVD88)	Depth to LNAPL (ft)	Depth to water (ft)	Depth to DNAPL (ft)	LNAPL Thickness (ft)	DNAPL Thickness (ft)	Groundwater Elevation LNAPL Corrected (ft NAVD88)
EW-1s	10/22/2012	10:42	40.1		25.7	41.2		5.8	14.4
EW-2s	10/22/2012	8:55	42.4		33.8	44.6		2.0	8.5
EW-8s	10/22/2012	10:36	40.5		26.5	52.9		1.9	13.9
EW-10s	10/22/2012	8:40	29.4	22.3	22.3	42.1	Trace	0.5	7.2
EW-15s	10/22/2012	9:25	43.0	31.4	37.8		6.4		11.5
EW-18s	10/22/2012	10:30	40.7	26.8	26.8	42.8	Trace	1.9	14.0
EW-19s	10/22/2012	8:34	25.9		17.9				8.0
EW-23s	10/22/2012	9:33	37.6	26.7	30.6		3.8		10.8
MW-1r	10/22/2012	10:20	37.6		26.2				11.4
MW-7 WC	10/22/2012	11:58	36.7		26.0				10.7
MW-10r	10/22/2012	9:55	41.9	27.9	28.2		0.2		13.9
MW-15s	10/22/2012	12:48	43.3		29.9				13.4
MW-17s	10/22/2012	11:21	41.3		28.1				13.2
MW-20i	10/22/2012	8:48	41.4		35.0	71.8		2.9	6.5
MW-22i	10/22/2012	9:50	42.3		34.9	52.8		6.1	7.3
MW-23d	10/22/2012	12:42	41.1		31.6				9.4
MW-32i	10/22/2012	8:14	39.3		27.9				11.5
MW-34i	10/22/2012	12:58	32.7		23.7				8.9
MW-35r	10/22/2012	12:02	32.3		23.2				9.1
MW-36d	10/22/2012	11:55	30.5		21.9				8.5
MW-36i	10/22/2012	11:56	30.2		21.7				8.5
MW-36s	10/22/2012	11:58	30.7		19.6				11.2
MW-37d	10/22/2012	11:44	26.1		17.6				8.5
MW-37i	10/22/2012	11:48	25.9		17.5				8.4
MW-37s	10/22/2012	11:50	24.9		17.1				7.8
MW-38d	10/22/2012	11:35	31.8		23.4				8.4
MW-38i	10/22/2012	11:25	32.1		24.6				7.4
MW-38s	10/22/2012	11:26	32.3		20.5				11.9
MW-39d	10/22/2012	11:32	29.8		21.5				8.4
MW-39i	10/22/2012	11:30	30.1		21.9				8.2
MW-39s	10/22/2012	11:20	29.8		21.5				8.3
MW-40d	10/22/2012	10:52	28.7		21.1				7.6
MW-40i	10/22/2012	10:53	28.7		21.7				7.1
MW-40s	10/22/2012	10:56	28.3		16.2				12.1
MW-41d	10/22/2012	11:08	27.4		19.7				7.8
MW-41i	10/22/2012	11:05	27.1		14.5				12.6
MW-41s	10/22/2012	10:58	27.8		19.7				8.1
MW-42d	10/22/2012	10:35	32.2		24.8				7.4
MW-42i	10/22/2012	10:30	32.7		25.4				7.3
MW-42s	10/22/2012	10:27	32.4		14.1				18.2
MW-43d	10/22/2012	10:30	28.3		22.7				5.6
MW-43i	10/22/2012	10:43	30.3		23.0				7.4
MW-43s	10/22/2012	10:38	31.1		21.7				9.4
MW-44d	10/22/2012	10:15	29.6		22.2				7.4
MW-44i	10/22/2012	10:10	29.3		22.2				7.1
MW-44s	10/22/2012	10:20	29.6		15.7				13.9
MW-45d	10/22/2012	9:55	27.9		20.0				7.9
MW-45i	10/22/2012	10:00	28.0		20.9				7.1
MW-45s	10/22/2012	10:05	28.2		20.0				8.2
MW-46s	10/22/2012	9:52	35.5		21.5				14.0
MW-47s	10/22/2012	9:48	35.5		27.3				8.3
MW-48s	10/22/2012	12:20	38.7		23.5				15.2

Table A-2 - Groundwater and NAPL Elevations: October 22, 2012
McCormick and Baxter Superfund Site
Portland, Oregon

Well ID[a]	Date	Time	Measuring Point Elevation (ft NAVD88)	Depth to LNAPL (ft)	Depth to water (ft)	Depth to DNAPL (ft)	LNAPL Thickness (ft)	DNAPL Thickness (ft)	Groundwater Elevation LNAPL Corrected (ft NAVD88)
MW-49s	10/22/2012	12:17	37.6		20.7				16.9
MW-50s	10/22/2012	12:39	39.3		24.6				14.7
MW-51s	10/22/2012	12:34	39.5		22.6				17.0
MW-52s	10/22/2012	12:30	40.7		26.8				13.9
MW-53s	10/22/2012	12:25	40.4		24.5				15.9
MW-54s	10/22/2012	9:08	41.8		28.1				13.7
MW-55s	10/22/2012	9:10	41.0		28.5				12.6
MW-56s	10/22/2012	10:05	43.5	31.3	32.3		1.0		12.2
MW-57s	10/22/2012	9:17	42.0		33.0				9.1
MW-58d	10/22/2012	12:14	41.4		32.8				8.7
MW-58i	10/22/2012	12:25	41.0		32.2				8.8
MW-58s	10/22/2012	12:20	41.5		33.0				8.5
MW-59s	10/22/2012	9:38	35.9		22.7				13.2
MW-60d	10/22/2012	12:05	40.1		31.4				8.6
MW-61s	10/22/2012	11:50	43.6		30.7				12.9
MW-62i	10/22/2012	12:55	42.6		33.7				9.0
MW-As	10/22/2012	8:15	39.3		21.9				17.4
MW-Ds	10/22/2012	9:20	42.9		34.3	36.5		2.2	8.7
MW-Gs	10/22/2012	8:45	40.2	31.9	31.9	42.7	Trace	2.0	8.3
MW-Os	10/22/2012	8:53	40.9		22.4				18.6
PW-1d	10/22/2012	8:43	44.0		32.7				11.3
PW-2d	10/22/2012	8:51	41.8		30.3				11.5

LNAPL specific gravity estimated as 0.981 g/cm^3

[a] Wells EW-9s, MW-2s, MW-3s, MW-18s and MW-Ks were decomissioned between June 30 and August 2, 2012 and are not included in this table.

Table A-3 - Net Annual Vertical Gradients in Monitoring Well Clusters: 2012
McCormick and Baxter Superfund Site
Portland, Oregon

Monitoring Well Cluster ID	2012 Net Annual Vertical Gradient [a] From shallow to deep zone
MW-36 (Interior)	-0.0244[b]
MW-37 (Exterior)	0.0018[c]
MW-44 (Interior)	-0.0423[c]
MW-45 (Exterior)	-0.0005[c]

Notes:
Negative values indicate a net downward hydraulic gradient and positive values indicate a net upward hydraulic gradient.
Vertical gradients in each well cluster could only be calculated for the periods where transducers were present in both the shallow and deep well.
[a] There was a break in all transducer data between mid-February and April 27, 2012 while all transducers were sent into the manufacturer for servicing.
[b] The vertical gradient calculation reflects data collected from January 1, 2012 through February 16, 2012 and from April 27, 2012 through October 22, 2012.
[c] The vertical gradient calculation reflects data collected between April 27, 2012 and October 22, 2012.

LEGEND

- Groundwater Monitoring Wells
- Groundwater Monitoring Wells with Transducers
- Decommissioned Groundwater Monitoring Wells
- Subsurface Barrier Wall

NOTES:

1) Aerial photo taken on September 22, 2006
2) Wells EW-9s, MW-2s, MW-3s, MW-18s, and MW-Ks were decommissioned between June 30 and August 2, 2012

0 200 400

Scale in feet

McCormick and Baxter Superfund Site
Portland, Oregon

Groundwater Monitoring Well Location Map

1/13

HARTCROWSER GSI Water Solutions, Inc.

Figure
A-1

File Path: P:\Portland\205 - OR DEQ\003 - 003 McCormick and Baxter\Project GIS\Project mxds\2012 Annual Report\Figure A-1 Monitoring Well Location Map.mxd

LEGEND

Groundwater Monitoring Wells (Thickness of LNAPL or DNAPL)

- Wells with LNAPL
- Wells with DNAPL
- Wells without LNAPL or DNAPL
- Subsurface Barrier Wall

NOTE:
1) Aerial photo taken on September 22, 2006

0 200 400

Scale in feet

McCormick and Baxter Superfund Site
Portland, Oregon

LNAPL and DNAPL Distribution Map for June 19, 2012 Sampling Event

1/13

HARTCROWSER GSI Water Solutions, Inc.

Figure
A-2

File Path: P:\Portland\205 - OR DEQ\003 - 003 McCormick and Baxter\Project GIS\Project mxds\2012 Annual Report\FigureA-2 LNAPL and DNAPL Map June19 2012.mxd

LEGEND

Groundwater Monitoring Wells (Thickness of LNAPL or DNAPL)

- Wells with LNAPL
- Wells with DNAPL
- Wells without LNAPL or DNAPL
- Decommissioned Monitoring Wells
- Subsurface Barrier Wall

NOTES:

1) Aerial photo taken on September 22, 2006
2) Wells EW-9s, MW-2s, MW-3s, MW-18s, and MW-Ks were decommissioned between June 30 and August 2, 2012

0 200 400

Scale in feet

McCormick and Baxter Superfund Site
Portland, Oregon

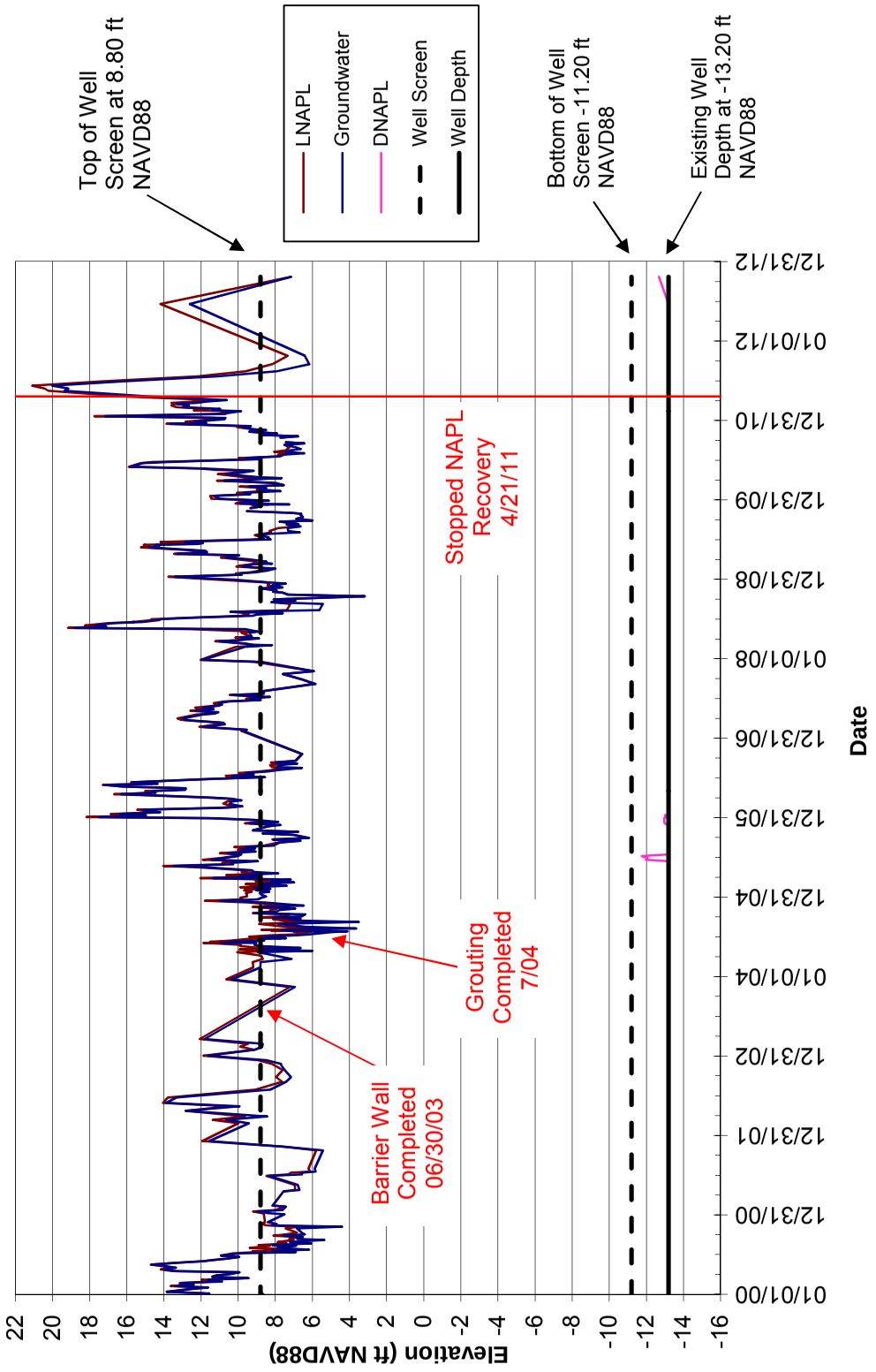
LNAPL and DNAPL Distribution Map for October 22, 2012 Sampling Event

1/13

HARTCROWSER GSI Water Solutions, Inc.

Figure
A-3

File Path: P:\Portland\205 - OR DEQ\003 - 003 McCormick and Baxter\Project GIS\Project mxds\2012 Annual Report\FigureA-3 LNAPL and DNAPL Map Oct22 2012.mxd



McCormick and Baxter Superfund Site
Portland, Oregon

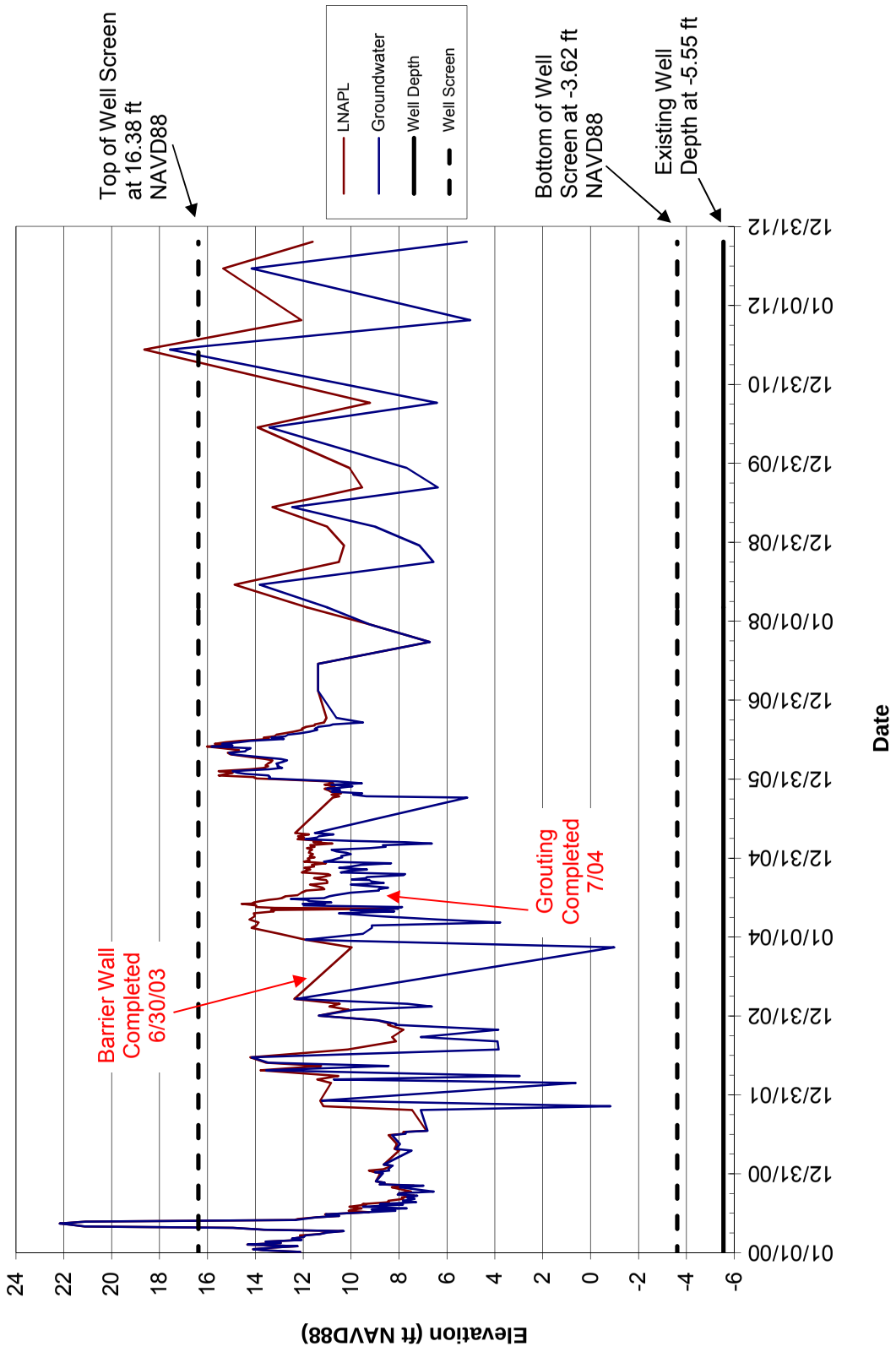
1999 to 2012 NAPL Thickness Plot for Well EW-10s

11/2012

HARTCROWSER GSI Water Solutions, Inc.

Figure

A-4



McCormick and Baxter Superfund Site
Portland, Oregon

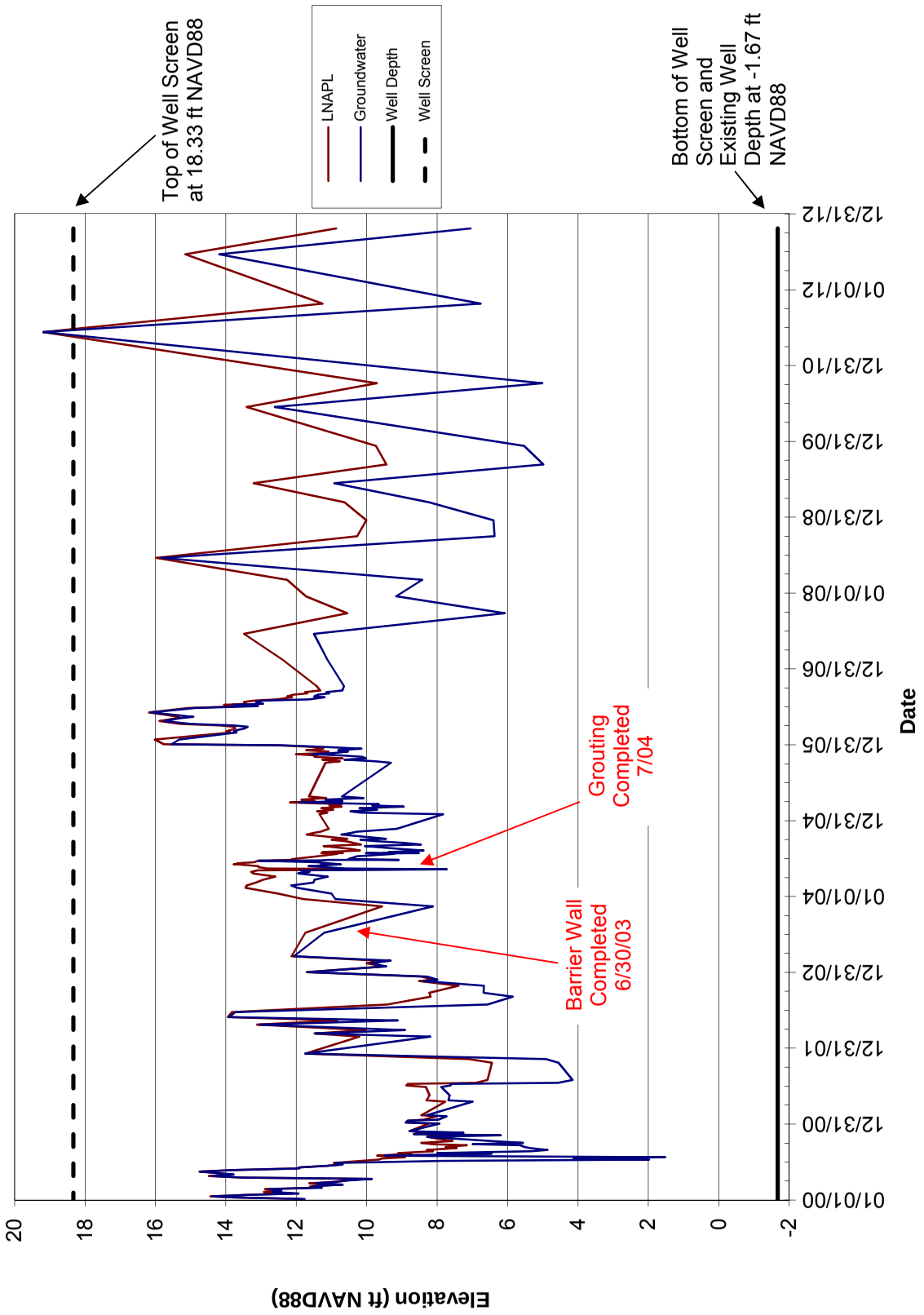
1999 to 2012 NAPL Thickness Plot for Well EW-15s

11/2012

HARTCROWSER GSI Water Solutions, Inc.

Figure

A-5



McCormick and Baxter Superfund Site
Portland, Oregon

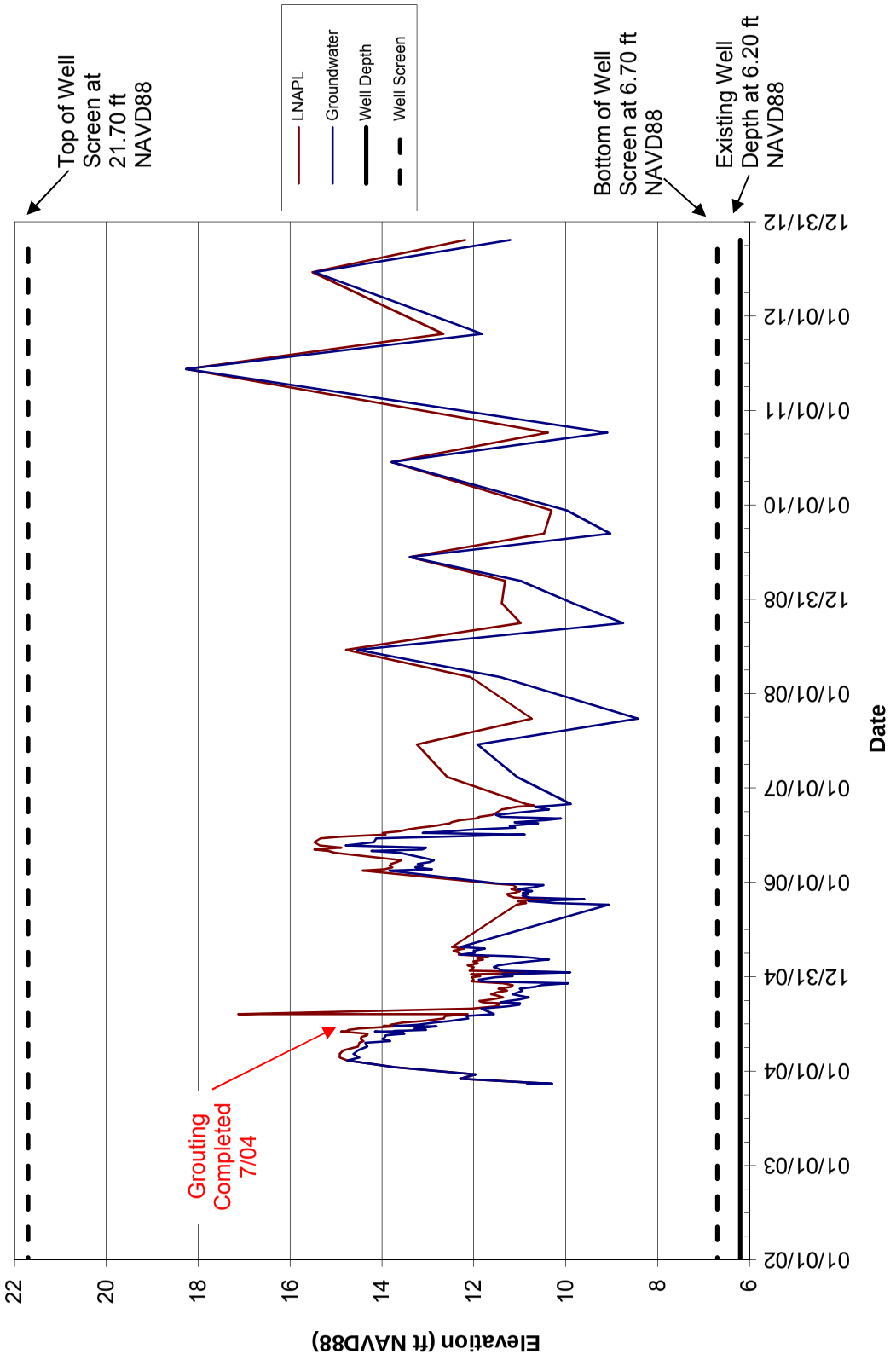
1999 to 2012 NAPL Thickness Plot for Well EW-23s

11/2012

HARTCROWSER GSI Water Solutions, Inc.

Figure

A-6



McCormick and Baxter Superfund Site
Portland, Oregon

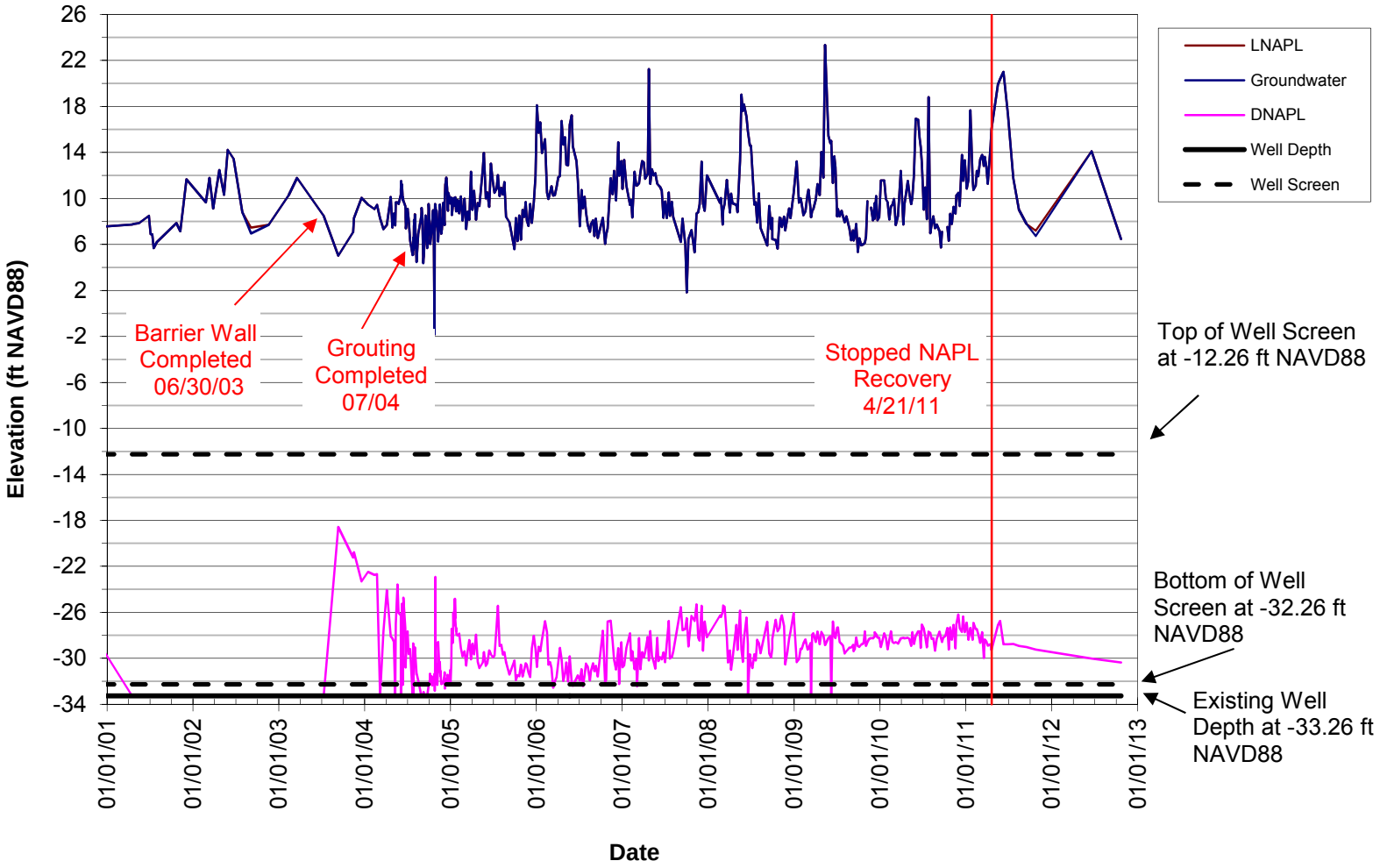
2003 to 2012 NAPL Thickness Plot for Well MW-56s

11/2012

HARTCROWSER GSI Water Solutions, Inc.

Figure

A-7



Note: DNAPL recovery was attempted in July 2007 but the extracted liquid appeared to be water with speck sized globules of DNAPL (with a creosote odor), rather than a distinct layer, suggesting that the DNAPL thicknesses measured may not accurately reflect the amount of DNAPL in the well.

2001 to 2012 NAPL Thickness Plot for Well MW-20i

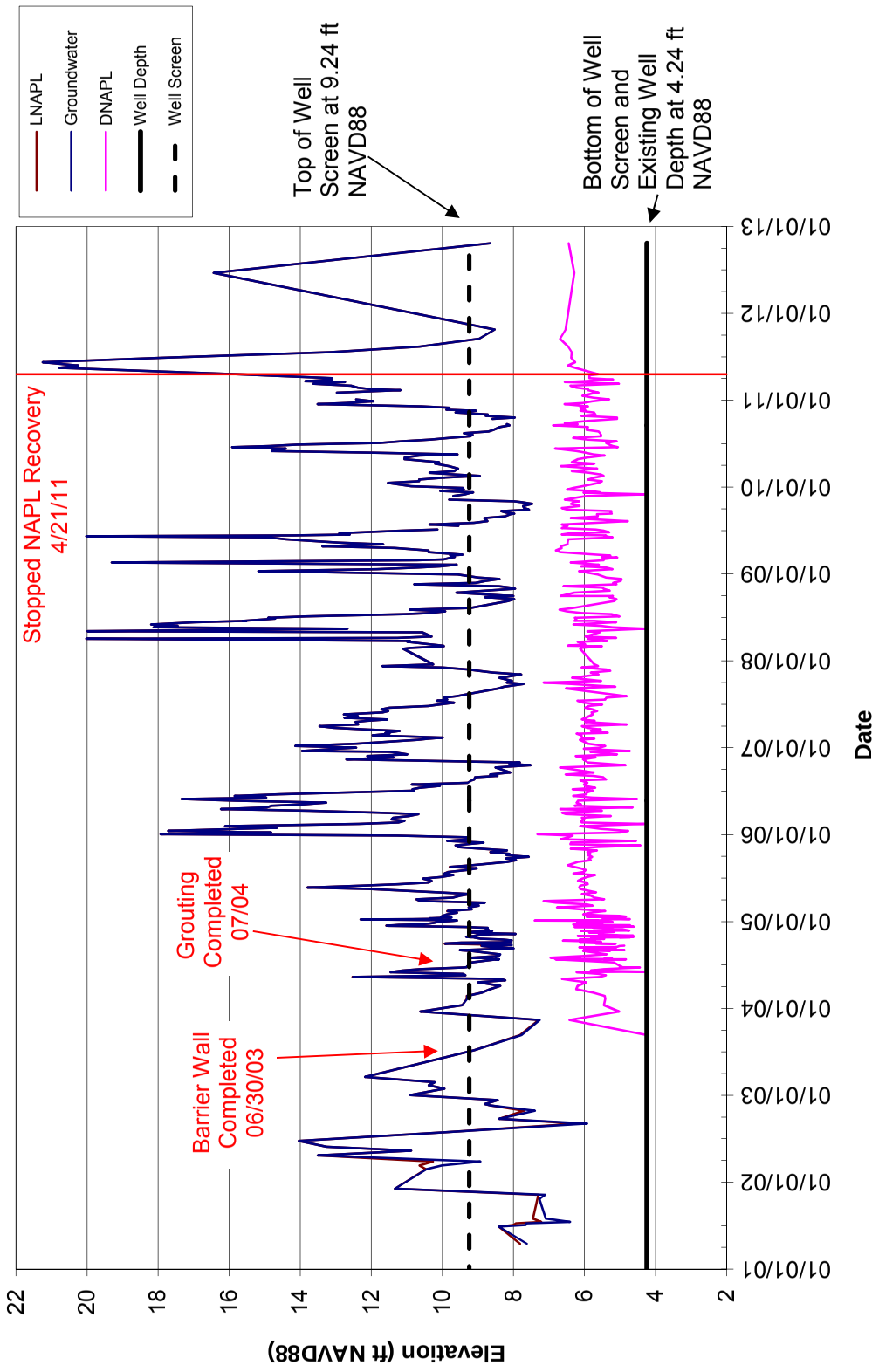
McCormick and Baxter Superfund Site
Portland, Oregon

11/2012

Figure **A-8**

HARTCROWSER

GSI Water Solutions, Inc.



McCormick and Baxter Superfund Site
Portland, Oregon

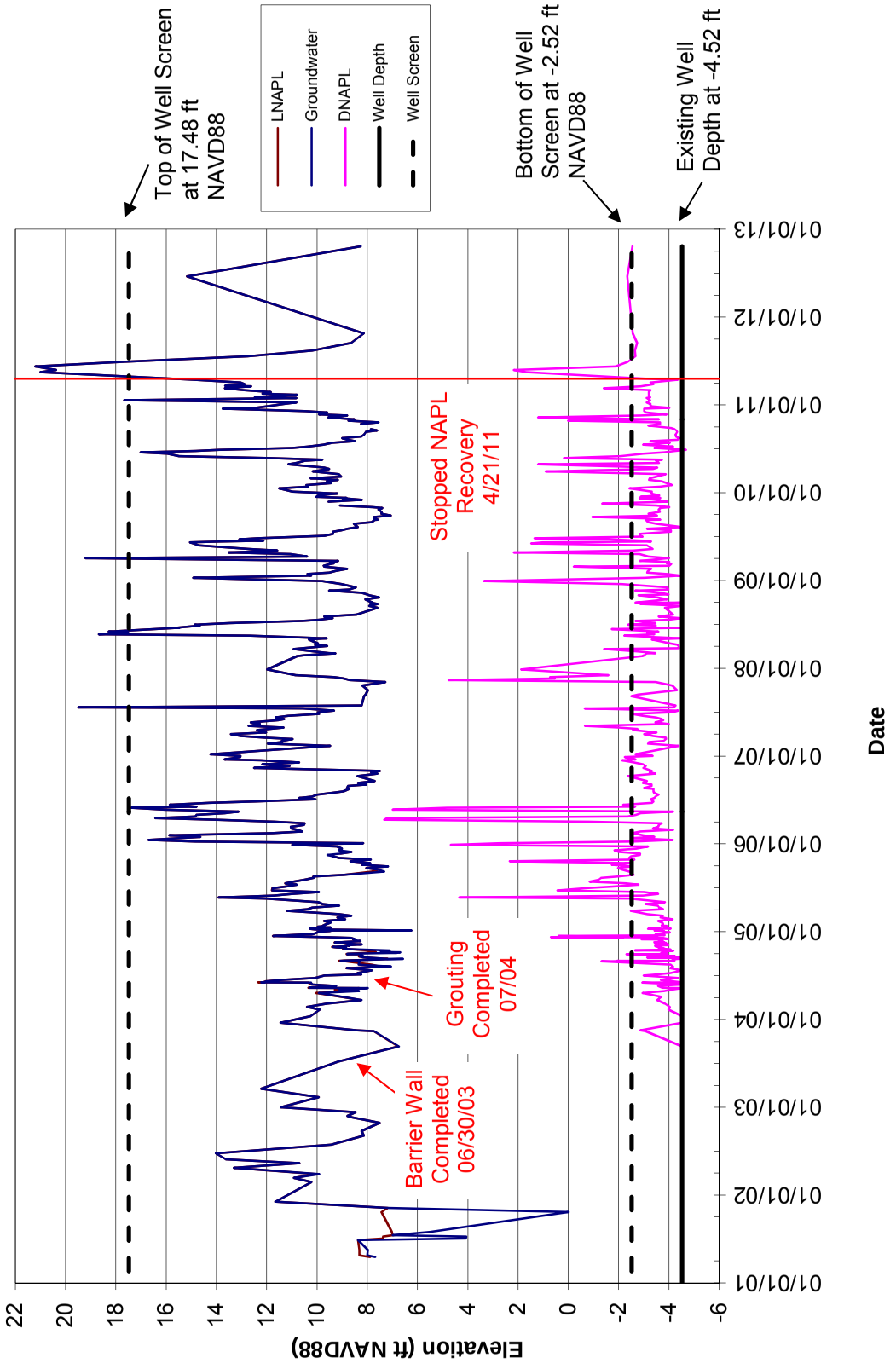
2001 to 2012 NAPL Thickness Plot for Well MW-Ds

11/2012

HARTCROWSER GSI Water Solutions, Inc.

Figure

A-9



McCormick and Baxter Superfund Site
Portland, Oregon

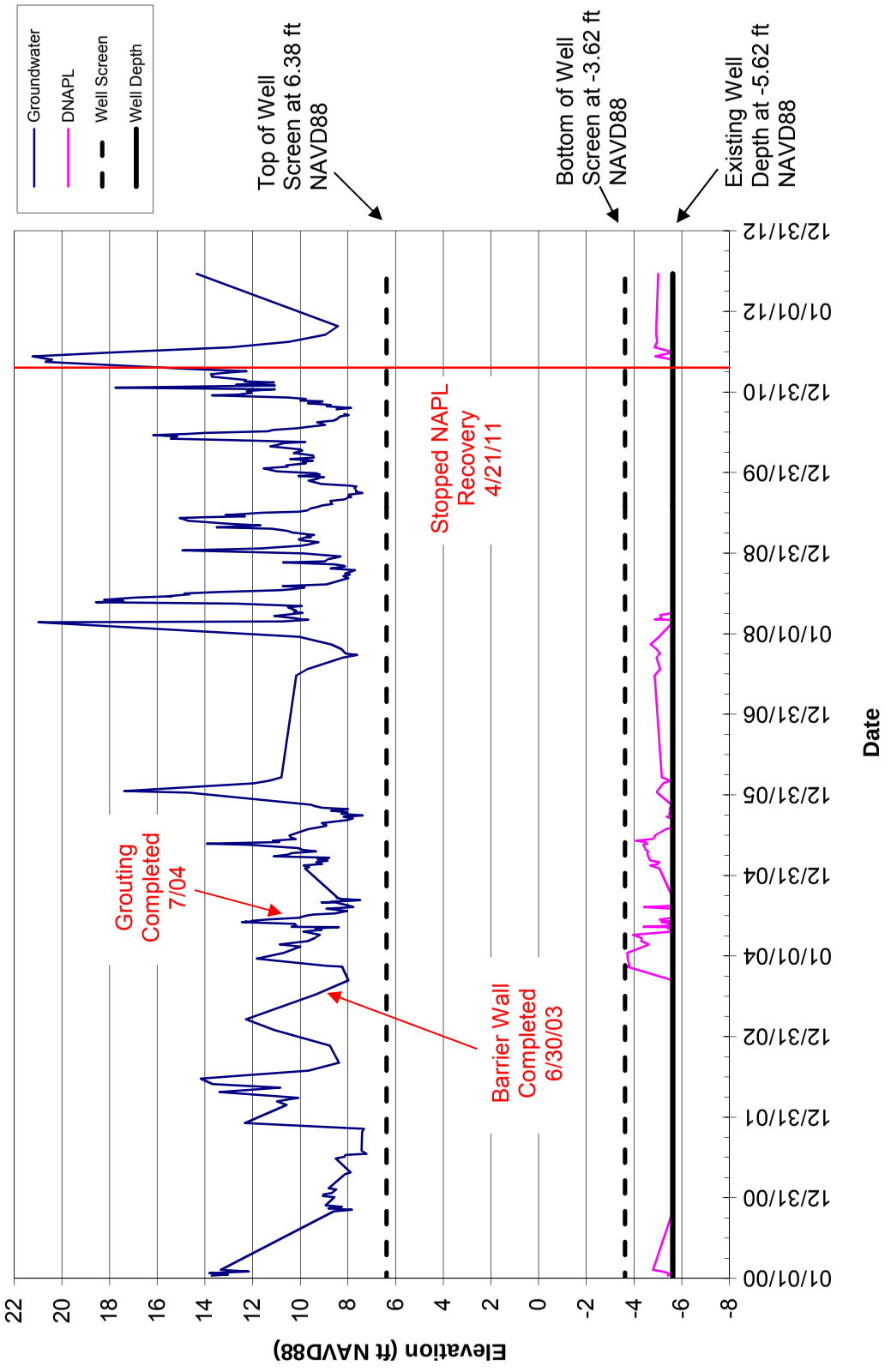
2001 to 2012 NAPL Thickness Plot for Well MW-Gs

11/2012

HARTCROWSER GSI Water Solutions, Inc.

Figure

A-10



Note: Well EW-9s was decomissioned on August 1, 2012.

McCormick and Baxter Superfund Site
Portland, Oregon

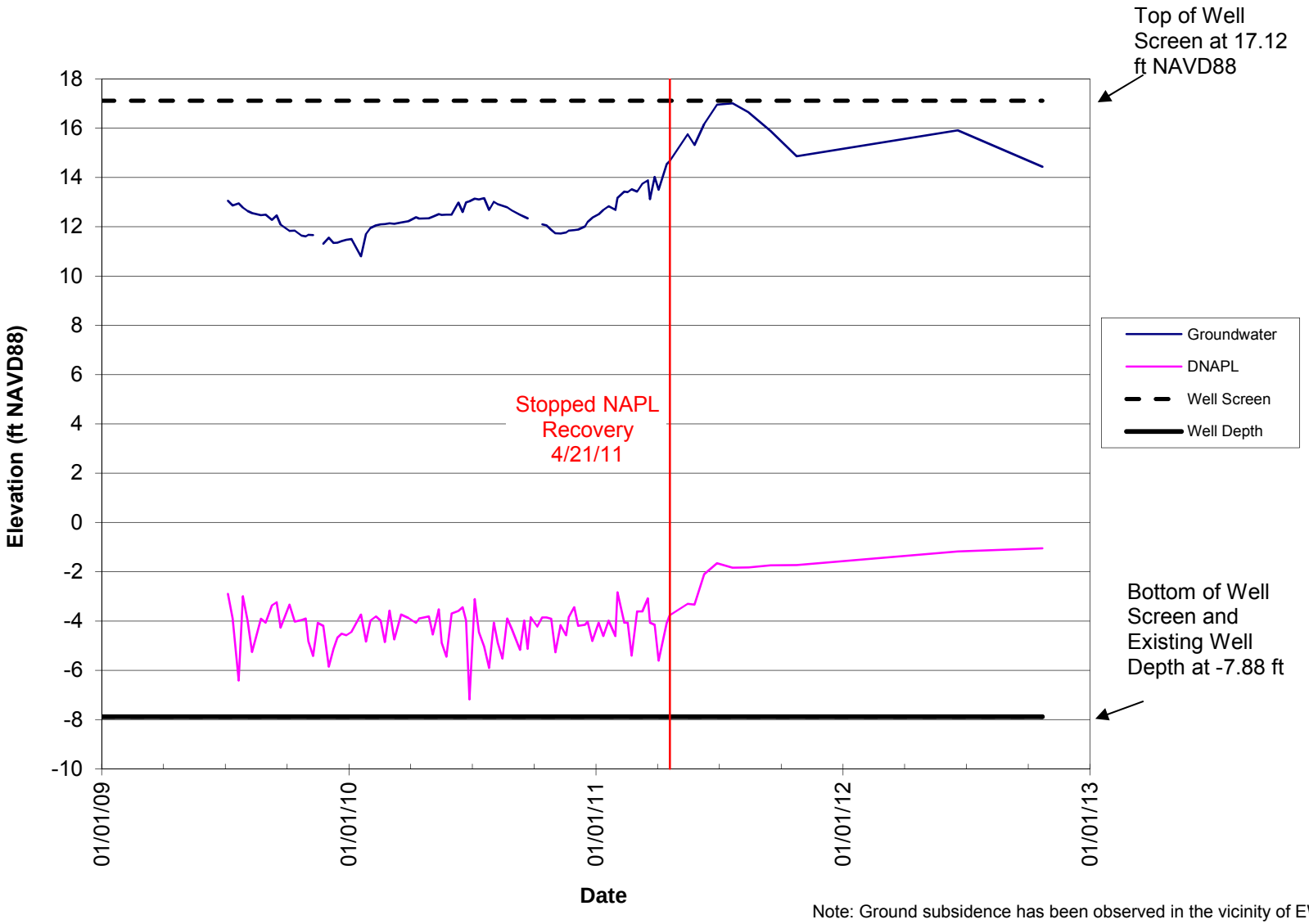
1999 to 2012 NAPL Thickness Plot for Well EW-9s

11/2012

HARTCROWSER GSI Water Solutions, Inc.

Figure

A-11



Note: Ground subsidence has been observed in the vicinity of EW-1s and the well casing has sunk over time. The screened interval and total well depth have been referenced to the most recent ground survey from September 2009. Given that the elevations are changing with time, the elevations shown are approximate.

McCormick and Baxter Superfund Site
Portland, Oregon

2009 to 2012 NAPL Thickness Plot for Well EW-1s

11/2012

Figure **A-12**

HARTCROWSER

GSI Water Solutions, Inc.

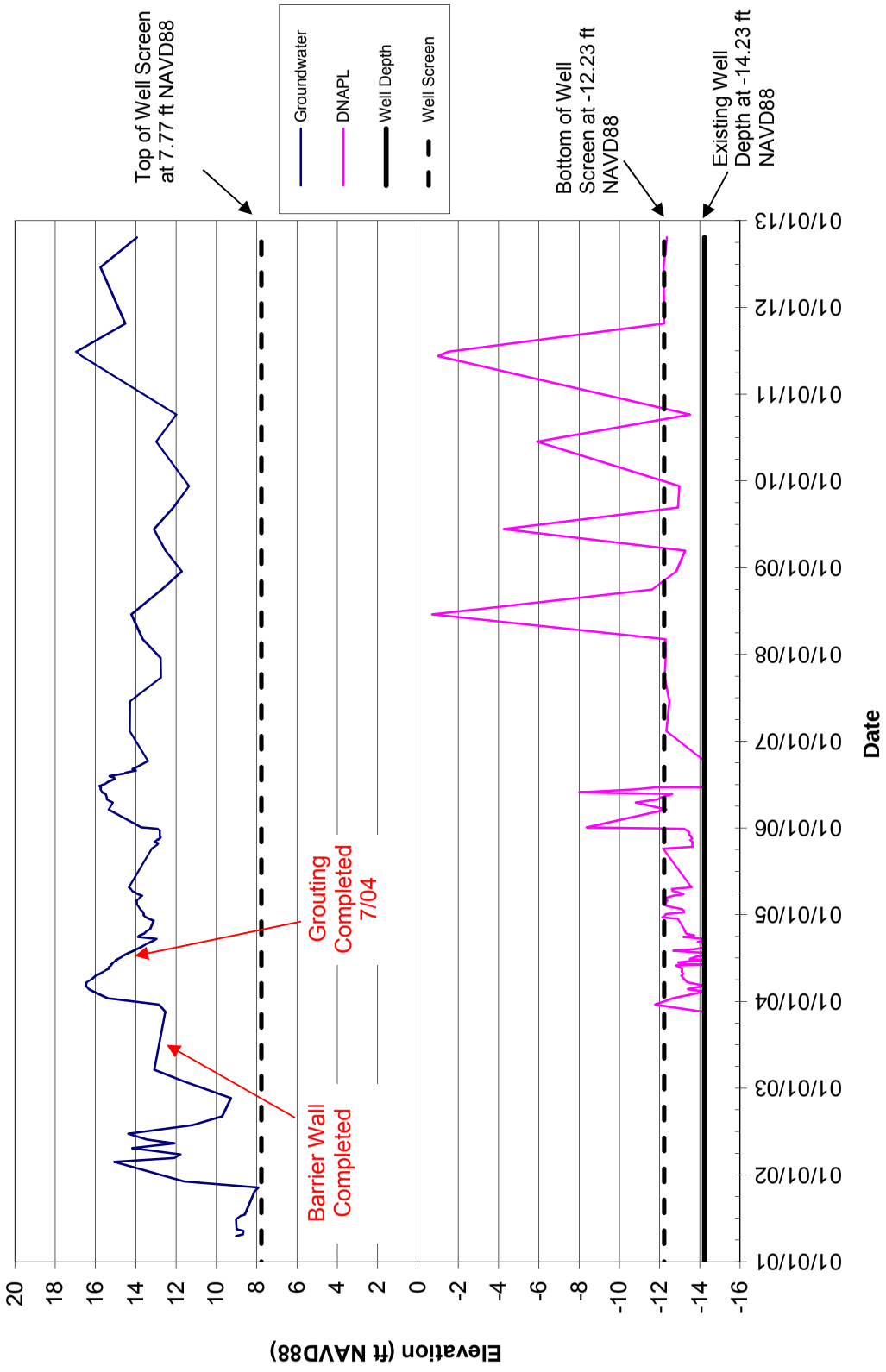
McCormick and Baxter Superfund Site
Portland, Oregon

2006 to 2012 NAPL Thickness Plot for Well MW-22i

11/2012

Figure
A-13

HARTCROWSER
GSI Water Solutions, Inc.



McCormick and Baxter Superfund Site
Portland, Oregon

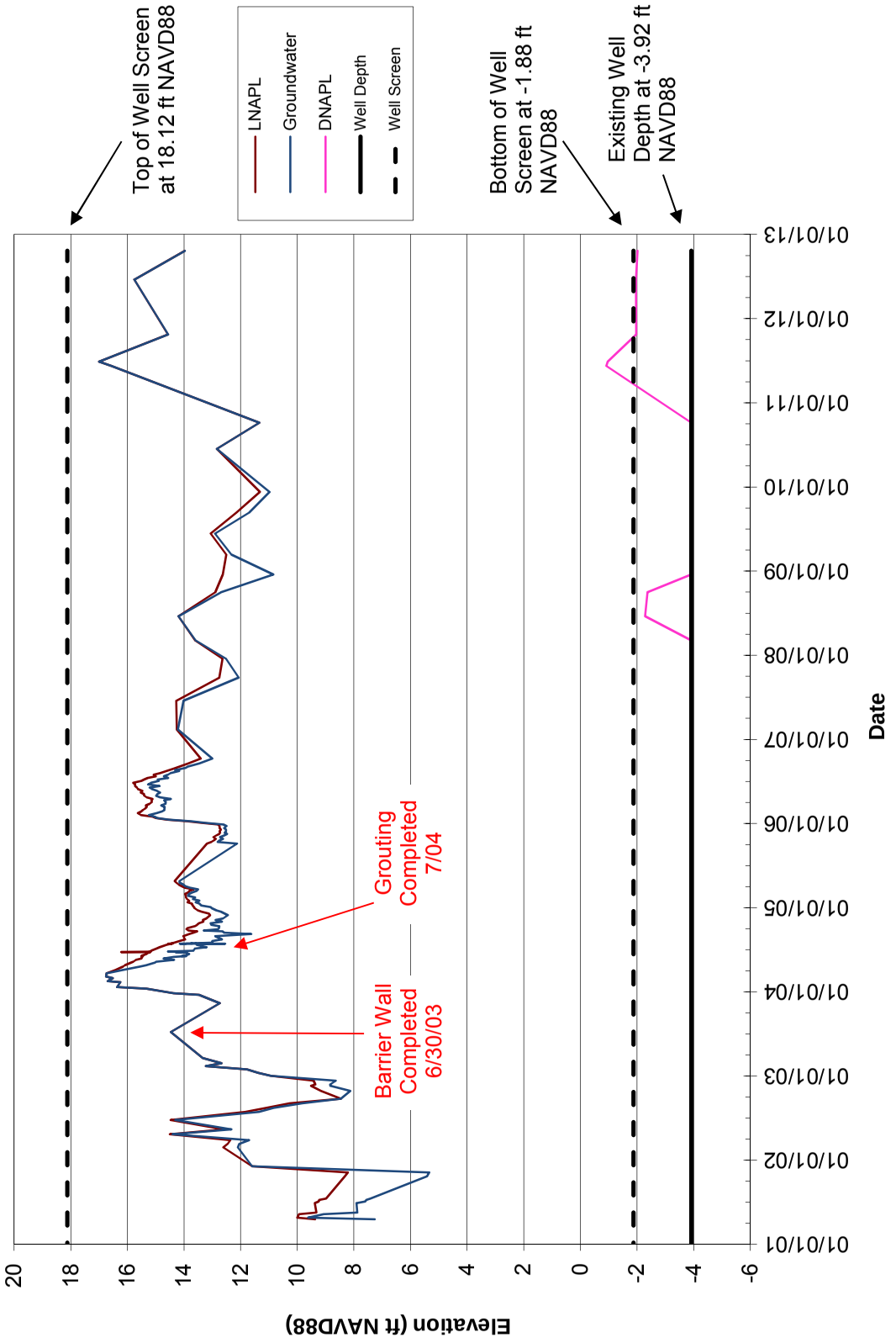
2001 to 2012 NAPL Thickness Plot for Well EW-8s

11/2012

HARTCROWSER GSI Water Solutions, Inc.

Figure

A-14



McCormick and Baxter Superfund Site
Portland, Oregon

2001 to 2012 NAPL Thickness Plot for Well EW-18s

11/2012

HARTCROWSER GSI Water Solutions, Inc.

Figure

A-15

LEGEND

- Groundwater Monitoring Wells (Groundwater Elevation)
- Groundwater Monitoring Wells with Transducers (Groundwater Elevation)
- Groundwater Elevation Contours (dashed where inferred)
- Willamette River Level During Sampling Event (14.1 feet)
- Subsurface Barrier Wall

NOTES:

1) Elevations shown in NAVD 88
2) Aerial photo taken on September 22, 2006
3) Water levels measured between 14:26 and 17:15
4) Willamette River low tide at 15:45 at 14.1 feet NAVD 88
5) MW-17s and MW-Ds field measurement not included due to suspect measurement error

0 200 400

Scale in feet

McCormick and Baxter Superfund Site
Portland, Oregon

Groundwater Contour Map for June 19, 2012 Monitoring Event

1/13

HARTCROWSER GSI Water Solutions, Inc.

Figure **A-16**

File Path: P:\Portland\205 - OR DEQ\003 - 003 McCormick and Baxter\Project_GIS\Project_mxds\2012_Annual_Report\FigureA-16_GW_Elevations_June19_2012.mxd

LEGEND

- Groundwater Monitoring Wells (Groundwater Elevation)
- Groundwater Monitoring Wells with Tranducers (Groundwater Elevation)
- Decommissioned Monitoring Wells
- Groundwater Elevation Contours (dashed where inferred)
- Willamette River Level During Sampling Event (6.1 feet)
- Subsurface Barrier Wall

NOTES:

1) Elevations shown in NAVD 88
2) Aerial photo taken on September 22, 2006
3) Water levels measured between 8:00 and 12:35
4) Willamette River low tide at 8:30 at 6.1 feet NAVD 88
5) Wells EW-9s, MW-2s, MW-3s, MW-18s, and MW-Ks were decommissioned between June 30 and August 2, 2012

0 200 400

Scale in feet

McCormick and Baxter Superfund Site
Portland, Oregon

Groundwater Contour Map for October 22, 2012 Monitoring Event

1/13

HARTCROWSER GSI Water Solutions, Inc.

Figure
A-17

File Path: P:\Portland\205 - OR DEQ\003 - 003 McCormick and Baxter\Project_GIS\Project_mxds\2012_Annual_Report\FigureA-17_GW_Elevations_Oct22_2012.mxd

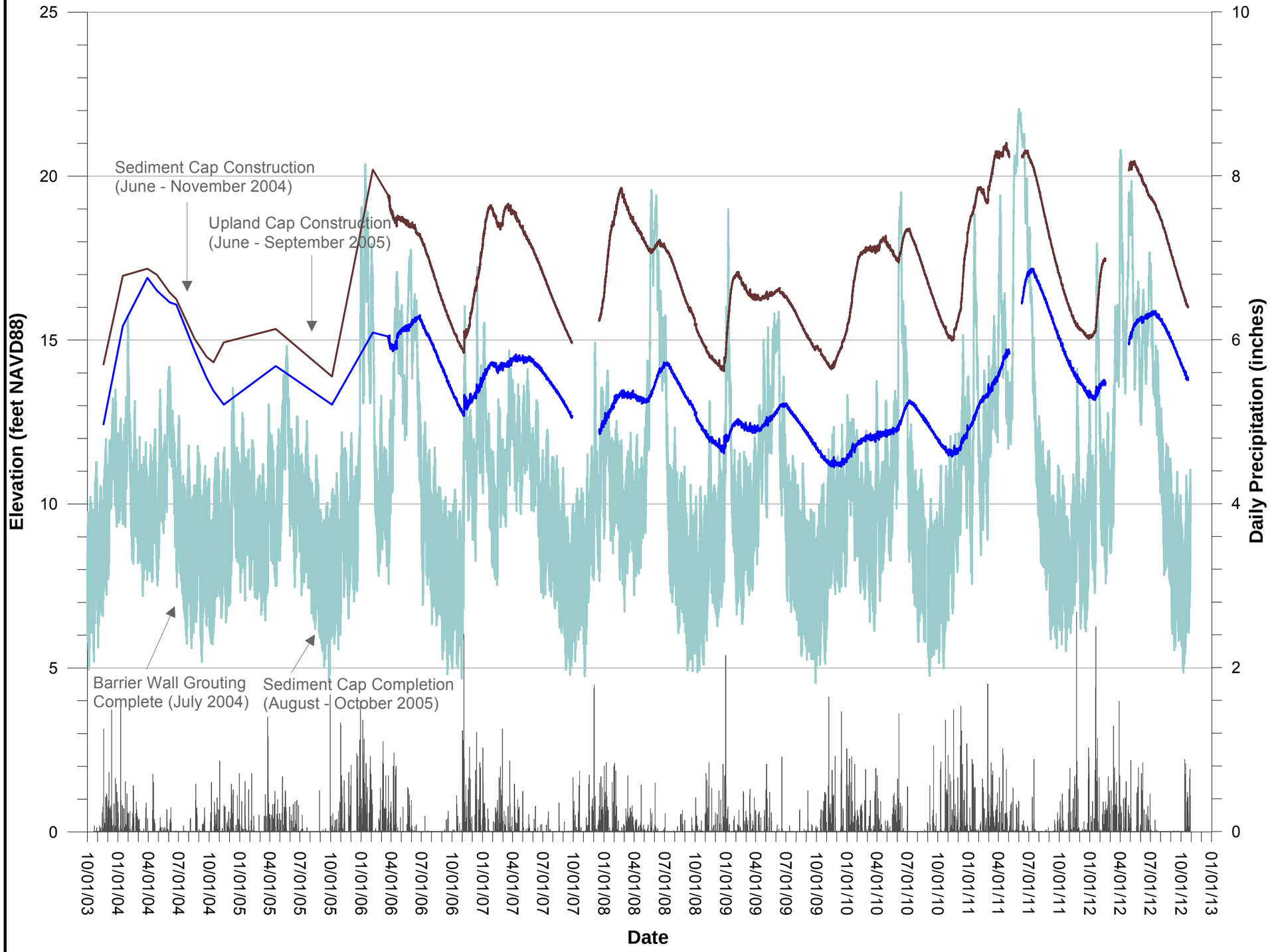


Figure A-18:
Post-Barrier Wall Groundwater Elevations in Monitoring Wells MW-52s and MW-53s
McCormick and Baxter Superfund Site
Portland, OR

LEGEND

- MW-52s (Interior)
- MW-53s (Exterior)
- River
- Precipitation Data

Notes:
MW-52s is located inside the barrier wall and MW-53s is located outside the barrier wall.

Top of Barrier wall (not shown) is about 31 ft NAVD.

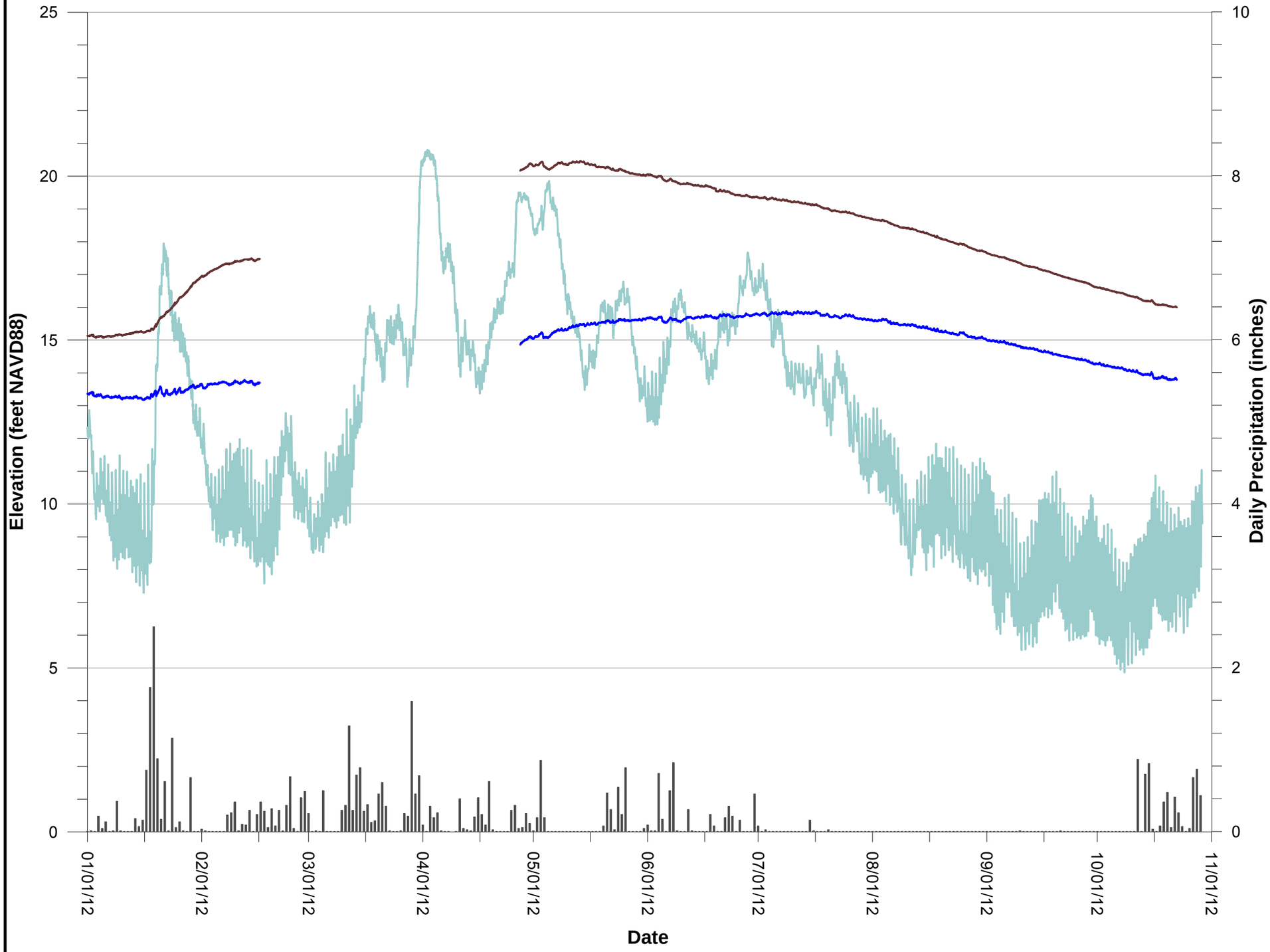
Prior to March 23, 2006 water level measurements are manual and intermittent.

Breaks in transducer data are the result of removal for calibration, removal for well modification, or a transducer was not collecting accurate pressure readings.

HARTCROWSER

GSI Water Solutions, Inc.

Figure A-19:
2012 Groundwater Elevations in Monitoring Wells MW-52s and MW-53s McCormick and Baxter Superfund Site Portland, OR



LEGEND

- MW-52s (Interior)
- MW-53s (Exterior)
- River
- Precipitation Data

Notes:
MW-52s is located inside the barrier wall and MW-53s is located outside the barrier wall.

Top of Barrier wall (not shown) is about 31 ft NAVD.

Breaks in transducer data are the result of removal for calibration, removal for well modification, or a transducer was not collecting accurate pressure readings.

HARTCROWSER

GSI Water Solutions, Inc.

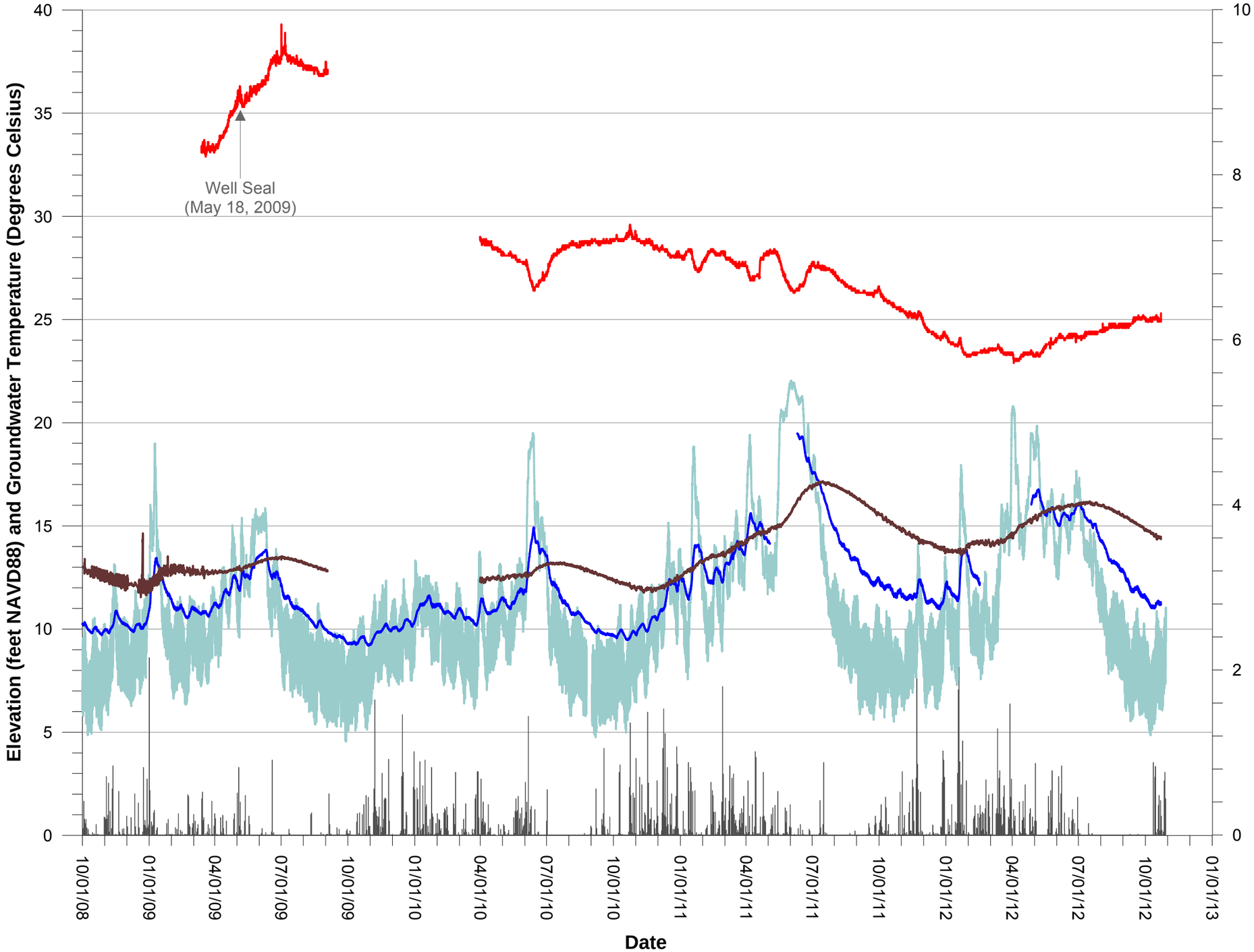


Figure A-20:
2008 to 2012 Groundwater Temperature in Montoring Well EW-1s and Groundwater Elevations in Monitoring Wells EW-1s and MW-36s
McCormick and Baxter Superfund Site
Portland, OR

LEGEND

- EW-1s Temperature
- EW-1s Water Elevation
- MW-36s Water Elevation
- River Elevation
- Precipitation Data

Notes:
Monitoring wells EW-1s and MW-36s are located inside the barrier wall.

Breaks in transducer data are the result of removal for calibration, removal for well modification, or a transducer was not collecting accurate pressure readings.

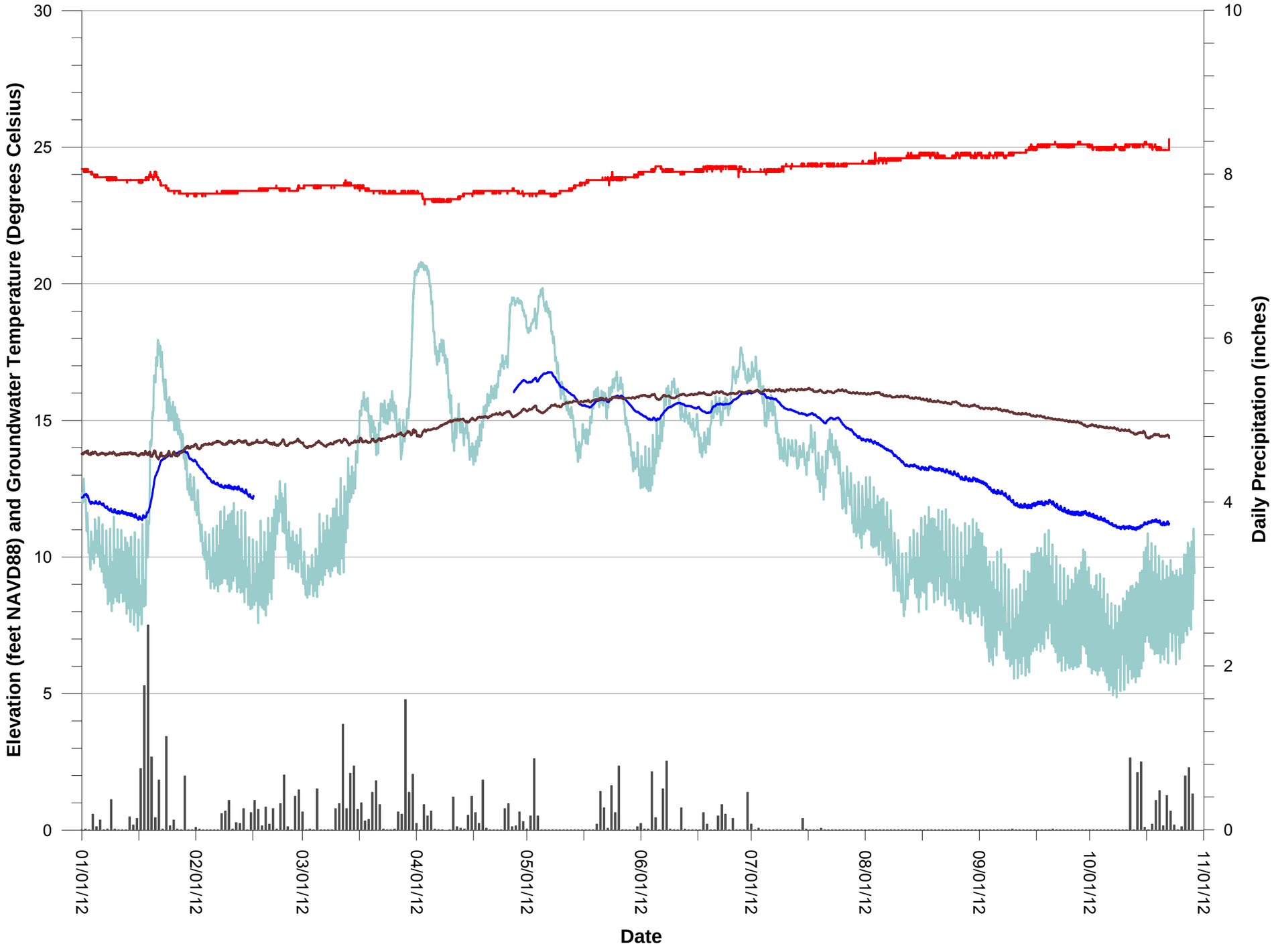
Groundwater elevation manually adjusted 0.25 ft up between 17:00 on May 6, 2010 and 14:00 on June 15, 2010 due to apparent displacement from field activities.

File Path: \\PDX\Projects\Portland\205 - OR DEQ\003 - 003 McCormick and Baxter\Project_GIS\Project_mxd\Misc_Maps\Base_Grapher.mxd

HARTCROWSER

GSI Water Solutions, Inc.

Figure A-21:
2012 Groundwater Temperature in Montoring Well EW-1s and Groundwater Elevations in Monitoring Wells EW-1s and MW-36s
McCormick and Baxter Superfund Site
Portland, OR



LEGEND

- EW-1s Temperature
- EW-1s (Interior)
- MW-36s (Interior)
- River
- Precipitation Data

Notes:
Monitoring wells EW-1s and MW-36s are located inside the barrier wall.

Breaks in transducer data are the result of removal for calibration, removal for well modification, or a transducer was not collecting accurate pressure readings.

HARTCROWSER

GSI Water Solutions, Inc.

Current Top of Wall Elevation at 22.15 ft NAVD88

Upland Cap Construction
(June - September 2005)

Sediment Cap Construction
(June - November 2004)

Barrier Wall Grouting
Complete (July 2004)

Sediment Cap Completion
(August - October 2005)

Elevation (feet NAVD88)

Daily Precipitation (inches)

25
20
15
10
5
0

10
8
6
4
2
0

10/1/03
1/1/04
4/1/04
7/1/04
10/1/04
1/1/05
4/1/05
7/1/05
10/1/05
1/1/06
4/1/06
7/1/06
10/1/06
1/1/07
4/1/07
7/1/07
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1/1/09
4/1/09
7/1/09
10/1/09
1/1/10
4/1/10
7/1/10
10/1/10
1/1/11
4/1/11
7/1/11
10/1/11
1/1/12
4/1/12
7/1/12
10/1/12
1/1/13

Date

Figure A-22:
Post-Barrier Wall Groundwater Elevations in Monitoring Wells MW-36 and MW-37
McCormick and Baxter Superfund Site
Portland, OR

LEGEND

- MW-36s (Interior)
- MW-36i (Interior)
- MW-36d (Interior)
- MW-37s (Exterior)
- MW-37i (Exterior)
- MW-37d (Exterior)
- River
- Precipitation Data

Notes:
MW-36 wells are located inside the barrier wall and MW-37 wells are located outside the barrier wall.

Breaks in transducer data are the result of removal for calibration, removal for well modification, or a transducer that was not collecting accurate pressure readings. Transducers in MW-36i and MW-37i were removed on February 16, 2012.

HARTCROWSER

GSI Water Solutions, Inc.

Current Top of Wall Elevation at 22.15 ft NAVD88

Elevation (feet NAVD88)

Daily Precipitation (inches)

25
20
15
10
5
0

10
8
6
4
2
0

1/1/12
2/1/12
3/1/12
4/1/12
5/1/12
6/1/12
7/1/12
8/1/12
9/1/12
10/1/12
11/1/12

Date

Figure A-23:
2012 Groundwater Elevations
in Monitoring Wells MW-36 and MW-37
McCormick and Baxter Superfund Site
Portland, OR

LEGEND

- MW-36s (Interior)
- MW-36d (Interior)
- MW-37s (Exterior)
- MW-37d (Exterior)
- River
- Precipitation Data

Notes:
MW-36 wells are located inside the barrier wall and MW-37 wells are located outside the barrier wall.

Breaks in transducer data are the result of removal for calibration, removal for well modification, or a transducer was not collecting accurate pressure readings.

HARTCROWSER

GSI Water Solutions, Inc.

Current Top of Wall Elevation at 23.35 ft NAVD88

Sediment Cap Construction
(June - November 2004)

Upland Cap Construction
(June - September 2005)

Barrier Wall Grouting
Complete (July 2004)

Sediment Cap Completion
(August - October 2005)

Elevation (feet NAVD88)

Daily Precipitation (inches)

Date

Figure A-24:
Post-Barrier Wall Groundwater Elevations in Monitoring Wells MW-44 and MW-45 McCormick and Baxter Superfund Site Portland, OR

LEGEND

- MW-44s (Interior)
- MW-44i (Interior)
- MW-44d (Interior)
- MW-45s (Exterior)
- MW-45i (Exterior)
- MW-45d (Exterior)
- River
- Precipitation Data

Notes:
MW-44 well cluster is located inside the barrier wall and MW-45 well cluster is located outside the barrier wall.

Breaks in transducer data are the result of removal for calibration, removal for well modification, or a transducer was not collecting accurate pressure readings. Transducers were removed from MW-44i and MW-45i on February 16, 2012.

HARTCROWSER

GSI Water Solutions, Inc.

Current Top of Wall elevation at 23.35 ft NAVD88

Elevation (feet NAVD88)

Daily Precipitation (inches)

Date

25
20
15
10
5
0

10
8
6
4
2
0

1/1/12
2/1/12
3/1/12
4/1/12
5/1/12
6/1/12
7/1/12
8/1/12
9/1/12
10/1/12
11/1/12

Figure A-25:
2012 Groundwater Elevations in Monitoring Wells MW-44 and MW-45
McCormick and Baxter Superfund Site
Portland, OR

LEGEND

- MW-44s (Interior)
- MW-44d (Interior)
- MW-45s (Interior)
- MW-45d (Exterior)
- River
- Precipitation Data

Notes:
MW-44 well cluster is located inside the barrier wall and MW-45 well cluster is located outside the barrier wall.

Breaks in transducer data are the result of removal for calibration, removal for well modification, or a transducer was not collecting accurate pressure readings.

HARTCROWSER

GSI Water Solutions, Inc.

APPENDIX B
SITE OBSERVATION AND ACTIVITY SUMMARY

OPERATION AND MAINTENANCE REPORT
JANUARY 2012 THROUGH DECEMBER 2012

APPENDIX B
CONTENTS

FIGURE

ATTACHMENTS

APPENDIX B
CONTENTS CONTINUED

ACRONYMS

ACB	articulated concrete block
bgs	below ground surface
Cherokee	Cherokee Construction Services
DEQ	Oregon Department of Environmental Quality
EPA	U.S. Environmental Protection Agency
HC/GSI	Hart Crowser, Inc./GSI Water Solutions, Inc.
IDW	investigation-derived waste
NAVD	Northern American Vertical Datum
NOAA	National Oceanic and Atmospheric Administration
O&F	Operation and Functionality
O&M	Operation and Maintenance
OWRD	Oregon Water Resources Department
Site	McCormick & Baxter Superfund Site
TRM	turf reinforced matting

APPENDIX B
SITE OBSERVATION AND ACTIVITY SUMMARY
OPERATION AND MAINTENANCE REPORT
JANUARY 2012 THROUGH DECEMBER 2012
MCCORMICK & BAXTER SUPERFUND SITE

1.0 INTRODUCTION

This Appendix B to the *January 2012 through December 2012 Operation and Maintenance* (*O&M*) *Report* (*O&M Report*) presents a summary of sediment and soil cap observation and maintenance activities at the McCormick & Baxter Superfund Site (Site) for the reporting period from January 1, 2012, through December 31, 2012. Attachments A through H provide detailed information about the activities.

These activities, in conjunction with Operation and Functionality (O&F) activities were funded by the Oregon Department of Environmental Quality (DEQ) through a Cooperative Agreement with the U.S. Environmental Protection Agency (EPA). The location of the Site, the Site layout, and surface elevations are shown in Figures 1 through 3 in the main section of the *O&M Report*.

2.0 SITE OBSERVATIONS

Site observations and maintenance activities were conducted according to the 2012 *Draft O&M Plan* (DEQ, 2012). As directed by DEQ, the frequency of inspections was reduced from monthly to quarterly in April 2010. Three soil and sediment cap inspections were conducted in March, June, and October 2012 by DEQ and Hart Crowser/GSI Water Solutions (HC/GSI). Observations of interest from the routine inspections and site meetings are summarized on Figure B-1.

Routine inspections are documented in observation forms developed and recorded for the Site. Attachments A through F present supporting documentation and pertinent details to the Site activities conducted and observations made in 2012. Attachment A also provides a log of all Site visitors in 2012, as required for the Site administrative record.

In addition to the routine quarterly inspections, inspection of the lower portion of the riparian area was also conducted in May 2012, in response to observed erosion of soil mulch and vegetation cover on the green turf reinforced matting (TRM) in October 2011 (which was caused by unusually high Willamette

River levels in June 2011). Repairs to the eroded areas were completed in October 2012.

2.1 Sediment Cap Observations

Routine sediment cap inspection was conducted three times in 2012 in conjunction with three quarterly Site meetings. Sediment cap inspection documentation is included in Attachment B. Sections 2.1.1 and 2.1.2 describe sediment cap observations regarding habitat enhancement features and wildlife, sediment cap features, and vandalism and/or trespassing. In general, the condition of the sediment cap remains in good condition. Shoreline sheen was not observed in 2012.

2.1.1 Habitat Enhancement Features and Wildlife

Habitat enhancement features, such as boulder clusters and sand cover as a biotic layer, are design elements of the sediment cap. Large woody debris also provide habitat enhancement and are present along the shoreline and in the riparian area above the shoreline. Generally, the distribution of sand is similar to previous years: sand was in place over a large portion of the Site, but absent over articulated concrete block (ACB) armoring where the bank slope is steeper and in Willamette Cove. The exposed ACB creates undesirable habitat for wildlife and an unsafe walking environment for public use. In October 2012, Cherokee Construction Services (Cherokee) under subcontract to Hart Crowser, filled void spaces within the ACB along the shoreline in areas where sand had been washed away. Rounded gravel (1½ inch-minus) was placed along a large portion of the shoreline and Willamette Cove (Figure B-1 and Appendix F, Photographs 1 through 3).

Large woody debris present along the length of the shoreline was emplaced at higher shoreline elevations during high river events. The amount of woody debris present at the Site appears to remain consistent every year. The highest river elevations recorded since the sediment cap was installed occurred in June 2011, reaching 22 feet North American Vertical Datum [NAVD] 88 or 1 foot below the 23-foot flood stage. Moderate erosion of soil mulch and vegetation cover on the green TRM was observed after river levels receded (Photographs 4 and 5). During ACB gravel placement in October 2012, Cherokee also repaired areas of erosion under the TRM. TRM was pulled away from the ACB and voids were filled with crushed rock (Photograph 6). The TRM then was pulled back over the crushed rock and re-secured to the ACB using concrete anchor nails. The area above the repaired TRM was planted in accordance with the Vegetative Planting Plan included in Attachment C.

Three areas of the shoreline appear to accumulate more woody debris than others:

- The south end of the shoreline near the City of Portland outfall;
- Along the shoreline near the former TFA (Photograph 7); and
- The north end of the Site near the Burlington Northern Railroad bridge.

Boulder clusters placed during the sediment cap construction remain in place. Numerous wildlife species continue to be observed at the Site; most frequently observed are various birds, including Canada geese, gulls, pigeons, blue herons, and ospreys (Photograph 8). Juvenile fish, clams, and crayfish were observed in the Willamette River at lower river levels.

2.1.2 Vandalism and Trespassing

The shoreline along the Site and in Willamette Cove is accessible and often is used by the public for various forms of recreation. Throughout 2012, various amounts of shoreline trash and graffiti were observed.

Four dilapidated boats (obviously used as dwellings) were seen beached in Willamette Cove during the October 2012 Site visit (Photograph 9). During low tide, boat anchors could be seen resting on the sediment cap portion of the cove (Photograph 10). No visible effects to the sediment cap were observed from the resting anchors. Although U.S. Coast Guard and Oregon State Marine Board rules prohibit anchoring on the sediment cap, damage to the ACB armoring was not observed or expected, and therefore no action was taken to enforce the anchoring prohibition.

The U.S. Coast Guard and Multnomah County Sheriff require boats to move after 14 days of anchoring in the same location. Metro actively monitored the transient use of the cove in 2012 and transient boats periodically were observed to be anchored in Willamette Cove throughout the year. Also, a new Oregon State Marine Board rule does not allow boats to remain anchored in the same location for more than 30 days. After that time, the boats must move at least 5 miles away.

2.2 Soil Cap Observations

The soil cap was inspected three times in 2012. The inspections were conducted in conjunction with three quarterly Site meetings. Soil cap observation documentation is included in Attachment D.

2.2.1 Wildlife

The upland soil cap provides habitat for rabbits, ground squirrels, Canada geese, several species of birds, and coyotes. Despite additional gravel placement in 2008 to fill the gap beneath fencing surrounding the upland portion of the Site, evidence of periodic burrowing continues to be observed under the southwest fence along the perimeter road (Figure B-1). These burrows are filled routinely and are not of major concern.

Evidence of ground squirrel activity was observed at several locations south of the Site trailers and in various areas throughout the upland soil cap. Ground squirrels are common to the general vicinity of the area, and their burrows typically extend to approximately 1 foot below ground surface (bgs). Ground squirrels prefer hillsides and low earth banks, sometimes using structures such as trees and boulders for cover. It appears the ground squirrels are using the surplus ACB stockpiled at the Site, paved roadway, and concrete well monuments as habitat. There are no indications that any of these borrows exist below the depth of the soil cap, and therefore, the soil cap continues to physically isolate site contaminants from human and ecological receptors. Continued monitoring of the burrows is recommended; no action to remove burrowing animals or to fill in the burrows is planned or is necessary at this time.

2.2.2 Vandalism and Trespassing

The gate at the top of North Edgewater Road marks the entrance to the Site and Willamette Cove property. This gate is locked with a series of locks and chain to provide access for two railroads, DEQ, and other agencies that require access to the area. The Union Pacific railroad tracks, which run parallel to the Site and neighboring properties, are often used by transients and the general public to access the area. Access to the area generally does not affect security because of the surrounding fence, lighting, and alarm system at the Site. However, during the October 22, 2012, Site inspection, DEQ and HC/GSI noted that the entrance gate to the paved staging area (office trailer area) could be opened without removing the lock. The locking mechanism on the center post of the double-wide swinging gates had become loose, which allowed the post to be lifted out of the post hole and swing the gates open with the lock in place. Cherokee repaired the locking mechanism to prevent future unauthorized access while conducting the shoreline gravel placement. No damage was observed along the perimeter fence surrounding the Site in 2012.

2.3 Soil Cap Subsidence

In June 2008, the inner casing of monitoring well MW-23d was observed to be protruding approximately 4 inches above the outer well casing/monument. A subsequent upland site survey confirmed that the ground surface had subsided in the local vicinity of MW-23d. A *Subsidence in Upland Cap Memorandum* (Hart Crowser/GSI, 2008) and an *Additional Subsidence Monitoring Memorandum* (Hart Crowser/GSI, 2009) present the results of the survey and additional investigation to determine the cause of the subsidence. A review of previous subsurface investigations indicated that significant subsurface wood debris was present in this area, leading to the conclusion that degradation of woody debris was occurring and further localized settling is likely to occur over time. Another potential contributing factor to the settling is a declining groundwater level inside the barrier wall. This decline was greater during the first few years after the impermeable cap installation, but the groundwater elevation has stabilized during the past 4 years and now appears to be in equilibrium with the Willamette River (see Appendix A).

Since 2010, subsidence in the MW-23d area has been insignificant. No movement was noted in 2012 between the inner and outer casing of this well; the difference remained at 0.03 inch in calendar year 2012. Total movement between the inner and outer casing since December 2008 (first periodic measurement conducted) was 1.48 inches. Placing an airtight seal on wellhead EW-1s, located within 10 feet of MW-23d, appears to have eliminated the source of oxygen thus reducing or eliminating aerobic degradation. While not anticipated, significant additional settling in this area could affect the performance of the stormwater conveyance system. The stormwater conveyance system was visually inspected three times during 2012 and continues to perform as designed (Photograph 11).

3.0 MAINTENANCE ACTIVITIES

Hart Crowser performed maintenance activities from January through December 2012. Activities included transducer maintenance and gate repairs. In addition to activities performed by Hart Crowser, maintenance activities also were performed by Instrumentation Northwest and Native Ecosystems Northwest. The following section discusses routine maintenance tasks and non-routine tasks performed in 2012. Site support services, such as phone, alarm, solid waste, and wastewater were provided by Century Link, Phillips, Trashco Services, and Schulz-Clearwater Sanitation, respectively.

3.1 Routine Maintenance

Routine activities conducted in 2012 include transducer maintenance, vegetative management, and investigation-derived waste (IDW) management.

All transducer data loggers were inspected in 2012. The transducers in wells MW-44D and MW-45D were removed on October 22, 2012, and sent to Instrumentation Northwest of Kirkland, Washington, for maintenance. Hart Crowser also replaced transducers into specific wells indentified in the *Draft O&M Plan* on October 26, 2012 (Appendix A).

As expected, inspection of the vegetation showed that irrigation in 2012 was not needed. Noxious weed control remains the primary ongoing vegetation management activity at the site. Native Ecosystems Northwest of Portland, Oregon, under subcontract to Hart Crowser, completed noxious weed control activities in the spring and fall of 2012. The work included completing application (spot spraying) of glyphosate herbicide and manual hand pulling to mitigate thistle, knapweed, Scotch broom, sweet clover, black mustard, and other noxious weeds within the upland and riparian areas of the Site. The general planting goals (NOAA, 2004) continue to be met.

IDW stored at the facility in 2012 included soil, water, and monitoring well casing from the monitoring well decommissioning; and debris from general O&M activities. IDW from the monitoring well decommissioning has been separated into hazardous and nonhazardous waste. Both hazardous IDW and nonhazardous IDW are scheduled for disposal in 2013.

3.2 Non-Routine Maintenance

Based on EPA and DEQ concurrence with the long-term groundwater data quality objectives developed by HC/GSI, groundwater data collected from fewer monitoring wells/locations is expected be sufficient to support long term remedy performance decisions at the Site. Six monitoring wells were identified for abandonment in 2012 according to the rationale, scope and methodology provided in the *Well Decommissioning Plan* submitted to DEQ in April 2012, and provided in Attachment G. Cascade Drilling, under subcontract to Hart Crowser, was selected to abandon monitoring wells EW-2s, EW-9s, MW-2s, MW-3s, MW-18s, and MW-Ks. Three of the wells are located outside of the subsurface barrier wall at the northwest corner of the Site (in a high density area of monitoring wells), two are located at the southern edge of the property, and one is located upgradient of known groundwater contamination. The wells are shown on Figure B-1.

Monitoring wells EW-9s, MW-2s, MW-3s, and MW-18s were abandoned using overdrilling methods according to Oregon Water Resources Department (OWRD) and DEQ procedures and regulations. Logs and field notes are provided in Attachment H. The overdrilling procedure consisted of removing the well monuments and concrete surface seals and pulling the well casing from the ground, re-drilling the wells to the original depth, and removing the sand filter pack and annular seal materials. The open boreholes were filled by pressure grouting to within approximately 2 feet of ground surface with a mixture of Type I/II Portland Cement and water. The remaining 2 feet were filled with sand to match the surrounding grade.

Well MW-Ks was abandoned in-place with an approved variance from the OWRD (provided in Attachment H). During the initial overdrilling of MW-Ks, an additional concrete monument was encountered 5 feet bgs, which apparently was the original monument, left in place when the soil cap was constructed. Attempts to remove this monument with the loader and drill rig were unsuccessful. MW-Ks was decommissioned by removing the well casing to 5 feet bgs and filling the remaining casing with pressurized grout. The top 5 feet were filled with sand to match the surrounding grade.

Well EW-2s was constructed using a 10-inch-diameter steel casing and was not decommissioned as planned because it was not feasible to remove and overdrill this diameter casing with the equipment in the field.

4.0 SUMMARY

Overall, the 2012 sediment cap and the upland soil cap observations and inspections revealed no significant change in remedy performance or areas of concern at the Site. Future O&M activities will primarily consist of quarterly inspections, routine maintenance, and biannual groundwater monitoring for the next several years. A draft long-term *O&M Plan* with descriptions of O&M activities and schedule for the next 5 years was prepared by DEQ with assistance from EPA, GSI, and Hart Crowser (DEQ, 2012). The draft *O&M Plan* is expected to be completed in 2013. Initial planning to decommission non-essential and obsolete equipment, including the irrigation system at the Site began in 2012, and will be executed to some extent in 2013.

Sand covers the shoreline at lower, less steep elevations, and there are significant amounts of large woody debris that have accumulated to help create wildlife habitat. Wildlife commonly seen at the Site includes Canada geese, blue herons, ospreys, crawfish, squirrels, and rabbits; evidence of coyotes has been observed. The general public also frequents the shoreline for recreation, most

commonly for walking dogs. Infrequent and minor instances of vandalism and littering have been noted. Habitat gravel used to fill voids within the ACB has created a more stable substrate for wildlife and for a consistent and safer walking surface for public use.

The degree of upland soil cap subsidence in the vicinity of well MW-23d is currently stable; no subsidence was observed in 2012. This area will continue to be monitored in 2013 both via a transducer that measures temperature and water level as well as during quarterly Site inspections.

5.0 REFERENCES

DEQ, 2012. *Draft Operation and Maintenance Plan, McCormick and Baxter Creosoting Company Superfund Site, Portland, Oregon*. April 2012.

Hart Crowser/GSI, 2008. *Subsidence in Upland Cap Memorandum, McCormick and Baxter Superfund Site, Portland, Oregon*. December 15, 2008.

Hart Crowser/GSI, 2009. *Additional Subsidence Monitoring Memorandum, McCormick and Baxter Superfund Site, Portland, Oregon*. February 22, 2009.

Hart Crowser/GSI, 2010. *Operation and Maintenance Report, January 1, 2009, to December 31, 2009, McCormick & Baxter Superfund Site, Portland, Oregon*. May 22, 2009.

NOAA, 2004. *Endangered Species Act – Section 7 Consultation Biological Opinion & Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation, McCormick & Baxter Creosoting Company Site, Willamette River Remediation Sediment Cap, Multnomah County, Oregon.* March 15, 2004.

Property Line
Fence (Typ.)
Union Pacific Railroad
Burlington Northern Inc.
(Spokane, Portland, and Seattle Railway Co.)
MW-Ks
Animal Burrows
Animal Burrows
Gravel Road
Perforated Collection Piping
EARTHEN CAP
MW-2s
Subsuface Barrier Wall
SDMH-A
Area of Subsidence
SDMH-C
SDMH-D
DRAINAGE SYSTEM
Retention Pond
High Point
Riprap
Animal Burrows Under Fence
SDMH-E
8" Corrugated HDPE (High Density Polythene)
SDMH-B
IMPERMEABLE CAP
MW-3s
Transient Boat Locations
Rock Pile
12" PVC Outfall
Habitat Gravel Pile
Spillway
Shallow Undercut
Shallow Undercut
COP Outfall
Willamette Cove
Sand Pile
MW-18s
Undercut
EW-9s
EW-2s
Small Undercut
Uneven ACB
Large Undercut
Large Undercut
Undercut
Undercut
Undercut
1
2
3
4
5
Willamette River
Sediment Cap Boundary
N

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 TRM Placed Over Earthen Cap

0 200 400
Scale in Feet

Location ID Figure 2.5	Buoy Label	Longitude			Latitude		
		Degree	Minute	Second	Degree	Minute	Second
1	Danger Rocks	-122	44	27.9115188	45	34	33.7505887
2	Danger Rocks	-122	44	34.6730244	45	34	36.3603940
3	Danger Rocks	-122	44	41.5979124	45	34	39.0343156
4	Danger Rocks	-122	44	47.5345212	45	34	43.8265931
5	Danger Rocks	-122	44	53.2295880	45	34	47.1865397
Coordinate projection: GCS_North_American_1983							

(1) Buoy Location and Number
Monitoring Well Location
MW-Ks Abandoned Monitoring Well Location and Number
EW-2s Monitoring Well Scheduled for Abandonment, Left in Place
Gravel Layer
Undercut TRM Repair Location
Large Undercut TRM Repair/Planting Location

McCormick and Baxter Superfund Site
Portland, Oregon

Site Observation Summary

12/12

HARTCROWSER GSI Water Solutions, Inc.

Figure
B-1

F:\Data\Jobs\DEQ\15670-xx M&B\15670-06 New New O&F\Tk 5 Annual Report\2012 Annual Report\2012 Annual Report Appendix B - Observation Summary\Figures\156700605-B1 (Site Observation).dwg

ATTACHMENT A
SITE ACTIVITY LOG

Site Visitation Record
McCormick and Baxter Creosoting Company
Portland, Oregon

SITE VISIT LOG

VISITORS AND WORKERS MUST CHECK IN AND OUT

Date	Time IN	a.m./ p.m.?	Time OUT	a.m./ p.m.?	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
1/31/12	1610	p.m	1650	p.m	Jason Miles	HC	Get sign in sheet/turn down heat/run sump pump
2/3/12	1010	am	1320	pm	Jason Miles	HC	Inventory equipment
2/16/12	1430	pm	1715	pm	Jason Miles	HC	Datalogger Maintenance
2/16/12	1455	pm	1715	pm	Troy Fowler	HC	Datalogger Maintenance
3/22/12	1300	PM	1600	"	Scott Manzano	DBO	Site Visit
3/22/12	1300	"	1600	"	Heidi Blischke	GSI	}
3/22/12	1300	"	1600	"	Tim Skrotzki	HC	↓
4/27/12	0727	am	1344	PM	Jason Miles	HC	Clean Trailers/Datalogger Maint
4/27/12	0927	am	1344	PM	Troy Fowler	HC	Datalogger Maint.
5/9/12	0820	AM	1010	AM	Chris Martin	HC	RFB Drillers Site walk
05/9/12	0850	AM	0955	AM	Dan Stahlnecker	MDE (major Drilling)	Site walk
5/9/12	8:30	AM	9:50		Clyde Moore	Western States	Site WALK
5/9/12	8:55	Am	9:55	Am	PAUL SMITH	BOART LONGYEAR	" "
5/9/12	8:55	Am	9:55	Am	RYAN GALBREATH	CASCADE DRILLING	SITE WALK
5/9/12	855	"	:	:	[illegible]		"
5/10/12	10:00	AM	1:35	PM	CELINA ABERCROMBIE	HC	Reg. site visit
5/17/12	10:10	AM	1200	PM	Tim Skrotzki	HC	" "

Site Visitation Record
McCormick and Baxter Creosoting Company
Portland, Oregon

SITE VISIT LOG

VISITORS AND WORKERS MUST CHECK IN AND OUT

Date	Time IN	a.m./ p.m.?	Time OUT	a.m./ p.m.?	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
5/17	1000		12 00		Heidi Blischke	GSI	Site Visit
↓	1000		↓		Scott Manzano	DEQ	↓
↓	1000		↓		Sarah Miller	DEQ	↓
↓	10 00		↓		Paul Fishman	Fishman	↓
6/19	1108	~~am~~ pm	1810		Chris Martin	HC	
↓	1108	~~10~~	1810		Jason Miles	HC	
6/19	1:00		3 00		Scott Manzano	DEQ	Site Visit
6/19	↓		↓		Sarah Miller	DEQ	↓
6/19	↓		↓		Heidi Blischke	GSI	↓
6/19	↓		↓		Tim Skrotzki	NC	↓
6/19	↓						
6/19	1:45		1800		John Lauer	HC	SV
6/29	13:13		1358		Jason Miles	HC	Upload Datalogger 445
7/15	125 PM		400	PM	Chris Martin	HC	GPS Damaged Mat along shore
7/25	7:15	am	0845	am	Jason Miles	HC	Mark out utility locations
7/30	12:00	pm	5:20	pm	John Lauer	HC	well Decommissioning

Site Visitation Record
McCormick and Baxter Creosoting Company
Portland, Oregon

SITE VISIT LOG

VISITORS AND WORKERS MUST CHECK IN AND OUT

Date	Time IN	a.m./ p.m.?	Time OUT	a.m./ p.m.?	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
7/30	1:00	P.M.	5:30	PM	Jeremiah Jenkins	CDLP	Drilling
7/30	1:00	PM	5:30	PM	Danny Arnold	CDLP	Drilling
7/30	1:00	PM	5:30	PM	Roy Pilmon	CDLP	Drilling
7/31	800	am	4:00	PM	John Lam	HC	Drilling
"	"	"	"	"	Jeremiah Jenkins	CDLP	"
"	"	"	"	"	Danny Arnold	CDLP	"
"	"	"	"	"	Ray Pilmer	CDLP	
8/1	800	am	100	PM	John Lam	HC	Drilling
8/1	"	"	1655	PM	Jeremiah Jenkins	CDI	"
8/1	"	"	1655	PM	Danny Arnold	CDI	"
8/1	"	"	1655	PM	Ray Pilmer	CDI	"
8/1	1229	PM	1655	PM	Jason Miles	HC	"
8/2	0730	AM	1430	PM	Jeremiah Jenkins	CDI	"
8/2	0730	AM	1430	PM	Danny Arnold	CDI	"
8/2	0730	AM	1430	PM	Ray Pilmer	CDI	"
8/2	0730	AM	1500	PM	Jason Miles	HC	"
8/13	7:45	AM	08:16	AM	Billeris	ASBF	B/F Test

Site Visitation Record
McCormick and Baxter Creosoting Company
Portland, Oregon

SITE VISIT LOG

VISITORS AND WORKERS MUST CHECK IN AND OUT

Date	Time IN	a.m./ p.m.?	Time OUT	a.m./ p.m.?	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
8/13	0745	a.m.	1145	a.m	Jason Miles	Hart Crowser	back flow inspection/ Cut up recycle metal
8/13	0850	AM	1145	a.m	Chris Martin	HC	" "
8/14	15:40		5:42	PM	Erin Carroll	GSI	Bill Fisch's Field Trip
8/14	16:00				LUKE FITZGERALD	PSU	PSU FIELD TRIP
8/14	16:00	PM			Sam Brown	PSU	
8/14	16:00	pm			Jacob Skoglund	PSU	" "
8/14	16:00	PM			Mohamad Mansouri	PSU	" "
8/14	16:00	PM			Saeed Almutairi	PSU	" "
8/14	16:00	PM			SHAUN OLIVER	PSU	" "
8/14	16:00	PM			Greg Lind	PSU	"
8/14	16:00				George Brown	PSU	" "
8/14	16:00	PM			Steve Ahlquist	PSU	" "
8/14	16:00	PM			Pat Lam	PSU	" "
8/14	16:05	PM			Bill Fisch	PSU	" "
8/14	16:00	PM			Ryan Sheean	PSU	"
8/14	16:00	PM			Sky Wasson	PSU	"

Site Visitation Record
McCormick and Baxter Creosoting Company
Portland, Oregon

SITE VISIT LOG

VISITORS AND WORKERS MUST CHECK IN AND OUT

Date	Time IN	a.m./ p.m.?	Time OUT	a.m./ p.m.?	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
10/1/12	1500	PM	1630		Chris Matan	Hart Crowser	Beach reinforcement site work
10/1/12	1500	PM	1630		Keith Setser	Cherokee Construction	Site walk
10/1/12	1500	PM	1530		Chris Ryan	Belfor Env	Site Walk
10/1	1500	PM	1650		Kelly Kellogg	AEC	Site Walk.
10/1	1500	pm	1650		Kim Kellogg	AEC	Site work
10/1	1500	pm	1530		Ray Grebb	Belfor Env.	Site Walk
10/1	1500	pm	1600		Newt Linn	COST	" "
10/1	1500	pm	1650		Bob Ramsdell	NRC	" "
10/15	0725	am	0830	am	Jason Miles	HC	Letting Cherokee in
10/15	8:00	AM	15:30		Keith Setser	Cherokee Construction	Beach work
10/15	8:00	AM	15:30		Jeff Berry	CCS	Beach work
10/16	7:00	AM	15:30		Keith Setser	CCS	Beach work
10/16	7:00	AM	15:30		Jeff Berry	CCS	Beach work
10/16	10:15	AM	12:30	PM	Celina Abercrombie	HC	Veg. inspection
10/17	7:00	AM	17:00		Keith Setser	CCS	Beach work
10/17	7:00	AM	17:00		Jeff Berry	CCS	Beach work
10/17	11:25	AM	12:10	PM	Jason Miles	HC	Construction Oversight

Site Visitation Record
McCormick and Baxter Creosoting Company
Portland, Oregon

SITE VISIT LOG

VISITORS AND WORKERS MUST CHECK IN AND OUT

Date	Time IN	a.m./ p.m.?	Time OUT	a.m./ p.m.?	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
10/18	8:00	AM	16:30	PM	Jeff Berry	CCS	Beach work
10/18	8:00	AM	16:30	PM	Keith Setser	CCS	Beach work
10/19	7:00	AM	17:00	PM	Jeff Berry	CCS	Beach work
10/19	7:00	AM	17:00	PM	Keith Setser	CCS	Beach work
10/A	8:50	Am	1005	am	Jason Miles	HC	Conf. ~~Sampling~~ Observations
10/22	7:20	AM	16:46		Jason Miles	HC	Low Tide Monitoring (PL Downloaded
10/22	7:30	AM	300		Jeff Berry	CCS	Beach work
10/22	7:30	AM	300		Keith Setser	CCS	Beach work
10/22	8:50	Am	11:00		Heidi Blaschke	GST	Site meeting
10/22	7:45	Am	~~16:00~~ 13:30	SM	Andrew Davidson	GSI	Water Levels
10/22	7:45	AM	~~16:00~~ 13:30	SM	Lizzi Barstok	GSI	Water Levels
10/22	8:30	Am	11:00		Chris Martin	GSI	Site Meeting
10/22	8:45	Am	11:00		Scott Manzano	DEQ	"
10/22	8:45	Am	11:00		Sarah Miller	DEQ	"
10/26	09:00	AM	1131		Jason Miles	HC	Install data loggers ACB cable removal

ATTACHMENT B
SEDIMENT CAP OBSERVATIONS

Table 3.2
Example Sediment Inspection Form
McCormick and Baxter Creosoting Company
Portland, Oregon

3/22/2012

Site Observations Form - Sediment Cap
Weekly / Monthly

tbl_site_observations

Category	Observation
gate conditions (weekly)	All locked and secure.
high temp (weekly)	64°F
low temp (weekly)	44°F
wind (weekly)	Light wind 7 to 10 MPH
precipitation (weekly)	1.56 inches
Sheen Observations (see table below)	None Observed
Size and Location	None Observed
Source (gas bubble, debris, etc.)	None Observed
ACB and Riprap Armoring	Good
Changes in Location	Good
Displaced blocks	Good
Vandalism	None Observed
River relative to top of ACB	12 to 30 plus feet (10 feet NAVD88)
Organoclay Mats (extreme low water)	None Observed
Edges of mats visible?	None Observed
Overlying Armoring conditions	Good
Evidence of movement?	None Observed
WC OC/Seep Area	Good
TFA OC/Seep Area	Good
Wildlife	
Fish / Crayfish / clams	Clams
Other	Birds
Warning Signs Condition	Good
Buoy Condition / Location	Four of five buoys visible, one tangled with wood debris
cove shoreline (general)	Good
FWDA shoreline (general)	Good
bulkhead shoreline (general)	Good
TFA shoreline (general)	Good
observations or notes	
Follow Up Inspection	☐ Yes ☐ No Date:

Sheen Description

Location (TFA, FWDA, Willamette Cove) indicate if located on map and attach map	Character (NS, BS, SS, MS, HS)	Size and dimension (inches)	Odor (no odor, petroleum odor. creosote odor, other odor)

Table 3.2
Example Sediment Inspection Form
McCormick and Baxter Creosoting Company
Portland, Oregon

6/19/2012

Site Observations Form - Sediment Cap
Weekly / Monthly

tbl_site_observations	
Category	**Observation**
gate conditions (weekly)	All locked and secure.
high temp (weekly)	71°F
low temp (weekly)	55°F
wind (weekly)	Light wind 5 to 7 MPH
precipitation (weekly)	1.01 inches
Sheen Observations (see table below)	None Observed
Size and Location	None Observed
Source (gas bubble, debris, etc.)	None Observed
ACB and Riprap Armoring	Good
Changes in Location	Good
Displaced blocks	Good
Vandalism	None Observed
River relative to top of ACB	12 to 30 plus feet (10 feet NAVD88)
Organoclay Mats (extreme low water)	None Observed
Edges of mats visible?	None Observed
Overlying Armoring conditions	Good
Evidence of movement?	None Observed
WC OC/Seep Area	Good
TFA OC/Seep Area	Good
Wildlife	
Fish / Crayfish / clams	Clams
Other	Birds
Warning Signs Condition	Good
Buoy Condition / Location	All five buoys visible, two tangled with wood debris
cove shoreline (general)	Good
FWDA shoreline (general)	Good
bulkhead shoreline (general)	Good
TFA shoreline (general)	Good
observations or notes	
Follow Up Inspection	☐ Yes ☐ No Date:

Sheen Description

Location (TFA, FWDA, Willamette Cove) indicate if located on map and attach map	Character (NS, BS, SS, MS, HS)	Size and dimension (inches)	Odor (no odor, petroleum odor. creosote odor, other odor)

Table 3.2
Example Sediment Inspection Form
McCormick and Baxter Creosoting Company
Portland, Oregon

10/22/2012

Site Observations Form - Sediment Cap
Weekly / Monthly

tbl_site_observations

Category	Observation
gate conditions (weekly)	All locked and secure.
high temp (weekly)	55°F
low temp (weekly)	44°F
wind (weekly)	Light wind 7 to 10 MPH
precipitation (weekly)	1.13 inches
Sheen Observations (see table below)	None Observed
Size and Location	None Observed
Source (gas bubble, debris, etc.)	None Observed
ACB and Riprap Armoring	Good
Changes in Location	Good
Displaced blocks	Good
Vandalism	None Observed
River relative to top of ACB	40 to 80 plus feet. (7 feet NAVD)
Organoclay Mats (extreme low water)	None Observed
Edges of mats visible?	None Observed
Overlying Armoring conditions	Good
Evidence of movement?	None Observed
WC OC/Seep Area	Good
TFA OC/Seep Area	Good
Wildlife	
Fish / Crayfish / clams	Clams
Other	Birds
Warning Signs Condition	Good
Buoy Condition / Location	All five buoys in place and in good condition
cove shoreline (general)	Good
FWDA shoreline (general)	Good
bulkhead shoreline (general)	Good
TFA shoreline (general)	Good
observations or notes	
Follow Up Inspection	☐ Yes ☐ No Date:

Sheen Description

Location (TFA, FWDA, Willamette Cove) indicate if located on map and attach map	Character (NS, BS, SS, MS, HS)	Size and dimension (inches)	Odor (no odor, petroleum odor. creosote odor, other odor)

ATTACHMENT C
VEGETATION PLANTING PLAN

August 23, 2012

Mr. Scott Manzano
Oregon Department of Environmental Quality
2020 SW Fourth Avenue Suite 400
Portland, Oregon 97201

Re: Vegetation Planting Plan for Shoreline Repair and Maintenance
McCormick and Baxter Soil O&M
6900 N Edgewater Street
Portland, Oregon
15670-07/Task 2

Dear Scott:

The purpose of this letter is to summarize repair and maintenance activities needed to support shoreline vegetation management at the McCormick and Baxter Creosoting Company Superfund site (Site). The site is located along the east bank of the lower Willamette River at river mile 7.0 between the St. Johns Bridge and Swan Island in Portland, Oregon (Figure 1).

High river levels in mid to late 2011 eroded localized areas of soil along the Site shoreline. Green erosion matting (TRM) is also visible and loose in several areas. This Vegetation Planting Plan is being prepared to outline the process to address shoreline erosion including replanting portions of the shoreline.

INTRODUCTION

In 2005, a soil cap with bank layback was installed at the Site as part of the remedial action. The goal of the bank layback (Riparian area) and plantings was to create habitat elements such as large wood material, riparian vegetation for food, habitat cover and shelter, and shading. The lower Riparian component is subject to fluctuations in the Willamette River, which influences vegetation conditions in this area. In general, we observed the lower Riparian component to be performing well following a late summer 2011 site visit with the installed trees and shrubs looking healthy and spreading. Groundcover species provided relatively good coverage of the soil with the exception of a few areas containing bare ground.

8910 SW Gemini Drive
Beaverton, Oregon 97008-7123
Fax 5033620.6918
Tel 503.620.7284

During routine maintenance visits in early 2012, Hart Crowser and DEQ staff noticed localized areas of erosion within the lower Riparian component. In particular, approximately two locations (labeled large undercut on Figure 2) along the edge of the existing ACB have been scoured out and are in need of replacement soil and vegetation.

These areas are shown on the attached Figure 2 and recommended treatments for these areas are described in detail below.

SUMMARY OF REPAIR AND MAINTENANCE AREAS

A total of nine areas (Figure 2) were identified for TRM repair, soil replacement and/or replanting to help stabilize this area of the shoreline and protect the underlying sediment cap. The two large undercuts will be planted (soil replacement and replanting) and the remaining undercuts will be repaired (TRM repair and soil replacement) but not planted. In general, the individual repair areas are approximately three feet in length and less than one foot wide with the exception of one larger area located along the northern shoreline, which is approximately 60 feet in length and one foot wide. These repair areas total approximately 85 to 90 square feet (sf) in size.

Green Matting (TRM) Repair

Several of the repair locations will require repairing and resecuring the green matting (TRM) in addition to soil replacement where erosion has created shallow undercuts upslope of the ACB blocks. To address these areas, we recommend repairing any holes or tears in the TRM to reduce and prevent future erosion. Following repair of holes or tears, place the TRM over the ACB and keep it taut, and resecure the TRM to the ACB along the length of the loose sections. The edges between the sheets of TRM should overlap and be secured (or nailed) along the seams to strengthen these edges.

Approximately six areas exist where shallow undercuts are present (Figure 2), we recommend lifting the loose TRM, filling the undercut areas to grade with a gravelly soil (4-inch minus angular rock and gravel with fines), placing the TRM over the ACB, and keeping the TRM taut, resecuring the TRM to the ACB. At these repair locations, a total of approximately half a cubic yard (less than 20 cubic feet of voids) of gravelly soil was estimated to fill in minor undercuts.

Soil Replacement

Prior to plant replacement activities, areas with eroded soils adjacent to the ACB will require weeding to remove any invasive, noxious, or non-native plant species to reduce competition with

desirable vegetation for nutrients and water. Following weed removal, small quantities of backfill (topsoil) may be necessary to bring these areas to grade with the adjacent ground surface during and after plant installation.

As needed, approximately 1 gallon of high-quality topsoil should be incorporated into each individual planting pit as a soil amendment. We recommend a planting soil consisting of approximately two-thirds soil (loam and sand) and one-third organic material (compost) thoroughly mixed together prior to arrival at the site. The soil should be sandy loam or loamy sand with an approximate composition of 30 percent loam, 30 percent sand and 40 percent compost.

All soil amendments should be certified free of material toxic to plant growth and noxious weed seeds.

To preserve the integrity of the underlying sediment cap, no digging or soil disturbance should occur deeper than one and a half feet below the ground surface. Thus, planting depth should be limited to one and a half feet. Any excess soil removed for planting must be managed and reused on site.

Plant Species and Quantities

Based on the past and current performance of a number of shrub species installed in the lower Riparian component, we recommend the following shrub species and quantities for shoreline repairs at the site.

Common Name	Scientific Name	Plant Condition	Quantity	Planting Location/Notes
Hardhack	*Spiraea douglasii*	1 gallon	2	Install at individual planting sites
Red-osier dogwood	*Cornus sericea*	1 gallon	4	Install in larger repair area
Sitka willow	*Salix sitchensis*	1 gallon	4	Install in larger repair area

Note: Individual species on this list may be substituted with river willow (*Salix fluviatilis*), rigid willow (*S. rigida*), or other plant species on this list based on plant stock availability.

We recommend installing the above vegetation during the fall to early spring. Periodic watering may be necessary to aid in plant establishment for the first year or two following installation.

SUMMARY

In 2011 and 2012, localized areas of erosion along the Site shoreline at the edge of the ACB were observed. This letter has been prepared to address activities to help stabilize the shoreline and protect the underlying sediment cap. These activities include plant replacement and soil amendments, as needed, at eroding locations to help reduce and prevent future erosion.

We appreciate this opportunity to assist with shoreline repair and maintenance recommendations for your project. If we may provide any additional information or clarification of the above activities, please do not hesitate to contact Celina Abercrombie at (425) 329-1173.

Sincerely,

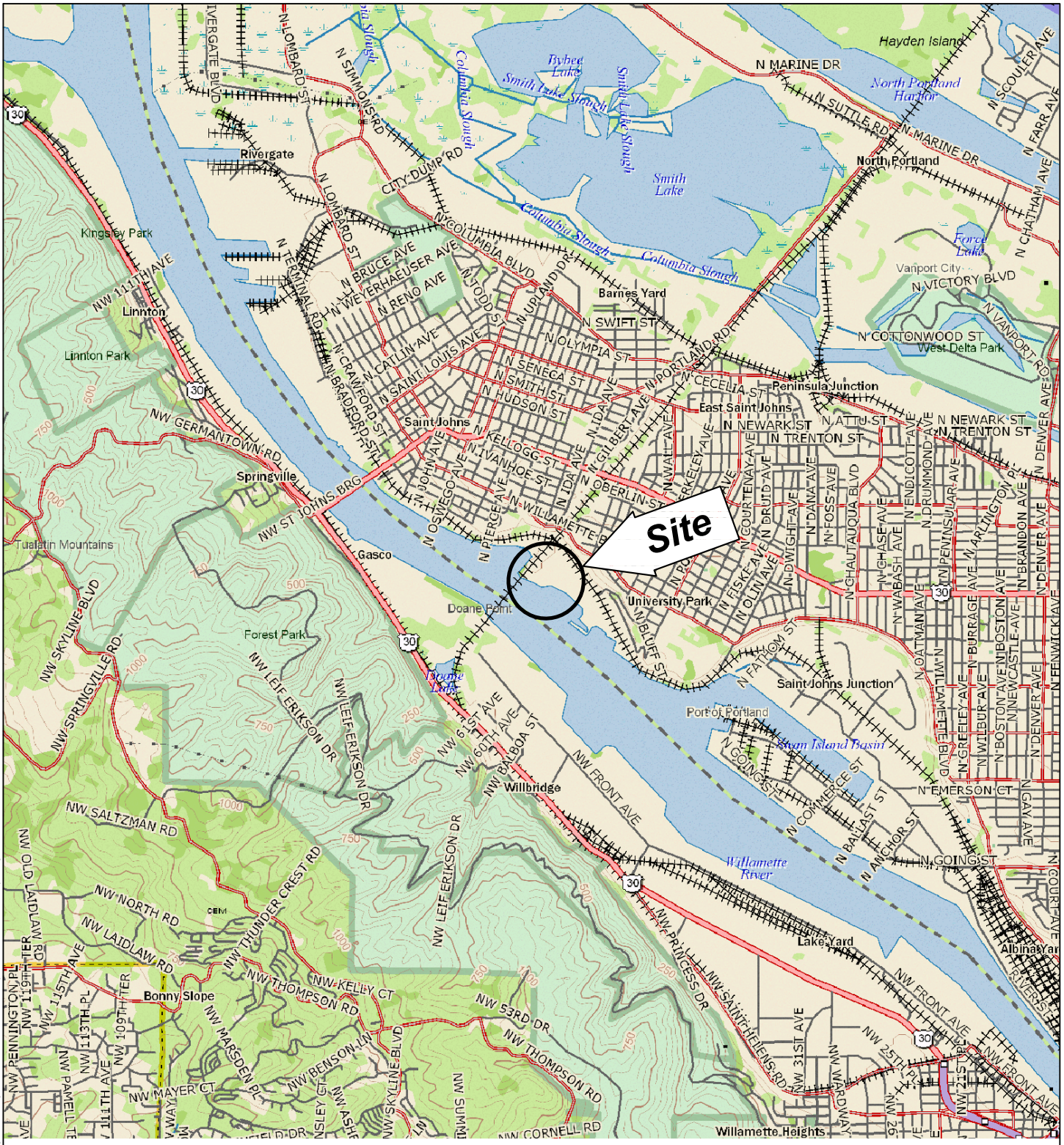
HART CROWSER, INC.

Celina Abercrombie
Ecologist

Richard D. Ernst, RG
Program Manager

Attachments:
Figure 1 – Site Location Map
Figure 2 – Vegetation Planting Plan
Photograph Log

cc: Steve Campbell, DEQ
Sarah Miller, DEQ, NW Region



Source: DeLorme Topo USA.

McCormick and Baxter Superfund Site
6900 N Edgewater Street, Portland, Oregon

Site Location Map

8/12

HARTCROWSER

GSI Water Solutions, Inc.

Figure
1

F:\Data\Jobs\DEQ\15670-xx M&B\15670-07 O&MTk 2\Planting Plan\Figures\1567002203-001 (Site Location Map).dwg

Willamette Cove

Burlington Northern Inc. (Spokane, Portland, and Seattle Railway Co.)

SDMH-B

SDMH-C

SDMH-D

SDMH-E

DRAINAGE SYSTEM

Retention Pond

8" Corrugated HDPE)

Spillway

12" PVC Outfall

High Point

IMPERMEABLE CAP

Subsuface Barrier Wall

RIPARIAN AREA

SEDIMENT CAP

Shallow Undercut

Shallow Undercut

Undercut

Small Undercut

Large Undercut

Large Undercut

Undercut

Undercut

Undercut

Undercut ● Repair Location

Large Undercut ■ Repair/Planting Location

0 150 300

Scale in Feet

N

McCormick and Baxter Superfund Site
Portland, Oregon

Vegetation Planting Plan

8/12

HARTCROWSER GSI Water Solutions, Inc.

Figure
2

F:\Data\Jobs\DEQ\15670-xx M&B\15670-07 O&M\Tk 2\Planting Plan\Figures\156700203-002 (Current Site Layout).dwg

Photograph 1 - Eroded soil observed under the TRM.

Photograph 2 - Soil erosion and damage to the TRM.

ATTACHMENT D
SOIL CAP OBSERVATIONS

Table 3.1
Example Soil Inspection Form
McCormick and Baxter Creosoting Company
Portland, Oregon

3/22/2012

Site Observations Form - Soil Cap
Weekly/Monthly

tbl_site_observations	
Category	**Observation**
Gate Conditions (weekly)	All locked and secure
perimeter fence (weekly)	Good
trespassers, entry point	None Observed
High temp (weekly)	64°F
Low temp (weekly)	44°F
Wind (daily)	Light wind 7 to 10 MPH
Precipitation (weekly)	1.56 inches
Erosion	None Observed
Around Manholes	None Observed
Headway retention pond	None Observed
Eastern edge of property	None Observed
Spillway area	None Observed
Outfall area	Fair
Animal burrows / disturbance	Old squirrel holes near buildings, extra ACB, and randomly throughout site
Manhole conditions	Good
Debris, flow, general condition	No debris, significant flow, greater than 30 GPM
Flow in collection piping	Significant flow, greater than 30 GPM
Outfall and Spillway	
Note approx. flow volume	Significant flow, greater than 30 GPM
Sprinkler System	In place but not in use
Vegetation Conditions	Fair
Wildlife	Birds, Geese
Daily activities	Site Inspection
Obsevations or notes	
Follow Up Inspection	☐ **Yes** ☐ **No** **Date:**

Table 3.1
Example Soil Inspection Form
McCormick and Baxter Creosoting Company
Portland, Oregon

6/19/2012

Site Observations Form - Soil Cap
Weekly/Monthly

tbl_site_observations	
Category	**Observation**
Gate Conditions (weekly)	All locked and secure
perimeter fence (weekly)	Good
trespassers, entry point	None Observed
High temp (weekly)	71°F
Low temp (weekly)	55°F
Wind (daily)	Light wind 5 to 7 MPH
Precipitation (weekly)	1.01 inches
Erosion	None Observed
Around Manholes	None Observed
Headway retention pond	None Observed
Eastern edge of property	None Observed
Spillway area	None Observed
Outfall area	Fair
Animal burrows / disturbance	Old squirrel holes near buildings, extra ACB, and randomly throughout site
Manhole conditions	Good
Debris, flow, general condition	No debris, moderate flow, approximately 5 GPM
Flow in collection piping	Moderate flow, approximately 5 GPM
Outfall and Spillway	
Note approx. flow volume	Moderate flow, approximately 5 GPM
Sprinkler System	In place but not in use
Vegetation Conditions	Fair
Wildlife	Birds, Geese
Daily activities	Site Inspection and Low Tide Monitoring
Obsevations or notes	
Follow Up Inspection	☐ **Yes** ☐ **No** **Date:**

Table 3.1
Example Soil Inspection Form
McCormick and Baxter Creosoting Company
Portland, Oregon

10/22/2012

Site Observations Form - Soil Cap
Weekly/Monthly

tbl_site_observations	
Category	**Observation**
Gate Conditions (weekly)	All locked but the main gate to the site could be opened without unlocking. The post could be pulled out of the ground and the gate swung open. This was repaired the same day.
perimeter fence (weekly)	Good
trespassers, entry point	None Observed
High temp (weekly)	55°F
Low temp (weekly)	44°F
Wind (daily)	Light wind 7 to 10 mph
Precipitation (weekly)	1.13 inches
Erosion	None Observed
Around Manholes	None Observed
Headway retention pond	None Observed
Eastern edge of property	None Observed
Spillway area	None Observed
Outfall area	Fair, needs more rock placement
Animal burrows / disturbance	Old squirrel holes near buildings, extra ACB, and randomly throughout site
Manhole conditions	Good
Debris, flow, general condition	No debris, low flow, less than 1 GPM
Flow in collection piping	Low flow, less than 1 GPM
Outfall and Spillway	
Note approx. flow volume	Low flow, less than 1 GPM
Sprinkler System	In place but not in use
Vegetation Conditions	Good
Wildlife	Birds, Geese
Daily activities	Site Inspection and Low Tide Monitoring
Obsevations or notes	
Follow Up Inspection	☐ **Yes** ☐ **No** **Date:**

ATTACHMENT E
QUARTERLY MEETING SUMMARIES

McCormick & Baxter Operational & Functional Determination Period Status Meeting Report

Thursday, March 22, 2012
1:00 PM
6900 N Edgewater Street
Portland, OR 97203

Meeting called by:	Oregon Department of Environmental Quality (DEQ)	Type of Meeting:	Quarterly Progress Meeting
Facilitator:	Heidi Blischke	Note Taker:	Tim Skrotzki
Attendees:	Scott Manzano	Project Officer	DEQ
	Heidi Blischke	Technical Manager	GSI
	Tim Skrotzki	Site Manager	Hart Crowser

Site Status Meeting Notes

Site Walk and Inspection

Tim Skrotzki, Scott Manzano, and Heidi Blischke completed a thorough inspection of the entire site on Thursday, March 22, 2012. The next inspection is scheduled for June 2012.

Site Walk – Shoreline

The following items were inspected during the shoreline site walk:

- shoreline conditions
- stormwater discharge
- buoy locations

The Willamette River level at the time of the inspection (~1:00 PM) was approximately 10 feet NAVD88 at low tide. A significant amount of debris was observed along the shoreline with large trees, concrete blocks, and a creosote treated log along the shoreline. The majority of the debris was located in the south shoreline area near the City of Portland outfall. Moderate erosion of soil mulch and vegetation cover on the green turf reinforced matting (TRM) was observed along the lower riparian area where the TRM is attached to the ACB.

One warning buoy was not visible and another appeared to have debris dragging on its chain. It appeared the velocity of the Willamette River was higher than normal with significant turbidity.

Significant discharge from the stormwater outfall was observed, as expected with record high precipitation at the Site in March 2012.

Site Walk – Upland

The following items were inspected during the upland site walk:

- soil cap
- monitoring well MW-23d
- EW-1s well-seal and one-way gas release valve

The distance between the inner casing and outer casing on MW-23d is 2.56 inches. This is similar to the previous measurement in December 2011indicating that no additional subsidence has occurred in the EW-1s area this quarter.

Action Items	Person Responsible	Deadline
Follow-up on Buoy Issues	Tim Skrotzki	May 2012
Monitor Stormwater Discharge	Tim Skrotzki	Quarterly
Monitor Subsidence (i.e., MW-23d movement)	Tim Skrotzki	Quarterly
Site Inspections	Tim Skrotzki	Quarterly
Download EW-1s transducer data	Tim Skrotzki	Semi-Annual
Follow-up on repairs for TRM	Tim Skrotzki	May 2012

Site Activities/Miscellaneous Field Activities

Fence Repair: During the December 13, 2011, site inspection, a damaged portion of the upland perimeter fence was observed. It appears trespassers entered the site and damaged a sign. No other damage was observed. Fence repair was conducted by West-Meyer Fence on December 14, 2011.

Equipment Decommissioning: On February 3, 2012, Hart Crowser completed a follow-up visit for equipment decommissioning activities consisting of updating the equipment list for the site in response to comments provided by DEQ.

Transducer Maintenance: On February 16, 2012, data was uploaded and transducers were removed from all site-wells (except EW-1s which was serviced in 2011) for general maintenance servicing. Each transducer was decontaminated and evaluated. After the evaluation, the eleven transducers with serviceable problems were sent to Instrumentation Northwest for general maintenance servicing. Two other transducers (EW-1s and MW-37s) have also been recently serviced. Servicing is being conducted to prepare transducers for long-term deployment at the site.

Shoreline Gravel Placement: Shoreline gravel placement plans will be postponed pending EPA coordination with NOAA.

Activities for Subsequent Period: Transducer re-installation will be completed in May 2012 in accordance with the low-tide monitoring reduction plan. Equipment decommissioning activities will be completed as directed by DEQ. Low-tide monitoring is scheduled for June 2012.

Action Items	Person Responsible	Deadline
Transducer Maintenance Services	Tim Skrotzki/Troy Fowler	March/April 2012
Transducer Re-Installation	Tim Skrotzki/Troy Fowler	May 2012
Semi-Annual Noxious Weed Control	Tim Skrotzki/Native Ecosystems NW	May 2012
Semi-Annual Vegetation Inspection	Tim Skrotzki/Celina Abercrombie	May 2012
Semi-Annual Low-Tide Monitoring	Tim Skrotzki/Troy Fowler	June 2012
Subsidence Observations	Tim Skrotzki	Quarterly
Site Inspections	Tim Skrotzki	Quarterly

Deliverables

Operations and Maintenance (O&M) Plan: A draft O&M Plan was submitted to the DEQ on January 13, 2012. After incorporating DEQ comments, a draft O&M Plan was submitted to the EPA for comment on February 3, 2012. A Draft Final O&M Plan will be completed in May 2012.

Equipment Decommissioning List: A Revised Equipment Decommissioning List was submitted to the DEQ on February 17, 2012. Scott Manzano, Lisa Weaver, and Steve Campbell of DEQ are coordinating equipment decommissioning activities.

Well Decommissioning Plan: A draft Well Decommissioning Plan was submitted to the DEQ on March 13, 2012. After incorporating of DEQ comments, a Final Well Decommissioning Plan will be submitted in late April 2012.

Well Decommissioning Bid Procurement Documents: The draft Well Decommissioning Bid Procurement documents will be submitted to the DEQ in late March 2012.

2011 O&M Annual Report: The draft 2011 O&M Annual Report Appendix B was submitted to the DEQ on March 12, 2012. The draft 2011 O&M Report Appendix C was submitted to the DEQ on March 17, 2012. The draft 2011 O&M Report Main Text and Appendix A was submitted to the DEQ on April 19, 2012. After incorporating DEQ comments, a Final 2011 O&M Report will be submitted in late May 2012.

Action Items	**Person Responsible**	**Deadline**
O&M Plan	Heidi Blischke	May 2012
Well Decommissioning Plan	Heidi Blischke/Tim Skrotzki	May 2012
2011 draft O&M Report Review	Scott Manzano	Late April 2012
2011 Final O&M Report	Tim Skrotzki/Heidi Blischke	Late May 2012
Well Decommissioning Solicitation	Tim Skrotzki	May 2012

Budget

Budget Status: December 2011 through March 2012 - at/or below the anticipated budget.

Meeting Status: The next progress meeting is tentatively scheduled for Tuesday, June 21, 2012.

Date / Time	Tentatively; Tuesday, June 21, 2012	1:00 PM
Location	McCormick & Baxter Facility	Site Office

McCormick & Baxter Operational & Functional Determination Period Status Meeting Report

Tuesday, June 19, 2012
1:00 PM
6900 N Edgewater Street
Portland, OR 97203

Meeting called by:	Oregon Department of Environmental Quality (DEQ)	Type of Meeting:	Quarterly Progress Meeting
Facilitator:	Heidi Blischke	Note Taker:	Tim Skrotzki
Attendees:	Scott Manzano	Project Officer	DEQ
	Sarah Miller	Project Task Manager	DEQ
	Heidi Blischke	Technical Manager	GSI
	Tim Skrotzki	Site Manager	Hart Crowser

Site Status Meeting Notes

Site Walk and Inspection

Tim Skrotzki, Scott Manzano, Sarah Miller, and Heidi Blischke, completed a thorough inspection of the entire site on Tuesday, June 19, 2012. The next inspection is scheduled for October 2012.

Site Walk – Shoreline

The following items were inspected during the shoreline site walk:

- Inspection of the McCormick and Baxter shoreline conditions
- Inspection of the McCormick and Baxter stormwater discharge
- Inspection of buoy locations

Area of damaged green matting in the lower riparian area was observed and documented. The Willamette River level at the time of the inspection (~1:00 PM) was approximately 10 feet NAVD88 at low tide, similar to river levels in March 2012. All buoys were observed; however, two buoys appeared to be partially submerged below the river level, possibly due to debris dragging on chains or river elevation higher than buoy chain length.

Discharge from the stormwater outfall was observed (approximately 5 gallons per minute) consistent with normal precipitation at the Site in June 2012.

Site Walk – Upland

The following items were inspected during the upland site walk:

- Inspection of the soil cap
- Inspection of monitoring well MW-23d
- EW-1s well-seal and one-way gas release valve

The distance between the inner casing and outer casing on MW-23d is 2.56 inches; no movement since previous measurement in March 2012.

Action Items	Person Responsible	Deadline
Monitor Stormwater Discharge	Tim Skrotzki	Quarterly
Monitor Subsidence (i.e., MW-23d movement)	Tim Skrotzki	Quarterly
Site Inspections	Tim Skrotzki	Quarterly

Site Activities/Miscellaneous Field Activities

Low-Tide Monitoring: Low-tide monitoring transducer download and water level measuring activities were completed on June 19, 2012.

Shoreline Repair: A lower riparian area vegetation replanting plan will be completed in late July for implementation in September 2012.

Shoreline Gravel Placement: The EPA approved shoreline gravel placement on July 10, 2012. Solicitation of a shoreline gravel placement and vegetation re-planting subcontractor will be completed in August 2012 for implementation in September 2012.

Activities for Subsequent Period: Well Decommissioning is scheduled for late July 2012. Shoreline gravel placement and repair and semi-annual noxious weed control activities are scheduled for September 2012. Low-tide monitoring and site inspections are scheduled for October 2012.

Action Items	Person Responsible	Deadline
Well Decommissioning	Tim Skrotzki	July 2012
Shoreline Gravel and Repair	Tim Skrotzki	September 2012
Semi-Annual Noxious Weed Control	Tim Skrotzki/Native Ecosystems NW	September 2012
Semi-Annual Vegetation Inspection	Tim Skrotzki/Celina Abercrombie	October 2012
Semi-Annual Low-Tide Monitoring	Tim Skrotzki/Troy Fowler	October 2012
Site Inspections	Tim Skrotzki	October 2012

Deliverables

Well Decommissioning Plan: The Final Well Decommissioning Plan was submitted to the DEQ on April 27, 2012.

Well Decommissioning Bid Procurement Documents: The Well Decommissioning Bid Procurement documents were submitted to the DEQ on May 17, 2012.

2011 O&M Report: The 2011 O&M Report was submitted to the Technical Team on May 30, 2012.

Vegetation Replanting Plan: The draft Vegetation Replanting Plan will be submitted in late July 2012. Based on DEQ comments, the plan will be revised and a final plan submitted in August 2012.

Shoreline Gravel Placement and Replanting Bid Procurement Documents: The Bid Procurement documents will be submitted to the DEQ in August 2012.

Action Items	Person Responsible	Deadline
Vegetation Replanting Plan	Tim Skrotzki	July/August 2012
Shoreline Gravel Placement and Replanting Subcontractor Solicitation	Tim Skrotzki	August 2012

Budget

Budget Status: April through June 2012 - at/or below the anticipated budget.

Meeting Status: The next progress meeting is tentatively scheduled for Tuesday, October 16, 2012.

Date/Time	Tentatively; Tuesday, October 16, 2012	1:00 PM
Location	McCormick & Baxter Facility	Site Office

McCormick & Baxter Operational & Functional Determination Period Status Meeting Report

Tuesday 10/22/12
9:00 A.M.
6900 N. Edgewater Street
Portland, OR 97203

Meeting called by:	Oregon Department of Environmental Quality (DEQ)	Type of Meeting:	Quarterly Progress Meeting
Facilitator:	Heidi Blischke	Note Taker:	Chris Martin
Attendees:	Scott Manzano	Project Officer	DEQ
	Sarah Miller	Project Task Manager	DEQ
	Chris Martin	Field Manager	Hart Crowser
	Heidi Blischke	Technical Manager	GSI

Site Status Meeting Notes

Site Walk and Inspection

Scott Manzano, Sarah Miller, Chris Martin and Heidi Blischke completed a thorough inspection of the entire site on Tuesday October 22, 2012. The next inspection will be scheduled for January 2013.

Site Walk – Shoreline

The following items were inspected during shoreline site walk:

- Willamette and Willamette Cove shoreline conditions
- Gravel overlay on ACB
- Riparian Area Repairs: Turf Reinforcement Mat (TRM) and Plantings
- Buoy locations
- Stormwater discharge

The rounded gravel overlay was nearly complete. The gravel sizing was questioned as it appeared that gravel sizes varied across the site. We were informed by the contractor that all of the gravel passed the 1.5 inch minus sieve but some loads contained a large portion of elongate gravel. Angular gravel had been placed under the turf reinforcement matting where there were voids. The TRM had not yet been stapled and the riparian area plants were not yet planted. This work is expected to be completed by October 24, 2012.

The Willamette River at the time of inspection (between 9:30 and 11:30 AM) was between 7 and 8 feet NAVD88. Low tide was at 7 AM with a tide of approximately 6 feet NAVD88. All of the 5 buoys were present and visible. Discharge from the stormwater outfall was slow (less than 1 gpm) as expected with a long dry period at the Site prior to our visit. It was raining during the visit but there would not have been sufficient time to generate flow. There was a buildup of weeds and algae at the outfall that will be cleaned out.

Site Walk – Upland

The following items were inspected during the upland site walk:

- Site perimeter and fence, and drainage basin
- Soil cap (burrows, erosion, etc.)
- EW-1s and MW-23d area of subsidence

The site perimeter fence was intact, no new areas of burrowing were identified, and the drainage basin was dry. The distance between the inner and outer casing at MW-23d showed no movement from June 2012

measurement – still at 2.56 inches.

Action Items	Person Responsible	Deadline
■ Continue to Monitor MW-23d inner/outer casing relationship for movement.	Chris Martin	Quarterly
■ Remove vegetation from around the outfall	Chris Martin	December 2012
■ Repair gate to garage area – can open when locked	Chris Martin	December 2012
■ Call NW Underwater to have chains lengthened	Heidi Blischke	December 2012
■ E-mail recommendation to Scott regarding drums with soil from MW-2 and MW-3	Heidi Blischke	December 2012

Site Activities/Miscellaneous Field Activities

ACB Gravel Placement and Turf Reinforcement Matt Repair: Completed October 25, 2012.

Buoy Monitoring: It appears buoys resurfaced after the high water levels in Winter and Spring 2012 receded. We will contact NW Underwater to request that they lengthen the chains as part of their previous contract.

Semi-Annual Vegetation Inspection: Celina Abercrombie inspected the riparian area and soil cap area for the vegetative health looking for vitality as well as invasive species in October.

Low-Tide Monitoring: Low-tide monitoring was completed on October 22, 2012.

Well Decommissioning: Well decommissioning was completed by Cascade Drilling in August 2012. Soils have been characterized for disposal. Soils from MW-2 and MW-3 were not hazardous. An e-mail recommendation to dispose of these soils onsite will be submitted to Scott Manzano. Soils from the locations where residual creosote is present are being handled as hazardous waste.

Deliverables

Final 2012 O&M Report: The Final 2012 O&M Report preparation will start at the completion of the Fall 2012 field activities. The draft final report will be submitted to Scott Manzano by January 30, 2012.

Hazardous Waste Disposal Procurement Documents: The Hazardous Waste Disposal Bid Procurement documents were submitted to the DEQ on June 11, 2012.

Action Item	Person Responsible	Deadline
Draft 2012 O&M Report	Heidi Blischke	January 2013

Budget Status: July through September 2012 - at/or below the anticipated budget.

Meeting Status

Date/Time	TBD – January	
Location	McCormick & Baxter Facility	Site Office

ATTACHMENT F
PHOTOGRAPH DOCUMENTATION

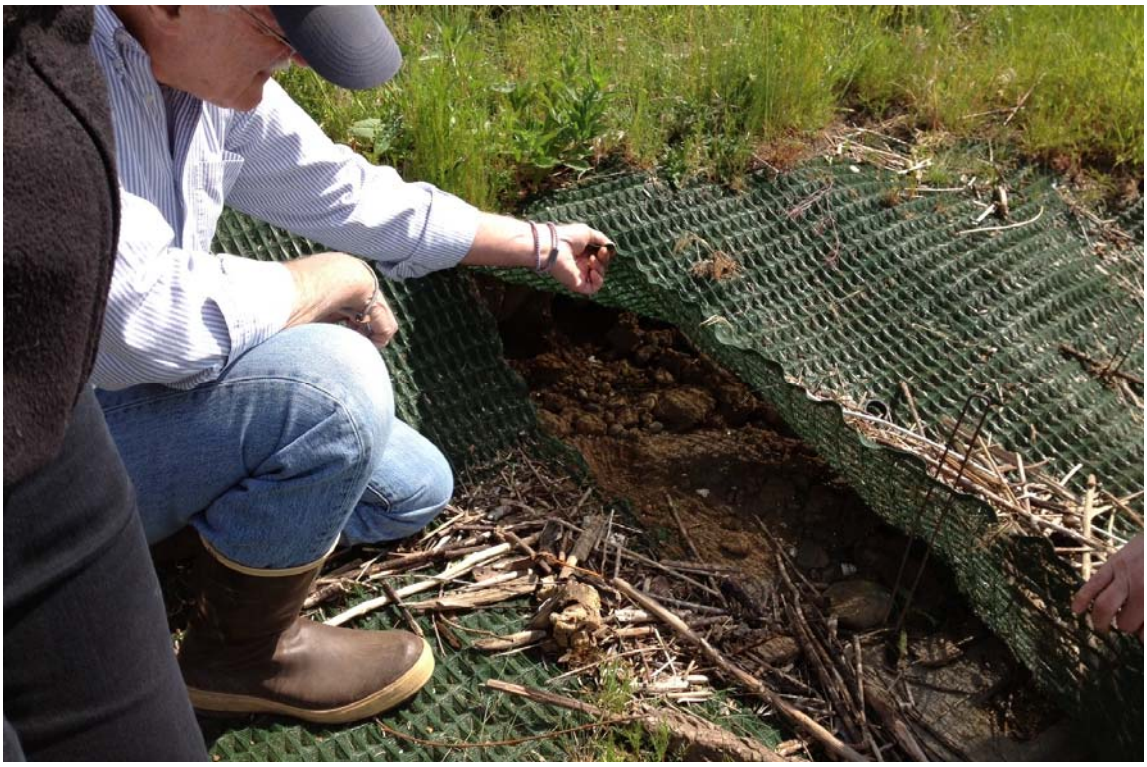
OPERATION AND MAINTENANCE REPORT
JANUARY 2012 TO DECEMBER 2012
MCCORMICK AND BAXTER SUPERFUND SITE
PORTLAND, OREGON

Photograph 1 – Comparison of ACB with and without habitat gravel to fill voids. Photograph taken facing northeast in Willamette Cove.

Photograph 2 – Comparison of ACB with and without habitat gravel to fill voids. Photograph taken facing east.

Photograph 3 – Habitat gravel along the beachfront in the foreground. Rip rap armoring along shoreline in background. Photograph taken facing northwest.

Photograph 4 – Soil can be observed eroding from under the TRM into ACB. Photograph taken facing northwest.



Photograph 5 – Void space under the TRM where soil has eroded away. Photograph taken facing east.

Photograph 6 – Void space under TRM filled in with crushed rock before TRM was re-secured to ACB. Photograph taken facing north.

Photograph 7 – Shoreline with accumulated woody debris. Photograph taken facing southwest.

Photograph 8 – Geese within riparian area. Photograph taken facing north.

Photograph 9 – Transient boats within Willamette Cove. Photograph taken facing west.

Photograph 10 – Transient boat anchor on ACB in Willamette Cove. Photograph taken facing southwest.

Photograph 11 – Stormwater discharge functioning correctly. Photograph taken facing north.

ATTACHMENT G
WELL DECOMMISSIONING PLAN

REQUEST FOR BIDS
WELL DECOMMISSIONING (PERMANENT ABANDONMENT) SERVICES

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
McCORMICK AND BAXTER SUPERFUND SITE
PORTLAND, OREGON

MANDATORY SITE MEETING:
May 9, 2012, 9:00 AM

BID SUBMITTAL DATE:
May 16, 2012, 5:00PM

Introduction

Hart Crowser, Inc., is currently performing environmental services for the Oregon Department of Environmental Quality (DEQ) at the McCormick and Baxter Superfund Site (the Site) in Portland, Oregon (Figure 1). Hart Crowser intends to subcontract well decommissioning services to permanently abandon six monitoring wells at the Site. The work is currently scheduled for June/July 2012.

General Requirements. The selected company must be licensed and bonded in the State of Oregon, and the driller must be an Oregon licensed monitoring well installer. The company must have environmental well decommissioning experience at sites with steel well casing and groundwater contamination. Experience should include removal of steel well casing and abandonment using over-drilling methods. The drilling Subcontractor will be responsible for performing the work in accordance with DEQ and Oregon Water Resources Department (OWRD) regulations and procedures, including obtaining necessary variances and submission of required documentation to the OWRD. A mandatory pre-bid meeting will be held on Wednesday, May 9, 2012, to view the monitoring wells including the varying stick-up monuments and to assess access.

Background Site Information. The Site address is 6900 North Edgewater Avenue, Portland, Oregon, just off North Willamette Boulevard (Figure 1). The Site is located on the Willamette River at approximately River Mile 7, and encompasses approximately 41 acres of land and an additional 23 acres of capped contaminated river sediments. McCormick and Baxter Creosoting Company

operated at the Site between 1944 and1991, treating wood products with creosote, pentachlorophenol, and inorganic (arsenic, copper, chromium, and zinc) preservative solutions. Significant concentrations of wood-treating compounds have been found in soil and groundwater at the Site and in river sediments adjacent to the Site.

Currently, the Site is vacant except for a paved parking area, a small shop building, two field office trailers, and associated utilities used to support ongoing remedial action operations and maintenance. Perimeter gravel roads provide access throughout the site. A security fence encloses the upland portion of the Site providing a secure location for equipment storage. The geologic substrate below the site is comprised primarily of sand and silt with trace gravels and wood debris to 75 feet below ground surface (bgs). Well logs are included in Attachment A. Groundwater is generally between 15 and 30 feet bgs.

Previous Environmental Activities. The EPA listed the Site on the National Priorities List in June 1994. The EPA designated the DEQ as the lead agency for implementing the selected remedy with funding for the remedial design and construction provided by the EPA. The Record of Decision was issued by EPA and DEQ in April 1996. The Remedy addressed contaminated groundwater, sediment, and soil. The groundwater remedy consisted of non-aqueous phase liquid (NAPL) recovery, and a fully-encompassing barrier wall surrounding 18 acres of contaminated soils and groundwater. The objective of the barrier wall is to prevent creosote from migrating to the Willamette River.

Implementation of the soil remedy began in March 1999 and was completed in September 2005 following installation of a combination impermeable/earthen cap. The sediment remedy was implemented in 2004 and primarily consists of a sand cap placed over 23 acres of contaminated sediment. As DEQ and EPA decided to terminate NAPL recovery in late April 2011, a reduced site-wide monitoring plan was implemented including the decommissioning of non-vital wells. Wells to be abandon are located within the earthen soil cap outside of the barrier wall.

Scope of Work

The following descriptions are intended to be a general description of well abandonment activities. Actual procedures implemented must be completed in accordance with the State of Oregon regulations regarding abandonment. Currently, Hart Crowser anticipates the abandonment by over-drilling of six monitoring wells (EW-2s, EW-9s, MW-2s, MW-3s, MW-18s, and MW-Ks) including bollard removal. The locations of the wells to be decommissioned are shown on Figure 2. These wells are constructed with a steel riser and screen and are generally completed with an above ground monument (a boring log for EW-2s is not available). The well depths range from approximately 31 to 47 feet. The anticipated total footage of the wells is 250 feet. Approximately 157 feet consists of two-inch diameter casing; the remaining footage consists of four-inch diameter

casing. Construction details for the six wells that will be abandoned are provided in Table 1, and the original well logs are provided as Attachment 1, if available. Since the wells were originally installed, a soil cap was installed and the wells were raised with additional riser pipe. Casing lengths described in Table 1 account for the soil cap and additional riser pipe.

The drilling Subcontractor will be responsible for providing all drilling equipment and materials and obtaining OWRD approval for the well decommissioning work. Hart Crowser and the DEQ will arrange site access and the marking of underground utilities. Hart Crowser will also clearly mark the six wells that will be abandoned with spray paint and will be on-site to observe this work.

Well Abandonment. The drilling Subcontractor will abandon the wells in accordance with OWRD and DEQ procedures and regulations and get any pre-approval of the abandonment method from OWRD prior to commencing work. Because groundwater contamination exists at the Site, OWRD rules and practices require these wells be abandoned using over-drilling methods.

The over-drilling procedure will, at a minimum, consist of:

- Removing the well monument and concrete surface seal and pulling the steel well casing out of the ground;
- Over-drilling the well bore to the original depth;
- Removing any remaining casing and screen, sand filter pack, and annular seal materials; and
- Pressure grouting with an expanding admixture of bentonite cement will be completed beginning at the bottom of the borehole and will continue to within two feet of the ground surface.

Surface Completion. At least two feet of clean sand fill must to be placed above the bentonite cement seal to match the surface material and surrounding grade, if necessary. Clean sand should also be placed after bollard removal, if necessary.

Documentation. Any permits or abandonment reports shall be prepared and sent to the appropriate agency. Copies of the permits and the OWRD well abandonment logs will be provided to Hart Crowser with the final invoice.

Equipment Decontamination. The selected Subcontractor will provide or construct a temporary decontamination pad. High-pressure washing or steam cleaning of drill rods, augers, and other down-hole equipment before use and between monitoring well locations will be required to prevent the potential for cross contamination. In addition, the Subcontractor will also be responsible for decontaminating any intact steel casing/screen removed from each well. Steel

screen shall be cleaned sufficient for recycling. The decontamination pad must be designed to collect all decontamination water. The Subcontractor will also be required to move drums to the waste storage area as shown on Figure 2. The wells with lesser contamination (MW-2s, MW-3s, and MW-Ks) will be abandoned before the more heavily impacted wells (EW-2s, EW-9s, and MW-18s) to further reduce any chance of spreading site contaminants to uncontaminated areas. Hart Crowser will direct the order of well abandonment on-site. Following project completion, the rig and all associated equipment shall be thoroughly cleaned to remove all oil, grease, mud, etc. If necessary, this cleaning process may consist of a high-pressure steam cleaning. Hart Crowser personnel will inspect all equipment to ensure sufficient cleaning. Water is available at the facility office trailer building. The Subcontractor must provide all equipment necessary for this cleaning process. Decontamination water will be collected in Department of Transportation (DOT) approved drums and handled as described below.

Investigation-Derived Waste (IDW) Handling. Drill cuttings and decontamination fluids from each well will be placed in separate properly labeled DOT-approved drums and stored onsite pending characterization for offsite disposal. The drilling Subcontractor will be responsible for supplying the DOT-approved drums, placing the IDW from each monitoring well into separate drums, and transporting the drummed material to the covered on-site drum storage area (Figure 2). The drilling Subcontractor will not be responsible for IDW storage, profiling or disposal.

Uncontaminated well construction debris (e.g., monument, concrete, cleaned steel casing/screen) will be stored in an on-site drop box provided by Hart Crowser for later disposal. Generally uncontaminated disposable supplies and PPE will be disposed on-site in a regulated waste-box, as directed by Hart Crowser. Construction debris, disposable supplies, and PPE exposed to NAPL will be disposed of separately in a DOT-approved drums or a 1-cubic yard Tote (provided by Hart Crowser).

Health and Safety. The drilling Subcontractor will be responsible for all matters relating to the health and safety of its personnel and equipment in performance of the work. This includes recognition of the potential health and safety hazards associated with the work and compliance with the minimum requirements of the Health and Safety Plan in force for the work. The Subcontractor has the option to exercise more conservative health and safety practices provided a minimum of one day notice is given Hart Crowser. Potential site contaminants include creosote related contaminants such as polynuclear aromatic hydrocarbons, pentachlorophenol, and other petroleum hydrocarbons. For bidding purposes, respiratory protection is not expected to be required.

The Subcontractor will warrant that all its employees are permitted to engage in hazardous waste operations which could expose them to hazardous substances, safety, or health hazards have obtained the necessary health and safety training and medical monitoring as specified in 29 CFR 1910.120,

Hazardous Waste Operations and Emergency Response, and all applicable state and local laws, regulations, and ordinances regarding health and safety.

Anticipated Schedule. For the purposes of this Request for Bids, it is assumed that all on-site work performed by the drilling Subcontractor will be completed in 8-hour days (excluding drill crew travel). The drilling Subcontractor must be able to complete the work by July 31, 2012.

The following is required for the bid submittal:

A) Attendance at the mandatory Site meeting on May 9, 2012 at 9:00 AM.

B) Complete Bid Request Form.

C) Company bonding/licensing information.

D) Company address, phone number, and contact person.

E) The names and descriptions of three projects where the bidder has performed drilling and sampling tasks similar to the planned scope of work.

F) Indication that project schedule can be met (i.e., complete work by July 31, 2012).

Definition of Bid Items

The following defines the bid items listed on the Drilling Sampling Bid Request Form:

- **Mobilization.** Includes all costs to mobilize to the site and demobilize following completion of the work.
- **Well Abandonment.** Well Abandonment lump sum includes all labor, subsistence, materials, and equipment associated with the permanent abandonment of the six identified monitoring wells via over-drilling methods including bollard removal. This includes setup, monument and seal removal, overdrilling, removal of well casing, screen, and filter pack/annular seal, abandonment by pressure grouting, equipment cleaning (e.g., temporary decontamination pad), removed well casing/screen cleaning, additional sand to match surrounding grade, and moving between monitoring wells. This lump sum should also include the costs of completing OWRD reporting requirements and health and safety procedures. Monitoring wells identified for abandonment will be clearly marked and utility notification will be conducted by Hart Crowser prior to conducting the field activities.
- **Standby.** Costs for this item shall include all labor, equipment rental, and materials for standby time associated with well decommissioning services. Standby time is incurred from delays by Hart Crowser, DEQ, or other contractors. Downtime caused by the drilling contractor, such as

for equipment breakage, is not considered standby time. Measurement for standby time shall be based on half-hour increments. No standby time shall be allowed for increments of less than 0.5 hours. Payment shall be based on an hourly rate. Standby time is estimated at one hour per boring for a total of 6 hours.

- **IDW Storage Drums.** Includes the material cost of the drums and handling and transport of IDW (e.g., monuments, concrete, drums, etc.) from each well location to the onsite storage area. IDW profiling and disposal will be performed by others.

Bidding Submittal

If you wish to be considered, you must attend the pre-bid meeting at the Site on Wednesday May 9, 2012, and return a completed price quote (using the attached Bid Request Form) by hard copy, facsimile, or email to Hart Crowser - attention Tim Skrotzki at (503) 620-6918 (FAX) or tim.skrotzki@hartcrowser.com. Bids must be received no later than the indicated bid submittal date/time. Telephone quotes will not be accepted. Only those solicitated can respond. Please contact Tim Skrotzki at (503) 539-6203 if you have any questions regarding this bid request.

Selection will be based on the total adjusted cost derived from the submitted Bid Request Form. The total adjusted cost includes the Subcontractor's total estimated price plus Hart Crowser's oversight costs based on the Subcontractor's schedule (number of days) to complete all onsite work. Additionally, the following mandatory requirements must be met: mandatory Site meeting attendance, proper bonding/licensing, three projects representing similar well abandonment procedures, comply with the above mentioned Health and Safety requirements, and ability to meet the project schedule.

Terms and Conditions

The selected Subcontractor will be required to execute Hart Crowser's agreement for subcontracting services (example included as Attachment B). This agreement has minimum insurance requirements that must be met (Section 6.0). Additionally, there are flow-down provisions in our prime agreement with the DEQ that pertain to subcontracts. Refer to Attachment C for a copy of these provisions. If selected, proof of insurance will be required.

Prevailing Wages

Prevailing Wage Applicability. This project is a construction project subject to the requirements of the Federal Davis-Bacon Act (DBA) Prevailing Wage Rate (information available on-line at http://www.gpo.gov/davisbacon/or.html).

Prevailing Wage Determination. We will require submission of Payroll and Certified Statement forms in accordance with DBA regulations. Additional regulatory requirements may apply. Contractual language required by DBA regulations will be included in our subcontracting agreement with the selected Subcontractor.

Measurement and Payment

The Bid Request Form presents line items for the scope of work described in this Request for Bids. The costs for each line item shall be based on the units and scope of work specified. Material and work paid for under one item will not be paid for under any other item. Except for the items designated on the Bid Request Form, the costs of other items necessary to complete the work as specified are considered incidental to the items specified for measurement and payment.

Payment to the Subcontractor for each line item as shown on the Bid Request Form will be made based on the quantities of work as measured in accordance with the specified methods of measurement and the unit or lump sum prices stipulated in the contract (which will include the completed Bid Request Form); will constitute complete compensation for furnishing all supervision, labor, equipment, overhead, profit, material, and services; and will be paid after accomplishing and completing all required work specified under each item, notwithstanding that minor tasks may not be mentioned herein. Unless explicitly identified elsewhere, all lump sum items shall be considered 100 percent complete when approved by Hart Crowser. Submission of copies of OWRD reports and Payroll and Certified Statement to Hart Crowser is required for payment.

Liquidated Damages

Bidders are required to present the estimated total number of days to complete the work on the Bid Request Form. Failure to complete the work by the specified time indicated on the Bid Request Form will result in damage to Hart Crowser. Since actual damage will be difficult to determine, it is agreed that the Subcontractor shall pay to Hart Crowser, not as a penalty but as liquidated damages, as follows.

Failure to complete the fieldwork within the number of on-site working days entered on the Bid Request Form shall result in liquidated damages of $1,200 per additional on-site working day, or $600 per half day. A half-day is defined as up to 6 hours on any single day. Liquidated damages will not be assessed for schedule adjustments for conditions beyond the control of the Subcontractor or for extensions granted by Hart Crowser.

Liquidated damages are cumulative and not mutually exclusive. Hart Crowser may, at its option, deduct amounts due Hart Crowser as liquidated damages from any money payable to the

Subcontractor, or may bill the Subcontractor as a separate item. Liquidated damages under this section shall be in addition to, and not in lieu of, any other damages, liquidated or otherwise, that may be assessed or payable under this agreement.

Attachments:
Bid Request Form
Table 1 – Well Decommissioning List and Construction Details
Figure 1 – Site Location Plan
Figure 2 – Well Decommissioning Plan
Attachment A – Original Well Logs
Attachment B – Sample Contract
Attachment C – Referenced Section of Prime Agreement

Bid Request Form - Well Decommissioning (Permanent Abandonment) Services
McCormick and Baxter Superfund Site
Portland, Oregon

Item	Units	Quantity	Unit Price	Extension
1. Mobilization	lump sum	1	_____	_____
2. Well Abandonment: 6 Monitoring Wells with a combined casing length of approximately 250 feet.	lump sum[1]	1	_____	_____
3. Standby	hours[1,2]	6	_____	_____
4. Drums for IDW Soil and Water	each[4]	_____	_____	_____
			Total Estimated Price :	_____
Hart Crowser Oversight Costs	Onsite days[1,3]	_____	$1,200/day	_____
			Total Adjusted Cost :	$

[1] Assumes 8 hour (onsite) working days.

[2] Estimated Quantity: Payment will be based on actual quantity used.

[3] Total time (in days) to complete the scope of work.

[4] Includes drum handling and IDW transport to storage location.

Please fill in blanks under Quantity, Unit Price and Extension

Additional Required Information (Attach or Provide Below):

1. Provide documentation of company bonding/licensing.

2. Provide Company Address, Phone Number, and Contact:

3. Describe the procedures and equipment that you will use to abandon these monitoring wells and provide project names and descriptions for three projects where your firm has conducted similar work. Attach extra pages if needed.

Signing this form confirms driller's ability to meet the anticipated schedule (June/July 2012) and your estimate of the time required to complete the work.

Signature: _____

Name: _____

Title: _____

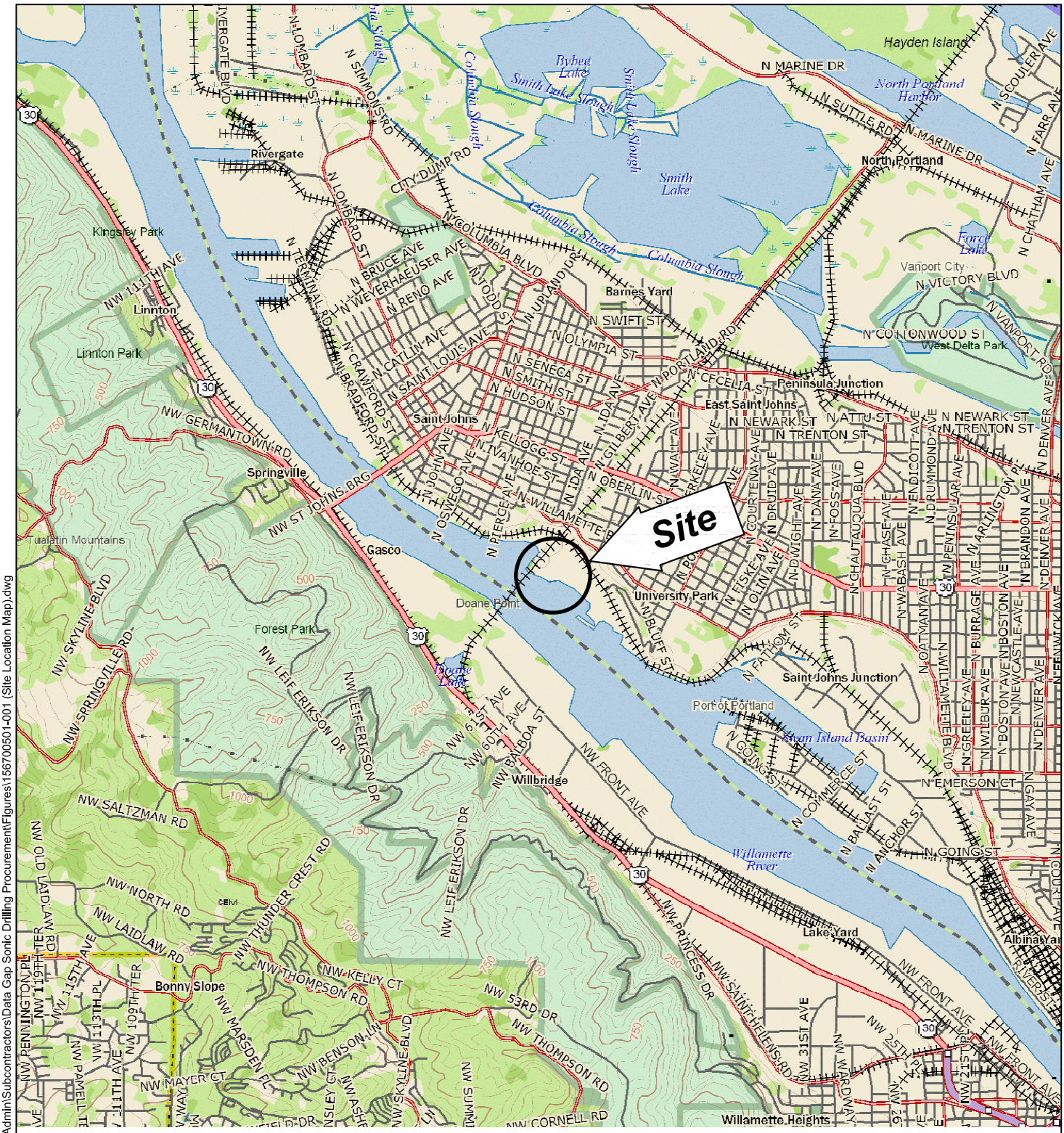
Company: _____

Date: _____

Table 1 - Well Decommissioning List and Construction Details
McCormick and Baxter Superfund Site
Portland, Oregon

Well ID	Date of Well Installation	Northing (NAD 83)	Easting (NAD 83)	Casing Diameter (inches)	Casing Type	Current (2009 survey) Concrete Pad Elevation (NAVD88)	2009 Top of Inner Casing Elevation (NAVD88)	Well TD Elevation (NAVD88)	Total Well Depth[1] (ft bgs)	Total Casing and Screen Length
EW-2s[1,2]	10/1/1987	705093.5424	7627502.46	4	Stainless Steel	40.1	42.4	-4.2	44.3	46.6
EW-9s	9/3/1992	705134.1449	7627491.751	4	Stainless Steel	38.7	40.8	-5.6	44.3	46.4
MW-18s	11/20/1990	705209.2236	7627553.325	2	Stainless Steel	41.3	43.1	-3.2	44.5	46.3
MW-2s	11/2/1990	704455.5015	7629490.957	2	Stainless Steel	35.5	38.3	0.2	35.3	38.1
MW-3s	11/1/1990	704136.107	7629124.121	2	Stainless Steel	30.4	30.6	-0.2	30.6	30.8
MW-Ks	7/10/1984	705806.5256	7628257.961	2	Galvanized Steel	41.6	44.1	2.0	39.6	42.2
						Total Casing Length				250
						Total 2" Casing Length				157
						Total 4" Casing Length				93

Notes:
bgs = below ground surface
NAD83 = North American Datum, 1983
NAVD88 = North American Vertical Datum, 1988
[1] Data taken from the original well log or from field measurement.
[2] Well log is not available.



McCormick and Baxter Superfund Site
6900 N Edgewater Street, Portland, Oregon

Site Location Map

15670-05/Task 1 1/11

HARTCROWSER

Figure
1

F:\Data\Jobs\DEQ\15670-xx M&B\15670-05 New O&FTk 1 - Admin\Subcontractors\Data Gap Sonic Drilling Procurement\Figures\156700501-001 (Site Location Map).dwg

LEGEND

Monitoring Wells

- Monitoring Wells to be Abandoned
- Other Monitoring Wells

All Other Features

- Subsurface Barrier Wall
- Covered Drum Storage Area

NOTE: Aerial photo taken on September 22, 2006

0 200 400

Scale in feet

McCormick and Baxter Superfund Site
Portland, Oregon

Well Decomissioning Plan

04/12

HARTCROWSER GSI Water Solutions, Inc.

Figure
2

File Path: P:\Portland\205 - OR DEQ\003 - 003 McCormick and Baxter\Project GIS\Project mxds\Reduced Monitoring Well Decom Plan\Figure2 Well Decom Plan.mxd, Date: April 2, 2012 4:15:10 PM

ATTACHMENT A
ORIGINAL WELL LOGS

The borelog for

well EW-2

is unavailable

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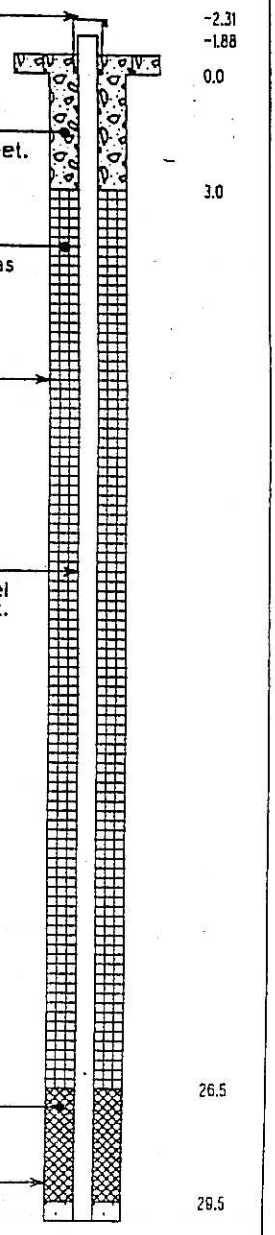
WELL EW-9

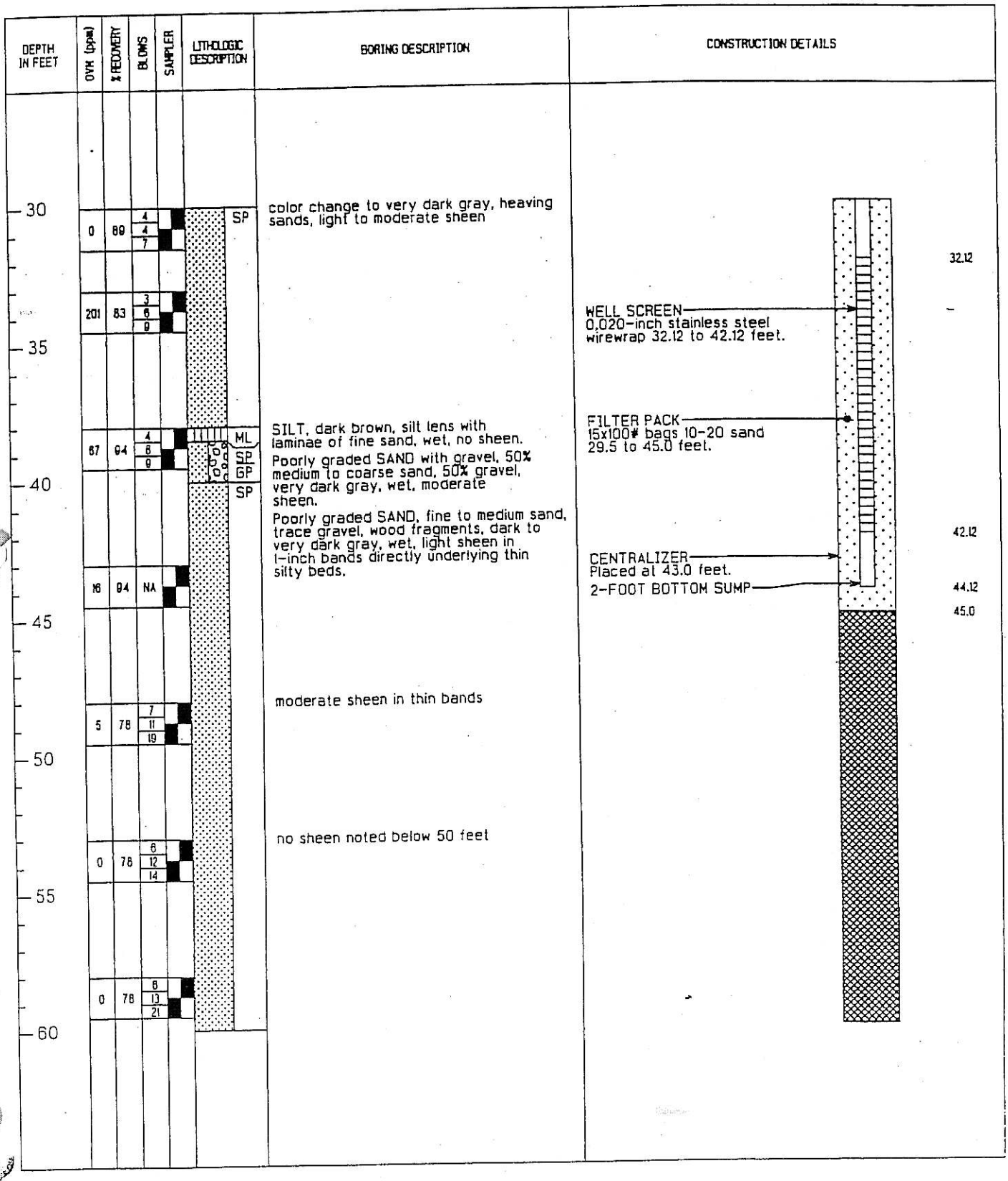
PROJECT MCCORMICK & BAXTER CREOSOTING
LOCATION PORTLAND, OREGON
CONTRACT NUMBER DEQ C8421614
GEOLOGIST/ENGINEER CHASE
DRILLING CONTRACTOR GEOTECH EXPL.
DRILLING METHOD HOLLOW STEM AUGER

DEPTH OF BORING 69.5 FEET
DATE (s) DRILLED 9/3/92
COORDINATES
WELL CASING ELEVATION
SURFACE PAD ELEVATION
TOTAL WELL CASING LENGTH 46.50 FEET

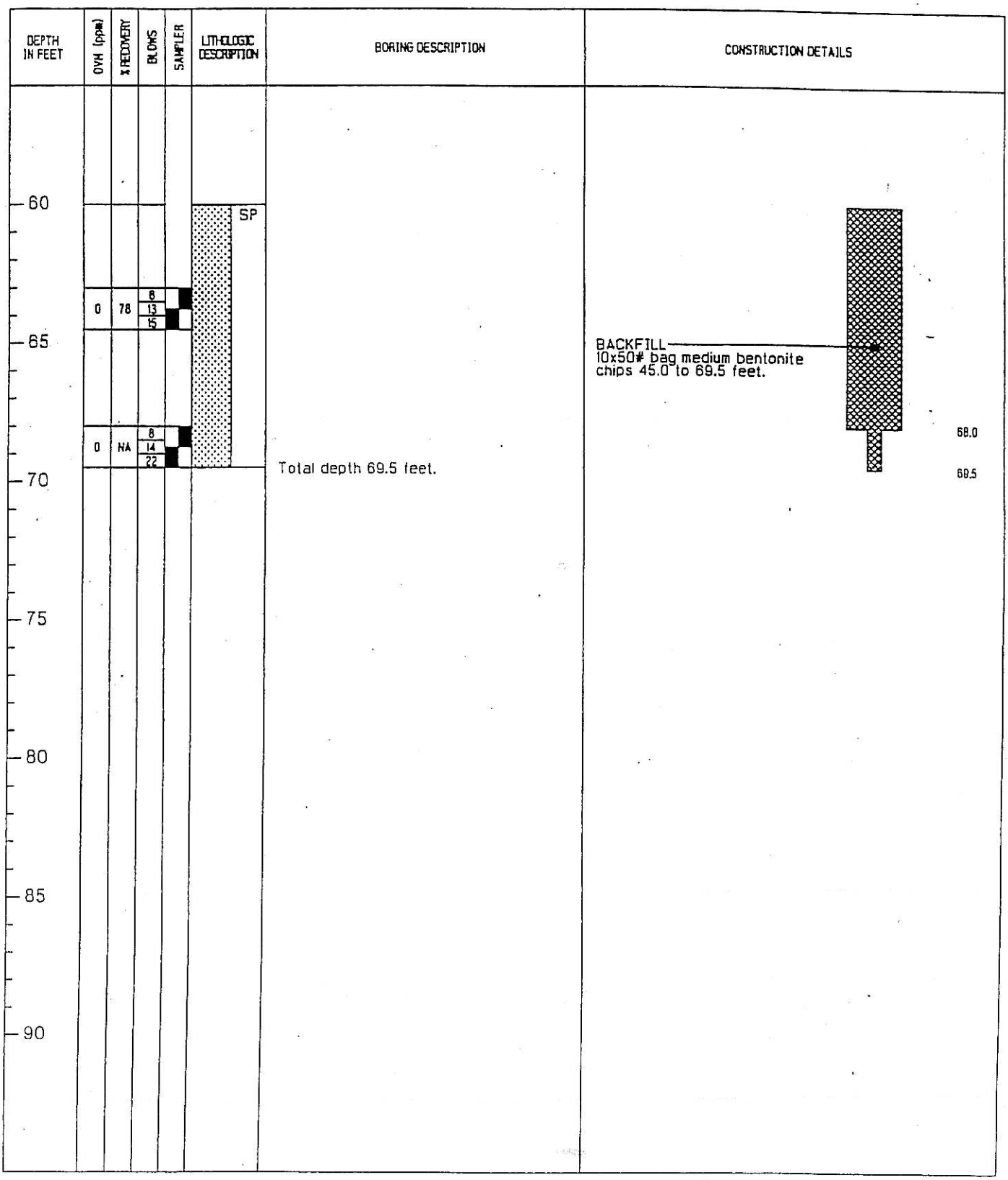
DEPTH IN FEET	OVH (ppm)	% RECOVERY	BLOWS	SAMPLER	LITHOLOGIC DESCRIPTION	BORING DESCRIPTION
0					SP	Poorly graded SAND, medium sand, very dark grayish brown, loose, dry to moist, no odor or sheen.
5	0	89	3, 5, 7			transition to moist
10	0	89	3, 6, 9			trace gravel
15	NA	44	4, 12, 12		GP / SP	GRAVEL, moist. Poorly graded SAND, 80% fine sand, 20% medium sand, trace gravel, very dark grayish brown, moist.
					GP / SP	GRAVEL, moist. Poorly graded SAND, 30% fine sand, 70% medium sand, trace wood, dark brown, with occasional thin silt lenses, moist to wet.
20	0	44	6, 15, 18			
25	0	100	6, 13, 14			
30						Water level at 29.0 feet 9/3/92.

CONSTRUCTION DETAILS




DEPTH IN FEET
OVM (ppm)
% RECOVERY
BLOWS
SAMPLER
LITHOLOGIC DESCRIPTION
BORING DESCRIPTION
CONSTRUCTION DETAILS
30
35
40
45
50
55
60
0 89 4 4 7
201 83 3 6 9
67 94 4 6 9
16 94 NA
5 78 7 11 19
0 78 6 12 14
0 78 6 13 21
SP
ML
SP
GP
SP
color change to very dark gray, heaving sands, light to moderate sheen
SILT, dark brown, silt lens with laminae of fine sand, wet, no sheen.
Poorly graded SAND with gravel, 50% medium to coarse sand, 50% gravel, very dark gray, wet, moderate sheen.
Poorly graded SAND, fine to medium sand, trace gravel, wood fragments, dark to very dark gray, wet, light sheen in 1-inch bands directly underlying thin silty beds.
moderate sheen in thin bands
no sheen noted below 50 feet
WELL SCREEN
0.020-inch stainless steel wirewrap 32.12 to 42.12 feet.
FILTER PACK
15x100# bags 10-20 sand
29.5 to 45.0 feet.
CENTRALIZER
Placed at 43.0 feet.
2-FOOT BOTTOM SUMP
32.12
42.12
44.12
45.0

WELL EW-9


DEPTH IN FEET
OVM (ppm)
% RECOVERY
BLOWS
SAMPLER
LITHOLOGIC DESCRIPTION
BORING DESCRIPTION
CONSTRUCTION DETAILS
60
65
70
75
80
85
90
SP
0
78
6
13
15
0
NA
8
14
22
Total depth 69.5 feet.
BACKFILL
10x50# bag medium bentonite chips 45.0 to 69.5 feet.
68.0
69.5

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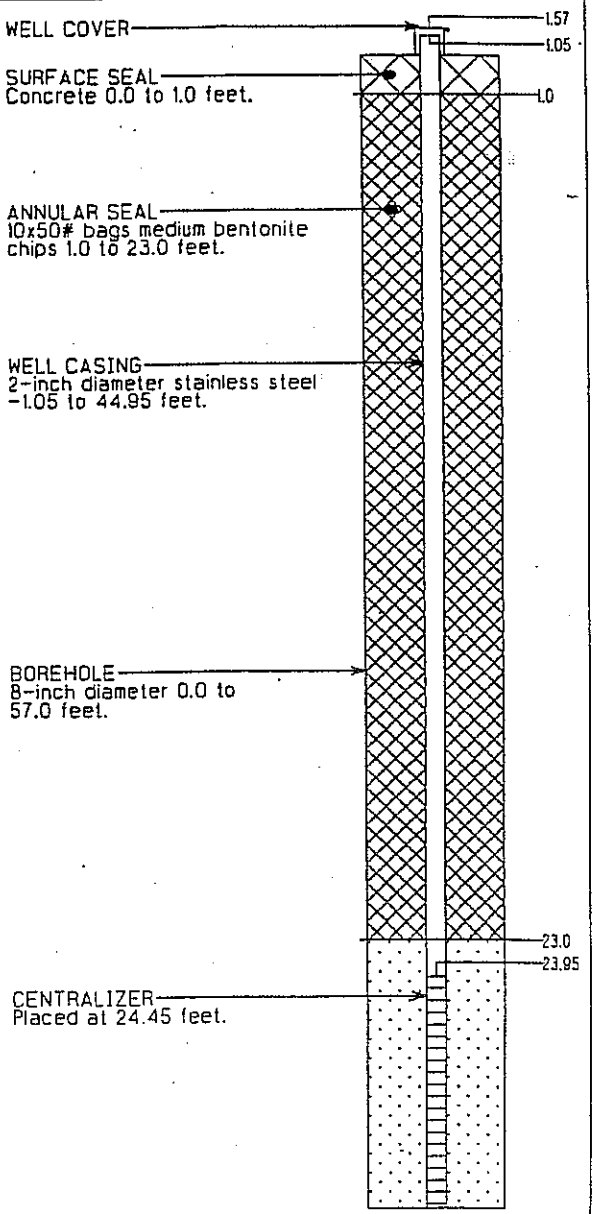
WELL MW-18s

PROJECT MCCORMICK & BAXTER CREOSOTING
LOCATION PORTLAND, OREGON
CONTRACT NUMBER DEQ C8421603
GEOLOGIST/ENGINEER McBETH & GOODE
DRILLING CONTRACTOR ESD
DRILLING METHOD MOD. HOLLOW STEM AUGER

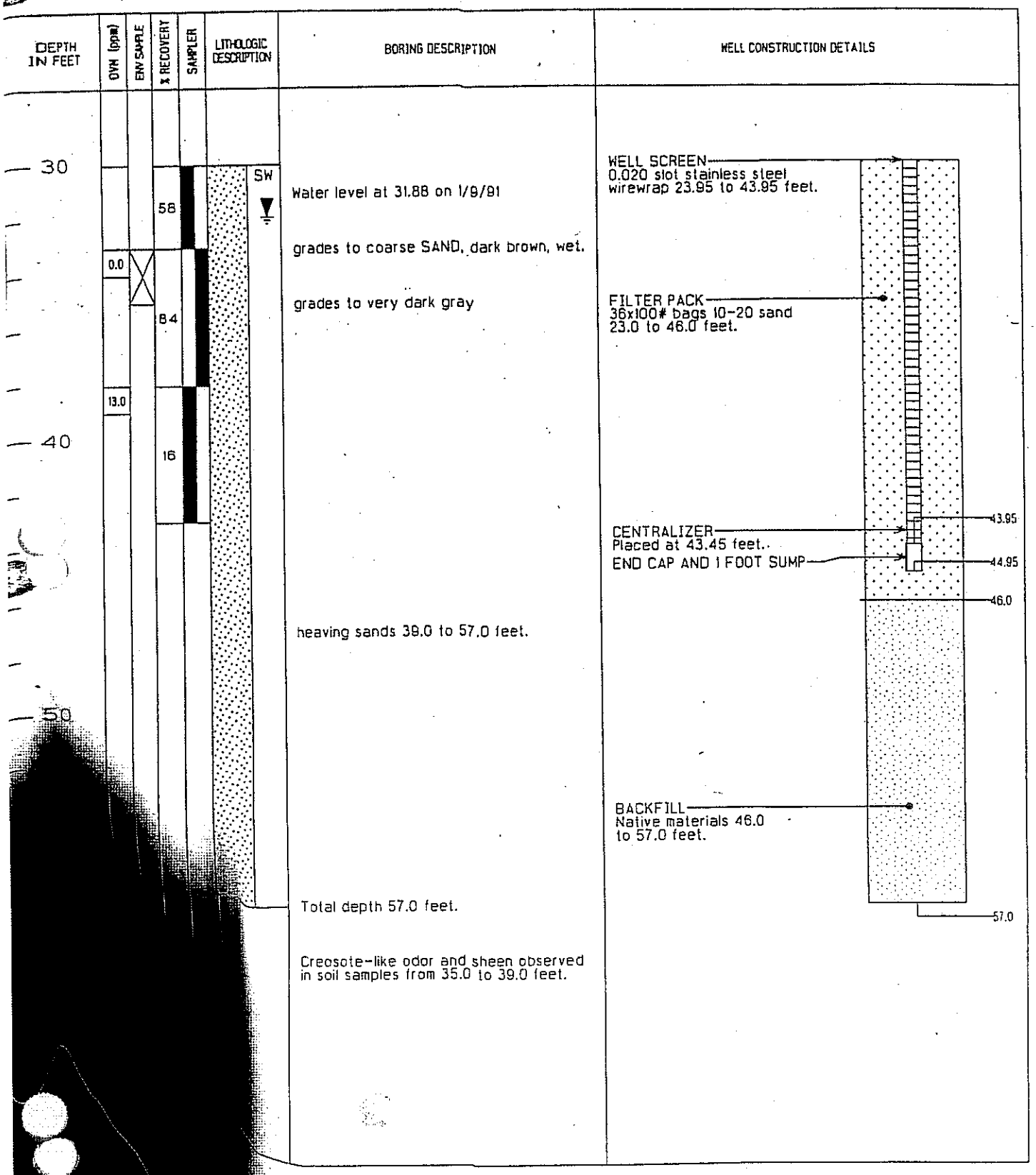
DEPTH OF BORING 57.0 FEET
DATE (s) DRILLED NOV 19-20, 1990
COORDINATES 705192.175, 1425631.050
WELL CASING ELEVATION 40.64 FEET
SURFACE PAD ELEVATION 39.59 FEET
TOTAL WELL CASING LENGTH 46.00 FEET

DEPTH IN FEET	OVH (ppm)	ENV SAMPLE	% RECOVERY	SAMPLER	LITHOLOGIC DESCRIPTION	BORING DESCRIPTION
0	0.0		66		SP	Medium SAND with trace silt and organic material, very dark gray, moist.
	3.0		70			
	5.0		76		SW	Medium to coarse SAND with trace silt, dark gray, moist.
10			56			
			62			
20	0.0		64			
	0.0		58			
30						

WELL CONSTRUCTION DETAILS



WELL MW-18s


DEPTH IN FEET
OVM (ppm)
ENV SAMPLE
% RECOVERY
SAMPLER
LITHOLOGIC DESCRIPTION
BORING DESCRIPTION
WELL CONSTRUCTION DETAILS
30
40
50
SW
58
84
16
0.0
13.0
Water level at 31.88 on 1/9/91
grades to coarse SAND, dark brown, wet.
grades to very dark gray
heaving sands 39.0 to 57.0 feet.
Total depth 57.0 feet.
Creosote-like odor and sheen observed in soil samples from 35.0 to 39.0 feet.
WELL SCREEN
0.020 slot stainless steel wirewrap 23.95 to 43.95 feet.
FILTER PACK
36x100# bags 10-20 sand 23.0 to 46.0 feet.
CENTRALIZER
Placed at 43.45 feet.
END CAP AND 1 FOOT SUMP
BACKFILL
Native materials 46.0 to 57.0 feet.
43.95
44.95
46.0
57.0

WELL MW-2S

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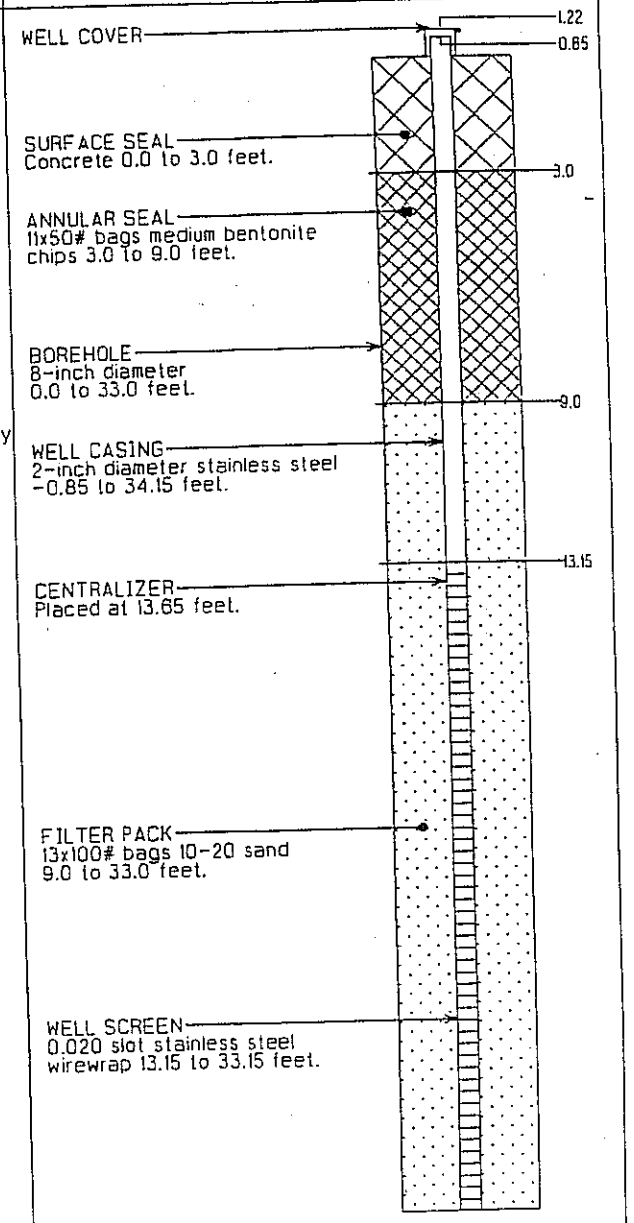
ENVIRONMENTAL SERVICES

PROJECT MCCORMICK & BAXTER CREOSOTING
LOCATION PORTLAND, OREGON
CONTRACT NUMBER DEQ C8421603
GEOLOGIST/ENGINEER D. LIVERMORE
DRILLING CONTRACTOR ESD
DRILLING METHOD MOD. HOLLOW STEM AUGER

DEPTH OF BORING 37.5 FEET
DATE (s) DRILLED NOV 1-2, 1990
COORDINATES 704440.919, 1427569.703
WELL CASING ELEVATION 33.11 FEET
SURFACE PAD ELEVATION 32.26 FEET
TOTAL WELL CASING LENGTH 35.00 FEET

DEPTH IN FEET	OVH (ppm)	ENV SAMPLE	% RECOVERY	SAMPLER	LITHOLOGIC DESCRIPTION	BORING DESCRIPTION
0			90		SM	Silty fine to medium SAND with trace gravel and organic material, dark brown to reddish brown, moist.
			80			
10			86		SM ML	Silty medium SAND, interbedded with sandy SILT, slightly plastic, brown, moist.
					SM	Silty medium SAND, brown, moist.
			80		SP	Fine to medium SAND, with trace of silt and fine gravel, brown, moist to wet.
20			80			Water level at 21.83 feet on 3/4/91
			80		SW	Fine to coarse SAND, with fine gravel to cobbles, increasingly silty with depth, dark brown to gray, wet.
			100		ML	
30						

WELL CONSTRUCTION DETAILS



WELL MW-2S

DEPTH IN FEET	OVM (ppm)	ENV SAMPLE	% RECOVERY	SAMPLER	LITHOLOGIC DESCRIPTION	BORING DESCRIPTION	WELL CONSTRUCTION DETAILS
30					ML	SILT, low plasticity, very dark gray, wet	
			100		SW	Fine to coarse SAND, with trace silt, very dark gray, wet.	CENTRALIZER Placed at 32.65 feet.
			91				1-FOOT SUMP AND END CAP — 33.15
							— 34.15
						Total depth 37.5 feet.	BACKFILL Native material 34.15 to 37.5 feet.
40						No sheen or odor observed in soil samples at any interval.	— 37.5
50							
60							

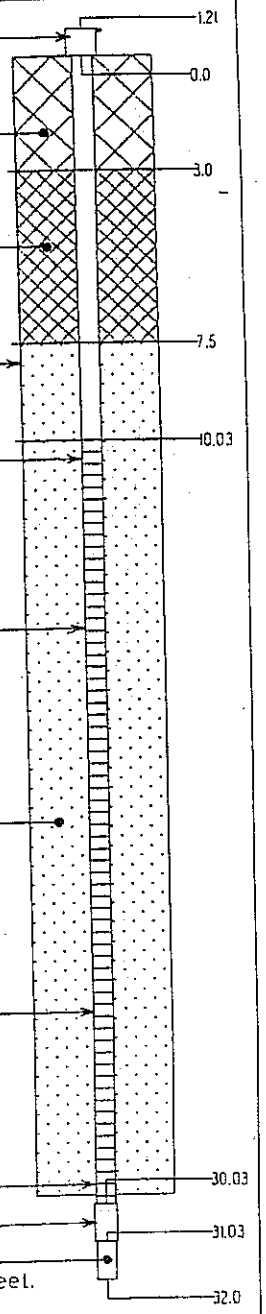
PTI
ENVIRONMENTAL SERVICES

WELL MW-3s

PROJECT MCCORMICK & BAXTER CREOSOTING
LOCATION PORTLAND, OREGON
CONTRACT NUMBER DEQ C8421603
GEOLOGIST/ENGINEER D. LIVERMORE
DRILLING CONTRACTOR ESD
DRILLING METHOD MOD. HOLLOW STEM AUGER

DEPTH OF BORING 32.0 FEET
DATE (s) DRILLED OCT 30-NOV 1, 1990
COORDINATES 704124.240, 1427205.050
WELL CASING ELEVATION 28.77 FEET
SURFACE PAD ELEVATION 28.77 FEET
TOTAL WELL CASING LENGTH 31.03 FEET

DEPTH IN FEET	OVA (ppm)	ENV SAMPLE	% RECOVERY	SAMPLER	LITHOLOGIC DESCRIPTION	BORING DESCRIPTION
0					GM	Silty GRAVEL with organic material, brown, moist
			100		SP	Fine to medium SAND with trace gravel and organic material, gray, moist.
					SP-SM	Fine to medium SAND with silt and trace gravel and organic material, dark gray, moist.
			93			
	0.0					
10			75			
					PT	WOOD (cribbing), fresh, dry interior, moist and orange exterior.
			52		ML	Clayey SILT with trace sand and organics, dark gray, moist.
						WOOD, water level at 16.27 feet on 3/4/91.
					ML-PT	SILT and WOOD.
20			70		PT	WOOD, fresh, dark reddish brown.
					PT SM	WOOD and PEAT, with minor clayey SILT, very dark gray, wet.
			100		ML SM	Sandy SILT with clay, interbedded with silty fine SAND with trace natural organic material, very dark gray, wet.
30			100			Total depth 32.0 feet.
						No sheen or odor observed in soil samples at any interval.



WELL CONSTRUCTION DETAILS

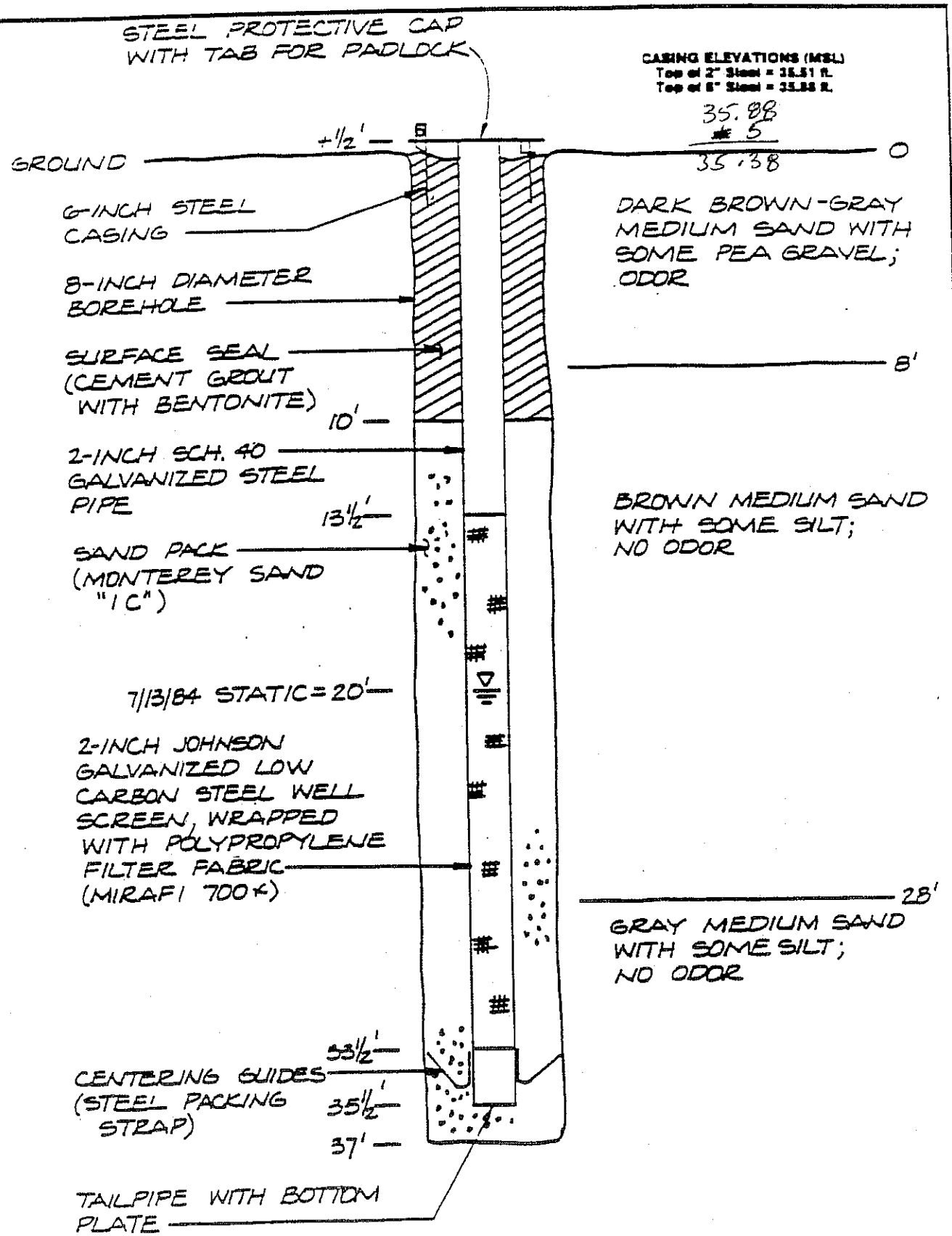


FIGURE B-7
MW-K Record Drawing
McCormick & Baxter Creosoting Co.
Portland, Oregon

P1TT74.A0

ATTACHMENT H
WELL DECOMMISSIONING LOGS, FIELD REPORTS, AND VARIANCE

MULT 111100

STATE OF OREGON
MONITORING WELL REPORT
(as required by ORS 537.765 & OAR 690-240-0395)

10/29/2012

WELL I.D. LABEL# L

START CARD # 1017266

(1) LAND OWNER

Owner Well I.D. MW9S

First Name P12230-5991 Last Name

Company MC CORMICK/BAXTER CREOSOTING C

Address PO BOX 3344

City PORTLAND State OR Zip 97208-3344

(2) TYPE OF WORK

☐ New ☐ Deepening ☐ Conversion ☐ Alteration (repair/recondition) ☒ Abandonment

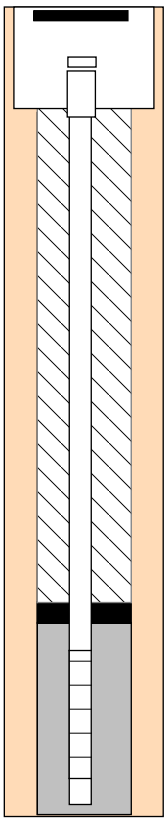
(3) DRILL METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable ☒ Hollow Stem Auger ☐ Cable Mud ☐ Reverse Rotary ☐ Other

(4) CONSTRUCTION

Piezometer Well ☐

Depth of Completed Well 45.00 ft. Special Standard ☐



MONUMENT/VAULT

From To

BORE HOLE

Diameter 8 From 0 To 45

CASING

Dia. From To

Gauge Wld Thrd

Material ◯Steel ◯Plastic ☐ ☐

LINER

Dia. From To

Gauge Wld Thrd

Material ◯Steel ◯Plastic ☐ ☐

SEAL

From 0 To 3

Material Concrete

Amount 4 Sacks Grout weight

SCREEN

Casing/Liner Material

Diameter From To

Slot Size

FILTER

From To Material Size of pack

(5) WELL TESTS

◯ Pump ◯ Bailer ◯ Air ◯ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Temperature °F Lab analysis ☐ Yes By

Supervising Geologist/Engineer

Water quality concerns? ☐ Yes (describe below)

From	To	Description	Amount	Units

(6) LOCATION OF WELL (legal description)

County MULTNOMAH Twp 1.00 N N/S Range 1.00 E E/W WM

Sec 7 SW 1/4 of the SW 1/4 Tax Lot 100

Tax Map Number Lot

Lat ° ' " or DMS or DD

Long ° ' " or DMS or DD

◉ Street address of well ◯ Nearest address

6900 N EDGEWATER AVE, PORTLAND, OR 97203

(7) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening	8/2/2012		☐	15
Completed Well			☐	

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES Depth water was first found

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
					☐	
					☐	
					☐	
					☐	
					☐	

(8) WELL LOG

Ground Elevation

Material	From	To

Date Started 8/2/2012 Completed 8/2/2012

(unbonded) Monitor Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon monitoring well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number 10641 Date 10/29/2012

Password : (if filing electronically)

Signed RORY PILMORE (E-filed)

(bonded) Monitor Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon monitoring well construction standards. This report is true to the best of my knowledge and belief.

License Number 10423 Date 10/29/2012

Password : (if filing electronically)

Signed DARRYL METZGER (E-filed)

Contact Info (optional)

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version:

MONITORING WELL REPORT - continuation page

MULT 111100

10/29/2012

WELL I.D. LABEL# L________________

START CARD # 1017266

(4) CONSTRUCTION

BORE HOLE

Dia	From	To

FILTER PACK

From	To	Material	Size

SEAL

Material	From	To	Amt	sacks/ lbs	grout weight
Cement	3	45	6	S	

CASING/LINER

Casing Liner	Dia	+	From	To	Gauge	Stl Plstc	Wld	Thrd

SCREENS

Perf/ Screen	Casing/ Liner	Screen Dia	From	To	Scrn size/ slot width	Slot length	# of slots	Tele/ pipe size

(5) WELL TESTS

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Water Quality Concerns

From	To	Description	Amount	Units

(7) STATIC WATER LEVEL

Water Bearing Zones

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(8) WELL LOG

Material	From	To

Comments/Remarks

PTI
ENVIRONMENTAL SERVICES

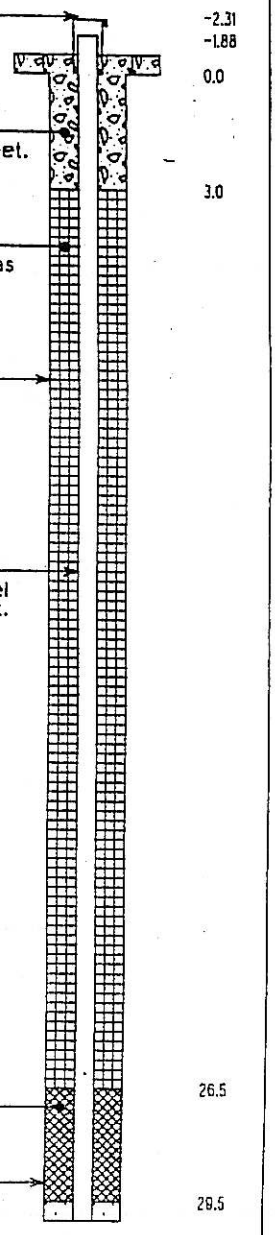
WELL EW-9

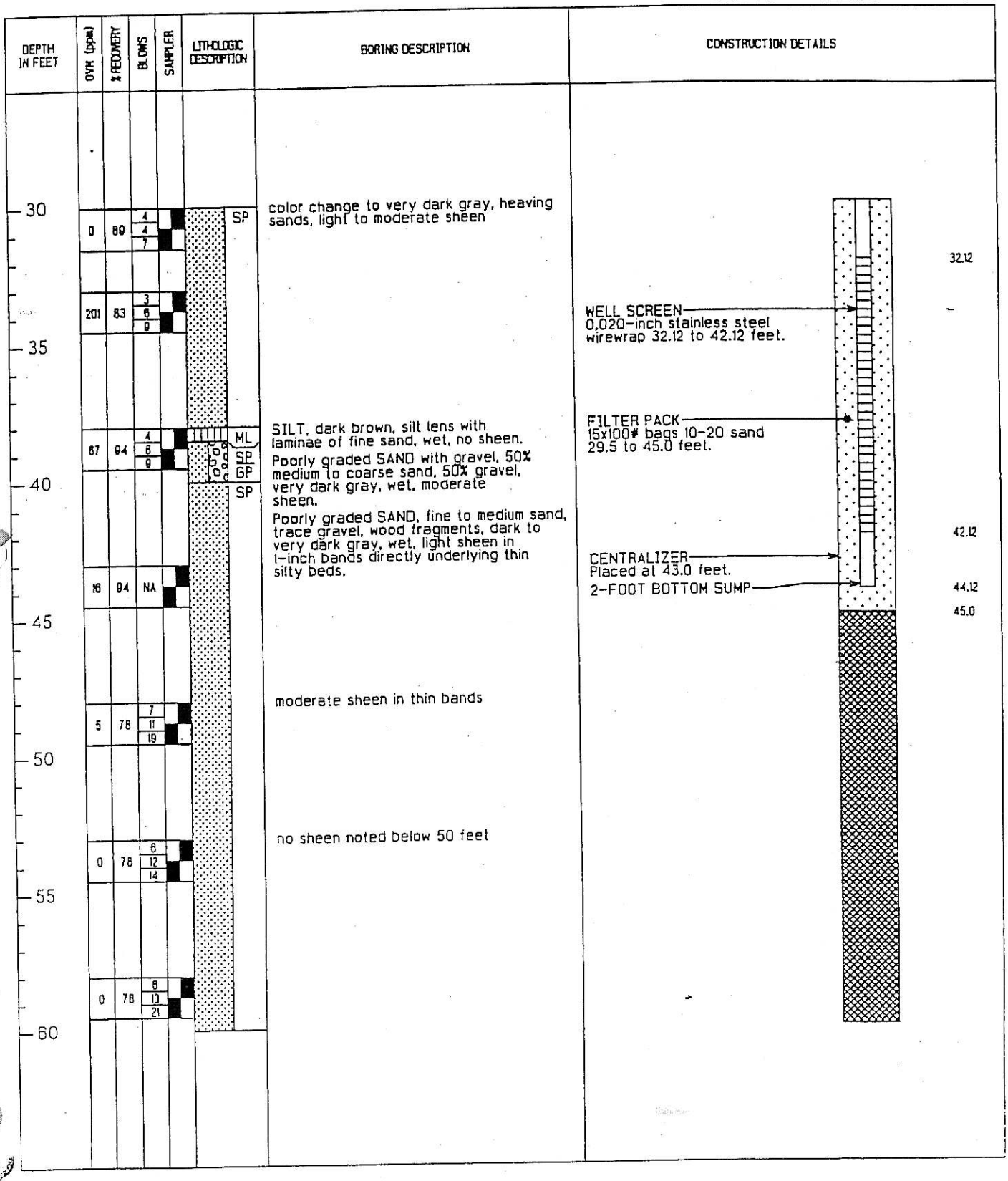
PROJECT MCCORMICK & BAXTER CREOSOTING
LOCATION PORTLAND, OREGON
CONTRACT NUMBER DEQ C8421614
GEOLOGIST/ENGINEER CHASE
DRILLING CONTRACTOR GEOTECH EXPL.
DRILLING METHOD HOLLOW STEM AUGER

DEPTH OF BORING 69.5 FEET
DATE (s) DRILLED 9/3/92
COORDINATES
WELL CASING ELEVATION
SURFACE PAD ELEVATION
TOTAL WELL CASING LENGTH 46.50 FEET

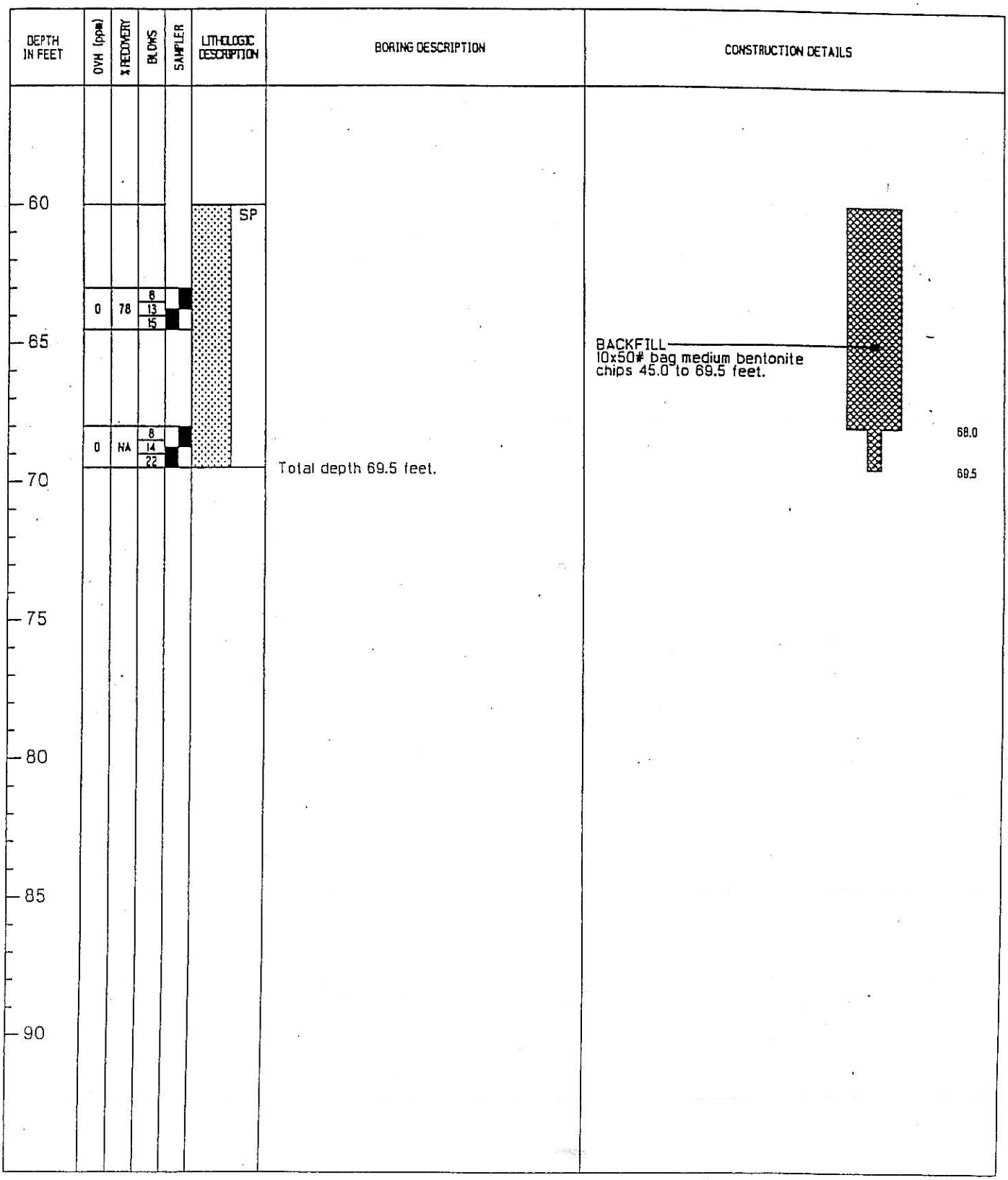
DEPTH IN FEET	OVH (ppm)	% RECOVERY	BLOWS	SAMPLER	LITHOLOGIC DESCRIPTION	BORING DESCRIPTION
0					SP	Poorly graded SAND, medium sand, very dark grayish brown, loose, dry to moist, no odor or sheen.
5	0	89	3, 5, 7			transition to moist
10	0	89	3, 6, 9			trace gravel
15	NA	44	4, 12, 12		GP / SP	GRAVEL, moist. Poorly graded SAND, 80% fine sand, 20% medium sand, trace gravel, very dark grayish brown, moist.
					GP / SP	GRAVEL, moist. Poorly graded SAND, 30% fine sand, 70% medium sand, trace wood, dark brown, with occasional thin silt lenses, moist to wet.
20	0	44	6, 15, 18			
25	0	100	6, 13, 14			
30						Water level at 29.0 feet 9/3/92.

CONSTRUCTION DETAILS




DEPTH IN FEET
OVM (ppm)
% RECOVERY
BLOWS
SAMPLER
LITHOLOGIC DESCRIPTION
BORING DESCRIPTION
CONSTRUCTION DETAILS
30
35
40
45
50
55
60
0 89 4 4 7
201 83 3 6 9
67 94 4 6 9
16 94 NA
5 78 7 11 19
0 78 6 12 14
0 78 6 13 21
SP
ML
SP
GP
SP
color change to very dark gray, heaving sands, light to moderate sheen
SILT, dark brown, silt lens with laminae of fine sand, wet, no sheen.
Poorly graded SAND with gravel, 50% medium to coarse sand, 50% gravel, very dark gray, wet, moderate sheen.
Poorly graded SAND, fine to medium sand, trace gravel, wood fragments, dark to very dark gray, wet, light sheen in 1-inch bands directly underlying thin silty beds.
moderate sheen in thin bands
no sheen noted below 50 feet
WELL SCREEN
0.020-inch stainless steel wirewrap 32.12 to 42.12 feet.
FILTER PACK
15x100# bags 10-20 sand
29.5 to 45.0 feet.
CENTRALIZER
Placed at 43.0 feet.
2-FOOT BOTTOM SUMP
32.12
42.12
44.12
45.0

WELL EW-9


DEPTH IN FEET
OVM (ppm)
% RECOVERY
BLOWS
SAMPLER
LITHOLOGIC DESCRIPTION
BORING DESCRIPTION
CONSTRUCTION DETAILS
60
65
70
75
80
85
90
SP
0
78
6
13
15
0
NA
8
14
22
Total depth 69.5 feet.
BACKFILL
10x50# bag medium bentonite chips 45.0 to 69.5 feet.
68.0
69.5

MULT 111099

STATE OF OREGON
MONITORING WELL REPORT
(as required by ORS 537.765 & OAR 690-240-0395)

10/29/2012

WELL I.D. LABEL# L

START CARD # 1017267

(1) LAND OWNER

Owner Well I.D. MW18S

First Name P12230-5991 Last Name

Company MC CORMICK/BAXTER CREOSOTING C

Address PO BOX 3344

City PORTLAND State OR Zip 97208-3344

(2) TYPE OF WORK

☐ New ☐ Deepening ☐ Conversion
☐ Alteration (repair/recondition) ☒ Abandonment

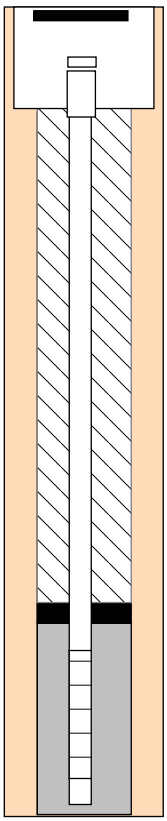
(3) DRILL METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable ☒ Hollow Stem Auger ☐ Cable Mud
☐ Reverse Rotary ☐ Other

(4) CONSTRUCTION

Piezometer Well ☐

Depth of Completed Well 45.00 ft. Special Standard ☐



MONUMENT/VAULT
From To

BORE HOLE
Diameter 12 From 0 To 45

CASING
Dia. From To
Gauge Wld Thrd
Material ◯Steel ◯Plastic ☐ ☐

LINER
Dia. From To
Gauge Wld Thrd
Material ◯Steel ◯Plastic ☐ ☐

SEAL
From 0 To 3
Material Concrete
Amount 4 Sacks Grout weight

SCREEN
Casing/Liner Material
Diameter From To
Slot Size

FILTER
From To Material Size of pack

(5) WELL TESTS

◯ Pump ◯ Bailer ◯ Air ◯ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Temperature °F Lab analysis ☐ Yes By

Supervising Geologist/Engineer

Water quality concerns? ☐ Yes (describe below)

From	To	Description	Amount	Units

(6) LOCATION OF WELL (legal description)

County MULTNOMAH Twp 1.00 N N/S Range 1.00 E E/W WM
Sec 7 SW 1/4 of the SW 1/4 Tax Lot 100
Tax Map Number Lot
Lat ° ' " or DMS or DD
Long ° ' " or DMS or DD
◉ Street address of well ◯ Nearest address
6900 N EDGEWATER AVE, PORTLAND, OR 97203

(7) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening	8/1/2012		☐	15
Completed Well			☐	

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES Depth water was first found

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
					☐	
					☐	
					☐	
					☐	
					☐	

(8) WELL LOG

Ground Elevation

Material	From	To

Date Started 8/1/2012 Completed 8/1/2012

(unbonded) Monitor Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon monitoring well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number 10641 Date 10/29/2012
Password : (if filing electronically)
Signed RORY PILMORE (E-filed)

(bonded) Monitor Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon monitoring well construction standards. This report is true to the best of my knowledge and belief.

License Number 10423 Date 10/29/2012
Password : (if filing electronically)
Signed DARRYL METZGER (E-filed)
Contact Info (optional)

ORIGINAL - WATER RESOURCES DEPARTMENT
THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version:

MONITORING WELL REPORT - continuation page

MULT 111099

10/29/2012

WELL I.D. LABEL# L

START CARD # 1017267

(4) CONSTRUCTION

BORE HOLE

Dia	From	To

FILTER PACK

From	To	Material	Size

SEAL

Material	From	To	Amt	sacks/ lbs	grout weight
Cement	3	45	14	S	

CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

SCREENS

Perf/ Screen	Casing/ Liner	Screen Dia	From	To	Scrn size/ slot width	Slot length	# of slots	Tele/ pipe size

(5) WELL TESTS

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Water Quality Concerns

From	To	Description	Amount	Units

(7) STATIC WATER LEVEL

Water Bearing Zones

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(8) WELL LOG

Material	From	To

Comments/Remarks

PTI
ENVIRONMENTAL SERVICES

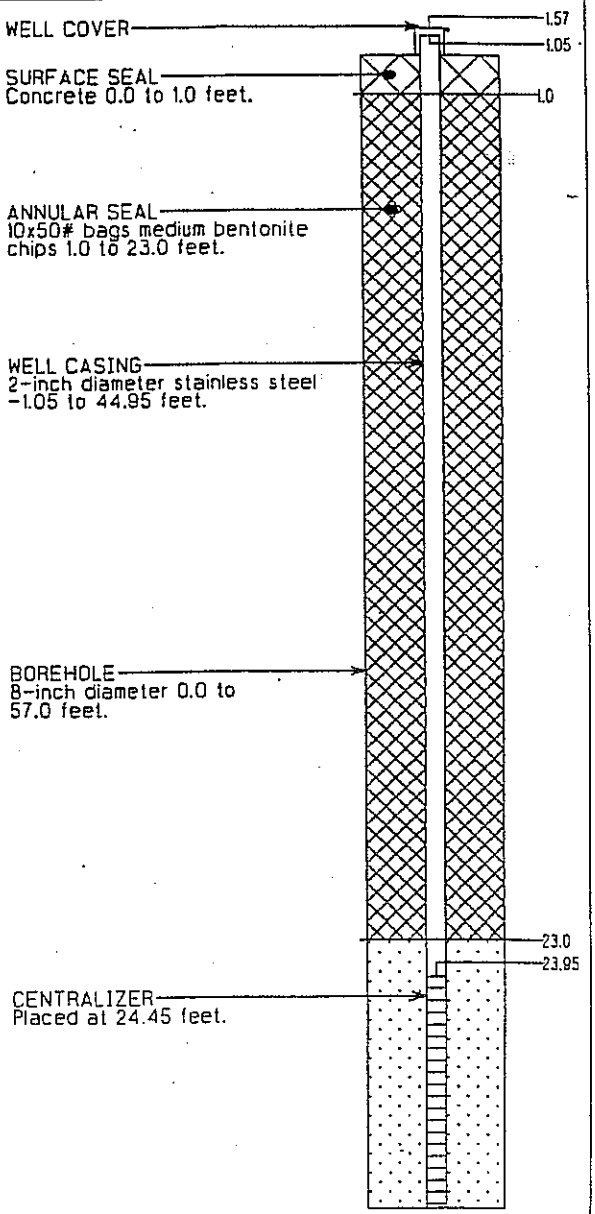
WELL MW-18s

PROJECT MCCORMICK & BAXTER CREOSOTING
LOCATION PORTLAND, OREGON
CONTRACT NUMBER DEQ C8421603
GEOLOGIST/ENGINEER McBETH & GOODE
DRILLING CONTRACTOR ESD
DRILLING METHOD MOD. HOLLOW STEM AUGER

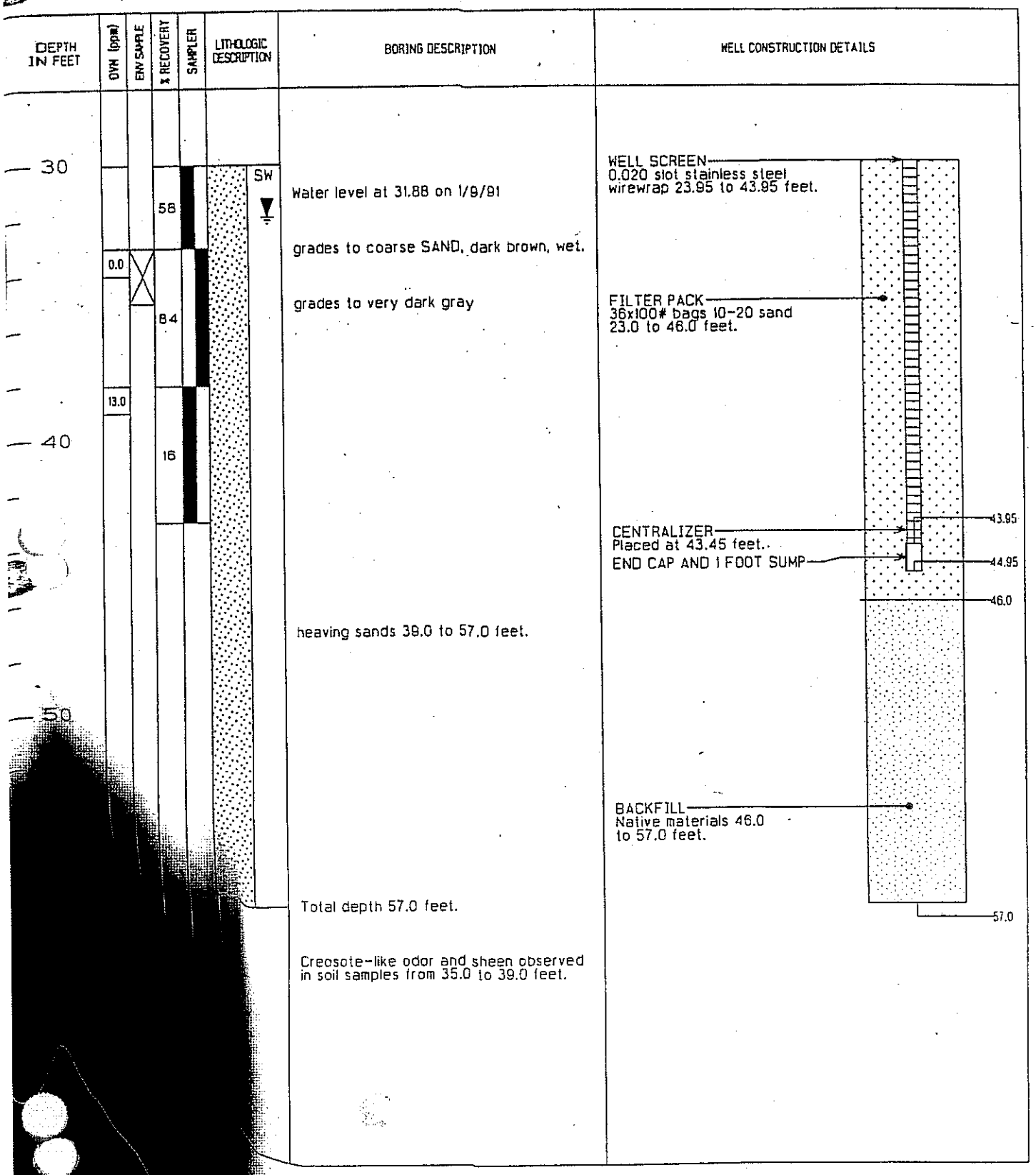
DEPTH OF BORING 57.0 FEET
DATE (s) DRILLED NOV 19-20, 1990
COORDINATES 705192.175, 1425631.050
WELL CASING ELEVATION 40.64 FEET
SURFACE PAD ELEVATION 39.59 FEET
TOTAL WELL CASING LENGTH 46.00 FEET

DEPTH IN FEET	OVH (ppm)	ENV SAMPLE	% RECOVERY	SAMPLER	LITHOLOGIC DESCRIPTION	BORING DESCRIPTION
0	0.0		66		SP	Medium SAND with trace silt and organic material, very dark gray, moist.
	3.0		70			
	5.0		76		SW	Medium to coarse SAND with trace silt, dark gray, moist.
10			56			
			62			
20	0.0		64			
	0.0		58			
30						

WELL CONSTRUCTION DETAILS



WELL MW-18s


DEPTH IN FEET
OVM (ppm)
ENV SAMPLE
% RECOVERY
SAMPLER
LITHOLOGIC DESCRIPTION
BORING DESCRIPTION
WELL CONSTRUCTION DETAILS
30
40
50
SW
58
84
16
0.0
13.0
Water level at 31.88 on 1/9/91
grades to coarse SAND, dark brown, wet.
grades to very dark gray
heaving sands 39.0 to 57.0 feet.
Total depth 57.0 feet.
Creosote-like odor and sheen observed in soil samples from 35.0 to 39.0 feet.
WELL SCREEN
0.020 slot stainless steel wirewrap 23.95 to 43.95 feet.
FILTER PACK
36x100# bags 10-20 sand 23.0 to 46.0 feet.
CENTRALIZER
Placed at 43.45 feet.
END CAP AND 1 FOOT SUMP
BACKFILL
Native materials 46.0 to 57.0 feet.
43.95
44.95
46.0
57.0

MULT 111097

STATE OF OREGON
MONITORING WELL REPORT
(as required by ORS 537.765 & OAR 690-240-0395)

10/29/2012

WELL I.D. LABEL# L 754578

START CARD # 1017263

(1) LAND OWNER

Owner Well I.D. MW2S

First Name P12230-5991 Last Name

Company MC CORMICK/BAXTER CREOSOTING C

Address PO BOX 3344

City PORTLAND State OR Zip 97208-3344

(2) TYPE OF WORK

☐ New ☐ Deepening ☐ Conversion ☐ Alteration (repair/recondition) ☒ Abandonment

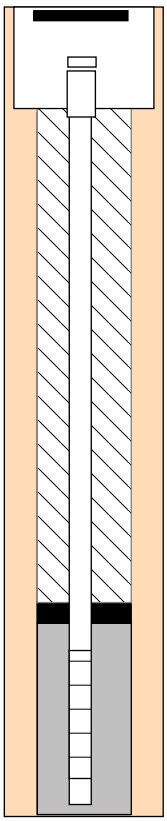
(3) DRILL METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable ☒ Hollow Stem Auger ☐ Cable Mud ☐ Reverse Rotary ☐ Other

(4) CONSTRUCTION

Piezometer Well ☐

Depth of Completed Well 30.00 ft. Special Standard ☐



MONUMENT/VAULT B

From To

BORE HOLE

Diameter 8 From 0 To 30

CASING

Dia. From To

Gauge Wld Thrd

Material ◯Steel ◯Plastic ☐ ☐

LINER

Dia. From To

Gauge Wld Thrd

Material ◯Steel ◯Plastic ☐ ☐

SEAL

From 0 To 3

Material Concrete

Amount 4 Sacks Grout weight

SCREEN

Casing/Liner Material

Diameter From To

Slot Size

FILTER

From To Material Size of pack

(5) WELL TESTS

◯ Pump ◯ Bailer ◯ Air ◯ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Temperature °F Lab analysis ☐ Yes By

Supervising Geologist/Engineer

Water quality concerns? ☐ Yes (describe below)

From	To	Description	Amount	Units

(6) LOCATION OF WELL (legal description)

County MULTNOMAH Twp 1.00 N N/S Range 1.00 E E/W WM

Sec 7 SW 1/4 of the SW 1/4 Tax Lot 100

Tax Map Number Lot

Lat ° ' " or DMS or DD

Long ° ' " or DMS or DD

◉ Street address of well ◯ Nearest address

6900 N EDGEWATER AVE, PORTLAND, OR 97203

(7) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening	7/30/2012		☐	15
Completed Well			☐	

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES Depth water was first found

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
					☐	
					☐	
					☐	
					☐	
					☐	

(8) WELL LOG

Ground Elevation

Material	From	To

Date Started 7/30/2012 Completed 7/30/2012

(unbonded) Monitor Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon monitoring well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number 10641 Date 10/29/2012

Password : (if filing electronically)

Signed RORY PILMORE (E-filed)

(bonded) Monitor Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon monitoring well construction standards. This report is true to the best of my knowledge and belief.

License Number 10423 Date 10/29/2012

Password : (if filing electronically)

Signed DARRYL METZGER (E-filed)

Contact Info (optional)

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version:

MONITORING WELL REPORT - continuation page

MULT 111097

10/29/2012

WELL I.D. LABEL# L 754578

START CARD # 1017263

(4) CONSTRUCTION

BORE HOLE

Dia	From	To

FILTER PACK

From	To	Material	Size

SEAL

Material	From	To	Amt	sacks/ lbs	grout weight
Cement	3	30	4	S	

CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

SCREENS

Perf/ Screen	Casing/ Liner	Screen Dia	From	To	Scrn size/ slot width	Slot length	# of slots	Tele/ pipe size

(5) WELL TESTS

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Water Quality Concerns

From	To	Description	Amount	Units

(7) STATIC WATER LEVEL

Water Bearing Zones

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
					☐	
					☐	
					☐	
					☐	
					☐	
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					☐	
					☐	

(8) WELL LOG

Material	From	To

Comments/Remarks

WELL MW-2S

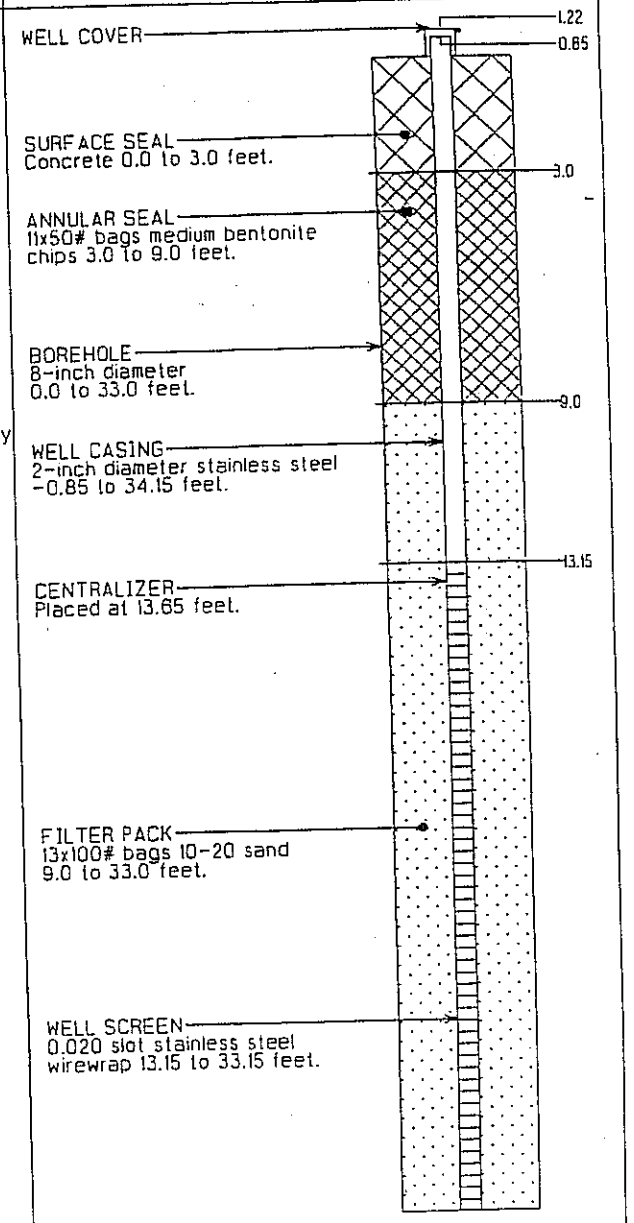
PTI
ENVIRONMENTAL SERVICES

PROJECT MCCORMICK & BAXTER CREOSOTING
LOCATION PORTLAND, OREGON
CONTRACT NUMBER DEQ C8421603
GEOLOGIST/ENGINEER D. LIVERMORE
DRILLING CONTRACTOR ESD
DRILLING METHOD MOD. HOLLOW STEM AUGER

DEPTH OF BORING 37.5 FEET
DATE (s) DRILLED NOV 1-2, 1990
COORDINATES 704440.919, 1427569.703
WELL CASING ELEVATION 33.11 FEET
SURFACE PAD ELEVATION 32.26 FEET
TOTAL WELL CASING LENGTH 35.00 FEET

DEPTH IN FEET	OVH (ppm)	ENV SAMPLE	% RECOVERY	SAMPLER	LITHOLOGIC DESCRIPTION	BORING DESCRIPTION
0			90		SM	Silty fine to medium SAND with trace gravel and organic material, dark brown to reddish brown, moist.
			80			
10			86		SM ML	Silty medium SAND, interbedded with sandy SILT, slightly plastic, brown, moist.
					SM	Silty medium SAND, brown, moist.
			80		SP	Fine to medium SAND, with trace of silt and fine gravel, brown, moist to wet.
20			80			Water level at 21.83 feet on 3/4/91
			80		SW	Fine to coarse SAND, with fine gravel to cobbles, increasingly silty with depth, dark brown to gray, wet.
			100		ML	
30						

WELL CONSTRUCTION DETAILS



WELL MW-2S

DEPTH IN FEET	OVM (ppm)	ENV SAMPLE	% RECOVERY	SAMPLER	LITHOLOGIC DESCRIPTION	BORING DESCRIPTION	WELL CONSTRUCTION DETAILS
30					ML	SILT, low plasticity, very dark gray, wet	
			100		SW	Fine to coarse SAND, with trace silt, very dark gray, wet.	CENTRALIZER Placed at 32.65 feet.
			91				1-FOOT SUMP AND END CAP — 33.15
							— 34.15
						Total depth 37.5 feet.	BACKFILL Native material 34.15 to 37.5 feet.
40						No sheen or odor observed in soil samples at any interval.	— 37.5
50							
60							

MULT 111098

STATE OF OREGON
MONITORING WELL REPORT
(as required by ORS 537.765 & OAR 690-240-0395)

10/29/2012

WELL I.D. LABEL# L

START CARD # 1017265

(1) LAND OWNER

Owner Well I.D. MW3S

First Name P12230-5991 Last Name

Company MC CORMICK/BAXTER CREOSOTING C

Address PO BOX 3344

City PORTLAND State OR Zip 97208-3344

(2) TYPE OF WORK

☐ New ☐ Deepening ☐ Conversion
☐ Alteration (repair/recondition) ☒ Abandonment

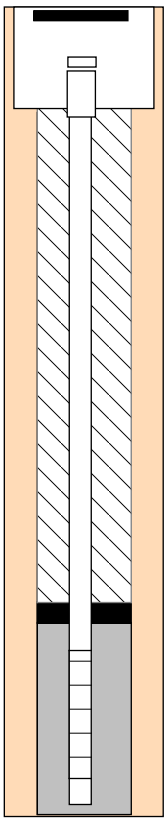
(3) DRILL METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable ☒ Hollow Stem Auger ☐ Cable Mud
☐ Reverse Rotary ☐ Other

(4) CONSTRUCTION

Piezometer Well ☐

Depth of Completed Well 30.00 ft. Special Standard ☐



MONUMENT/VAULT B
From To

BORE HOLE
Diameter 8 From 0 To 30

CASING
Dia. From To
Gauge Wld Thrd
Material ◯Steel ◯Plastic ☐ ☐

LINER
Dia. From To
Gauge Wld Thrd
Material ◯Steel ◯Plastic ☐ ☐

SEAL
From 0 To 3
Material Concrete
Amount 4 Sacks Grout weight

SCREEN
Casing/Liner Material
Diameter From To
Slot Size

FILTER
From To Material Size of pack

(5) WELL TESTS

◯ Pump ◯ Bailer ◯ Air ◯ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Temperature °F Lab analysis ☐ Yes By

Supervising Geologist/Engineer

Water quality concerns? ☐ Yes (describe below)

From	To	Description	Amount	Units

(6) LOCATION OF WELL (legal description)

County MULTNOMAH Twp 1.00 N N/S Range 1.00 E E/W WM
Sec 7 SW 1/4 of the SW 1/4 Tax Lot 100
Tax Map Number Lot
Lat ° ' " or DMS or DD
Long ° ' " or DMS or DD
◉ Street address of well ◯ Nearest address
6900 N EDGEWATER AVE, PORTLAND, OR 97203

(7) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening	7/31/2012		☐	15
Completed Well			☐	

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES Depth water was first found

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
					☐	
					☐	
					☐	
					☐	
					☐	

(8) WELL LOG

Ground Elevation

Material	From	To

Date Started 7/31/2012 Completed 7/31/2012

(unbonded) Monitor Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon monitoring well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number 10641 Date 10/29/2012
Password : (if filing electronically)
Signed RORY PILMORE (E-filed)

(bonded) Monitor Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon monitoring well construction standards. This report is true to the best of my knowledge and belief.

License Number 10423 Date 10/29/2012
Password : (if filing electronically)
Signed DARRYL METZGER (E-filed)
Contact Info (optional)

ORIGINAL - WATER RESOURCES DEPARTMENT
THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version:

MONITORING WELL REPORT - continuation page

MULT 111098

WELL I.D. LABEL# L

START CARD # 1017265

10/29/2012

(4) CONSTRUCTION

BORE HOLE

Dia	From	To

FILTER PACK

From	To	Material	Size

SEAL

Material	From	To	Amt	sacks/ lbs	grout weight
Cement	3	30	6	S	

CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

SCREENS

Perf/ Screen	Casing/ Liner	Screen Dia	From	To	Scrn size/ slot width	Slot length	# of slots	Tele/ pipe size

(5) WELL TESTS

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Water Quality Concerns

From	To	Description	Amount	Units

(7) STATIC WATER LEVEL

Water Bearing Zones

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(8) WELL LOG

Material	From	To

Comments/Remarks

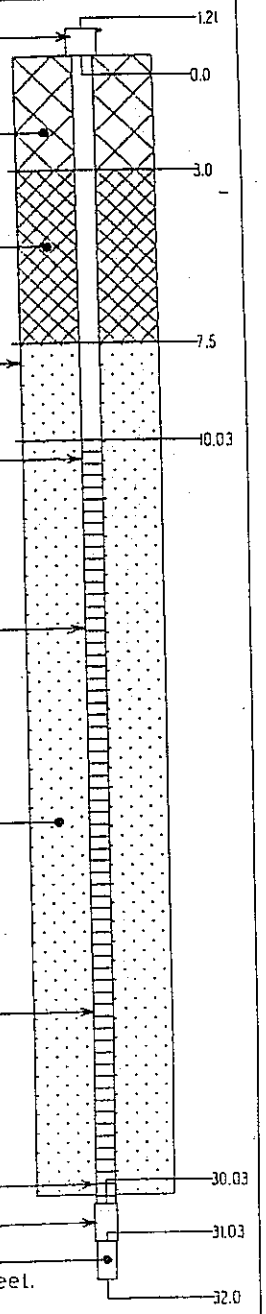
PTI
ENVIRONMENTAL SERVICES

WELL MW-3s

PROJECT MCCORMICK & BAXTER CREOSOTING
LOCATION PORTLAND, OREGON
CONTRACT NUMBER DEQ C8421603
GEOLOGIST/ENGINEER D. LIVERMORE
DRILLING CONTRACTOR ESD
DRILLING METHOD MOD. HOLLOW STEM AUGER

DEPTH OF BORING 32.0 FEET
DATE (s) DRILLED OCT 30-NOV 1, 1990
COORDINATES 704124.240, 1427205.050
WELL CASING ELEVATION 28.77 FEET
SURFACE PAD ELEVATION 28.77 FEET
TOTAL WELL CASING LENGTH 31.03 FEET

DEPTH IN FEET	OVA (ppm)	ENV SAMPLE	% RECOVERY	SAMPLER	LITHOLOGIC DESCRIPTION	BORING DESCRIPTION
0					GM	Silty GRAVEL with organic material, brown, moist
			100		SP	Fine to medium SAND with trace gravel and organic material, gray, moist.
					SP-SM	Fine to medium SAND with silt and trace gravel and organic material, dark gray, moist.
			93			
	0.0					
10			75			
					PT	WOOD (cribbing), fresh, dry interior, moist and orange exterior.
			52		ML	Clayey SILT with trace sand and organics, dark gray, moist.
						WOOD, water level at 16.27 feet on 3/4/91.
					ML-PT	SILT and WOOD.
20			70		PT	WOOD, fresh, dark reddish brown.
					PT SM	WOOD and PEAT, with minor clayey SILT, very dark gray, wet.
			100		ML SM	Sandy SILT with clay, interbedded with silty fine SAND with trace natural organic material, very dark gray, wet.
30			100			Total depth 32.0 feet.
						No sheen or odor observed in soil samples at any interval.



WELL CONSTRUCTION DETAILS

MULT 111101

STATE OF OREGON
MONITORING WELL REPORT
(as required by ORS 537.765 & OAR 690-240-0395)

10/29/2012

WELL I.D. LABEL# L

START CARD # 1017264

(1) LAND OWNER

Owner Well I.D. MWKS

First Name P12230-5991 Last Name

Company MC CORMICK/BAXTER CREOSOTING C

Address PO BOX 3344

City PORTLAND State OR Zip 97208-3344

(2) TYPE OF WORK

☐ New ☐ Deepening ☐ Conversion
☐ Alteration (repair/recondition) ☒ Abandonment

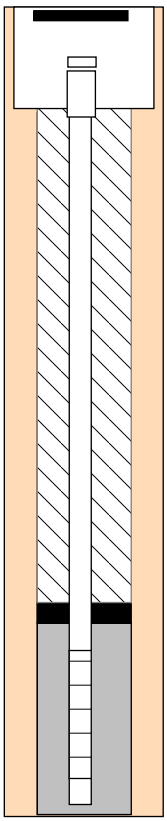
(3) DRILL METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable ☒ Hollow Stem Auger ☐ Cable Mud
☐ Reverse Rotary ☐ Other

(4) CONSTRUCTION

Piezometer Well ☐

Depth of Completed Well 39.50 ft. Special Standard ☒



MONUMENT/VAULT B
From To

BORE HOLE
Diameter 2 From 0 To 39.5

CASING
Dia. From To
Gauge Wld Thrd
Material ◯Steel ◯Plastic ☐ ☐

LINER
Dia. From To
Gauge Wld Thrd
Material ◯Steel ◯Plastic ☐ ☐

SEAL
From 0 To 1
Material Concrete
Amount 2 Sacks Grout weight

SCREEN
Casing/Liner Material
Diameter From To
Slot Size

FILTER
From To Material Size of pack

(5) WELL TESTS

◯ Pump ◯ Bailer ◯ Air ◯ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Temperature °F Lab analysis ☐ Yes By

Supervising Geologist/Engineer

Water quality concerns? ☐ Yes (describe below)

From	To	Description	Amount	Units

(6) LOCATION OF WELL (legal description)

County MULTNOMAH Twp 1.00 N N/S Range 1.00 E E/W WM
Sec 7 SW 1/4 of the SW 1/4 Tax Lot 100
Tax Map Number Lot
Lat ° ' " or DMS or DD
Long ° ' " or DMS or DD
◉ Street address of well ◯ Nearest address
6900 N EDGEWATER AVE, PORTLAND, OR 97203

(7) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening	8/2/2012		☐	15
Completed Well			☐	

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES Depth water was first found

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
					☐	
					☐	
					☐	
					☐	
					☐	

(8) WELL LOG

Ground Elevation

Material	From	To

Date Started 8/2/2012 Completed 8/2/2012

(unbonded) Monitor Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon monitoring well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number 10641 Date 10/29/2012
Password : (if filing electronically)
Signed RORY PILMORE (E-filed)

(bonded) Monitor Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon monitoring well construction standards. This report is true to the best of my knowledge and belief.

License Number 10423 Date 10/29/2012
Password : (if filing electronically)
Signed DARRYL METZGER (E-filed)
Contact Info (optional)

ORIGINAL - WATER RESOURCES DEPARTMENT
THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version:

MONITORING WELL REPORT - continuation page

MULT 111101

10/29/2012

WELL I.D. LABEL# L____________

START CARD # 1017264

(4) CONSTRUCTION

BORE HOLE

Dia	From	To

FILTER PACK

From	To	Material	Size

SEAL

Material	From	To	Amt	sacks/ lbs	grout weight
Cement	1	39.5	1	S	

CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

SCREENS

Perf/ Screen	Casing/ Liner	Screen Dia	From	To	Scrn size/ slot width	Slot length	# of slots	Tele/ pipe size

(5) WELL TESTS

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Water Quality Concerns

From	To	Description	Amount	Units

(7) STATIC WATER LEVEL

Water Bearing Zones

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(8) WELL LOG

Material	From	To

Comments/Remarks

HARTCROWSER

Hart Crowser, Inc.
8910 SW Gemini Drive
Beaverton, Oregon 97008-7123
FAX 503.620.6918
503.620.6918

FIELD REPORT

Job No. 15670-06/Task 7
Field Report No. 1
Page 1 of 2
DATE 7/30/12
S M T W Th F S

JOB	McCormick & Baxter Superfund Site	ARRIVAL TIME	11:30 AM
LOCATION	N. Edgewater Street, Portland, OR	DEPARTURE TIME	5:30 PM
CLIENT	Oregon DEQ	WEATHER	Cloudy a.m., sunny p.m., mid 70's
PURPOSE OF OBSERVATIONS	Monitoring well decommissioning		
HC REPRESENTATIVE	John Lawes	HC PROJECT MANAGER	Tim Skrotzki
CONTRACTOR	Cascade Drilling International	PERMIT NO.	
DRILLER	Jeremiah	JOB PHONE	

COMMENTS:

I arrived at the above site at the request of Tim Skrotzki (Hart Crowser) and authorization of Scott Manzano (Oregon DEQ) to observe decommissioning of six monitoring wells. The following summarizes my observations:

Work Performed Today:

1130	Arrive onsite
1140	Cascade Drilling (CDI) support truck arrives
1140-1200	Escort truck to operations compound area, park truck, return to upper gate with CDI crewman. CDI drives rental skid-steer loader down to ops area.
1200-1240	Standby at upper gate waiting for drill transporter
1240	CDI drill transporter arrives
1240-1300	Escort drill transporter to ops site, safety briefing, recon MW-Ks site
1300-1330	Mob rig and loader to MW-Ks, pull monument.
1330-1510	Secondary monument base encountered at depth of 5 feet below ground surface (bgs). Attempt to remove with loader and drill rig without success. Consult w/ CDI and Hart Crowser project managers, agree to move to MW-2s
1510-1515	Mob to MW-2s
1515-1630	Remove 3 bollards and monument with loader. Remove 16' of blank, 20' of screened 2" O.D. stainless steel casing from well. Overdrill well using 10" O.D. hollow-stem auger to 30 feet bgs.

1630-1730 Mix neat grout 30 gal water with 4 x 94lb bags Type I/II Portland Cement, tremie into boring; grout level at 8 feet bgs. Clean up, demob for day

Drilling/Grouting Time:	1 hr
Monument/Casing Removal Time:	1 hr, 40 min (MW-Ks), 30 min (MW-2s) – 2 hr 10 min total
Mob Time:	45 min
Standby Time:	1 hr 30 min

Wells Decommissioned: MW-2s

Distribution (e-mail):

- Scott Mazano, ODEQ
- Tim Skrotski, Hart Crowser
- Ryan Galbreth, CDI

Attachments: Well Abandonment Report, MW-2s

Unresolved Issues List

Item No.	Date	Issue	Date Resolved
1	7/30/12	Unable to remove older monument from MW-Ks; request variance to grout in place	

* Note: Resolved items will remain on list for at least 1 day, then will be marked with a strike-through for at least 1 day, and then will be removed from the list.

BY: John Lawes

I have read and understand the content of this field report.

HART CROWSER REPRESENTATIVE HART CROWSER PROJ. MANAGER CONTRACTOR REPRESENTATIVE

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HARTCROWSER

Hart Crowser, Inc.
8910 SW Gemini Drive
Beaverton, Oregon 97008-7123
FAX 503.620.6918
503.620.6918

FIELD REPORT

Job No. 15670-06/Task 7
Field Report No. 2
Page 1 of 2
DATE 7/31/12
S M T W Th F S

JOB	McCormick & Baxter Superfund Site	ARRIVAL TIME	8:00 AM
LOCATION	N. Edgewater Street, Portland, OR	DEPARTURE TIME	3:30 PM
CLIENT	Oregon DEQ	WEATHER	Cloudy a.m., sunny p.m., mid 70's
PURPOSE OF OBSERVATIONS	Monitoring well decommissioning		
HC REPRESENTATIVE	John Lawes	HC PROJECT MANAGER	Tim Skrotzki
CONTRACTOR	Cascade Drilling International	PERMIT NO.	
DRILLER	Jeremiah	JOB PHONE	

COMMENTS:

I arrived at the above site at the request of Tim Skrotzki (Hart Crowser) and authorization of Scott Manzano (Oregon DEQ) to observe decommissioning of six monitoring wells. The following summarizes my observations:

Work Performed Today:

0800 Arrive onsite

0800-0830 Standby at upper gate waiting for drillers; support truck had broken down on Willamette Blvd., proceed to MW-2s with transporter truck

0830-1030 Arrive MW-2s; grout level at 13½ feet below ground surface (bgs). Mix and pump 10 gal. water + 2 x 94lb sacks Portland Cement; grout level to 2 feet bgs. Decontaminate augers and 2" stainless steel casing, cleanup site, recon MW-3s site.

1030-1130 Mob rig and loader to MW-3s, pull monument and bollards, dead-pull 31 feet of 2" stainless steel casing (10' blank, 20' screened w/ 1 foot blank sump). Overdrill well boring w/10" O.D. hollow-stem auger.

1130-1300 Mix neat grout 40 gal water with 6 x 94lb bags Type I/II Portland Cement, tremie into boring; grout level at 2 feet bgs. Move all materials, monument, well casing to MW-2s site, decon, load in prep to mob to EW-2s site

1300-1330 Lunch

1330-1400 Mob to EW-2s. Open well; sounded clear to 45'; noted that well has no inner casing – what appears to be monument is 10" O.D. steel well casing. Called Tim (Hart Crowser) to inform.

1400-1530 Recon EW-9s, MW-18s sites, remove bollards from MW-18s, stockpile supplies for tomorrow's decommissioning inside gate. Move drums, monument steel and concrete debris to ops site, clean up, depart for day

Drilling/Grouting Time:	3 hr 15 min
Monument/Casing Removal Time:	20 min (MW-3s), 15 min (MW-18s) – 35 min total
Mob Time:	45 min
Decon/Cleanup Time:	1 hr 30 min

Wells Decommissioned: MW-3s

Distribution (e-mail):

- Scott Mazano, ODEQ
- Tim Skrotski, Hart Crowser
- Ryan Galbreth, CDI

Attachments: Well Abandonment Report, MW-3s

Unresolved Issues List

Item No.	Date	Issue	Date Resolved
1	7/30/12	Unable to remove older monument from MW-Ks; request variance to grout in place	
2	7/31/12	EW-2s casing too large to be overdrilled using current rig	**7/31/12 – ODEQ directs to leave in place**

* Note: Resolved items will remain on list for at least 1 day, then will be marked with a strike-through for at least 1 day, and then will be removed from the list.

BY: John Lawes

I have read and understand the content of this field report.

HART CROWSER REPRESENTATIVE HART CROWSER PROJ. MANAGER CONTRACTOR REPRESENTATIVE

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HARTCROWSER

Hart Crowser, Inc.
8910 SW Gemini Drive
Beaverton, Oregon 97008-7123
FAX 503.620.6918
503.620.6918

FIELD REPORT

Job No. 15670-06/Task 7
Field Report No. 3
Page 1 of 2
DATE 8/01/12
S M T W Th F S

JOB	McCormick & Baxter Superfund Site	ARRIVAL TIME	7:45 AM
LOCATION	N. Edgewater Street, Portland, OR	DEPARTURE TIME	4:55 PM
CLIENT	Oregon DEQ	WEATHER	Cloudy a.m., sunny p.m., mid 70's
PURPOSE OF OBSERVATIONS	Monitoring well decommissioning		
HC REPRESENTATIVE	Jason Miles	HC PROJECT MANAGER	Tim Skrotzki
CONTRACTOR	Cascade Drilling International	PERMIT NO.	
DRILLER	Jeremiah	JOB PHONE	

COMMENTS:

I arrived at the above site at the request of Tim Skrotzki (Hart Crowser) and authorization of Scott Manzano (Oregon DEQ) to observe decommissioning of six monitoring wells. The following summarizes my observations:

Work Performed Today:

0745	John Lawes arrived on site.
0745-0800	Mob equipment to EW-9s.
0800-0830	Pull monument and bollards.
0830-0900	Dead pull casing.
0900-0945	Overdrilled boring with 12" O.D. hollow stem auger from 0-45'.
0945-1200	Mix and tremie cement grout.
1200-1225	Complete decontamination of EW-9s, mob to MW-18s. Pull bollards and monument.
1225-1250	Jason Miles meets with John Lawes to replace him for the oversight. Meanwhile drillers are finishing surface material for the top 2 feet of EW-9s. Drill rig tension adjuster grease sert came out letting all tension out of the rig's track.
1300-1400	Drillers are taking lunch and getting parts to fix the rig.
1400-1425	Repair rig and starting to pull PVC.
1500-1545	Were unable to pull casing. They believe they are stuck on stainless steel.
1550-1620	Attempted to overdrill to 20' and then pull the casing. They were still unable to pull it.

Spoke with Tim Skrotzki on the phone and variance has been granted to decommission MW-Ks in place. Started cleaning up for the night.

1655 HC and Cascade are off site.

Drilling/Grouting Time:	4 hr 50 min
Monument/Casing Removal Time:	30 min (EW-9s), 25 min (MW-18s) – 55 min total
Mob Time:	40 min
Decon/Cleanup Time:	50 min
Rig repair time	30 min

Wells Decommissioned: EW-9s, MW-18s still in progress

Distribution (e-mail):

- Scott Mazano, ODEQ
- Tim Skrotski, Hart Crowser
- Ryan Galbreth, CDI

Unresolved Issues List

Item No.	Date	Issue	Date Resolved
1	7/30/12	Unable to remove older monument from MW-Ks; request variance to grout in place	**8/1/12 Variance granted**
2	7/31/12	~~EW-2s casing too large to be overdrilled using current rig~~	**7/31/12 – ODEQ directs to leave in place**

* Note: Resolved items will remain on list for at least 1 day, then will be marked with a strike-through for at least 1 day, and then will be removed from the list.

BY: Jason Miles

I have read and understand the content of this field report.

HART CROWSER REPRESENTATIVE HART CROWSER PROJ. MANAGER CONTRACTOR REPRESENTATIVE

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HARTCROWSER

Hart Crowser, Inc.
8910 SW Gemini Drive
Beaverton, Oregon 97008-7123
FAX 503.620.6918
503.620.6918

FIELD REPORT

Job No. 15670-06/Task 7
Field Report No. 4
Page 1 of 2
DATE 8/02/12
S M T W Th F S

JOB	McCormick & Baxter Superfund Site	ARRIVAL TIME	7:30 AM
LOCATION	N. Edgewater Street, Portland, OR	DEPARTURE TIME	3:00 PM
CLIENT	Oregon DEQ	WEATHER	Sunny, warmed to low 80's
PURPOSE OF OBSERVATIONS	Monitoring well decommissioning		
HC REPRESENTATIVE	Jason Miles	HC PROJECT MANAGER	Tim Skrotzki
CONTRACTOR	Cascade Drilling International	PERMIT NO.	
DRILLER	Jeremiah	JOB PHONE	

COMMENTS:

I arrived at the above site at the request of Tim Skrotzki (Hart Crowser) and authorization of Scott Manzano (Oregon DEQ) to observe decommissioning of six monitoring wells. The following summarizes my observations:

Work Performed Today:

0730 Jason Miles (HC) arrived on site along with Cascade Drilling.

0750 Continuing with overdrilling of MW-18s.

0845 Overdrilled to 25' to remove bentonite chips and to try and remove well casing.

0915-0950 Pull casing.

1000-1030 Overdrilled boring with 12" O.D. hollow stem auger from 0-45'.

1030-1110 Mix and tremie cement grout. Going to let set and rise while decommissioning MW-Ks.

1110-1210 Deconning and storing drill equipment, and mobbing to MW-Ks

1210-1240 Cascade on lunch. I collected a composite soil sample from MW-2s and MW-3s drums (MBSD0812-1 at 12:15). Also used their lunch time to close up and label drums.

1240-1325 Finishing storing equipment and mobbing to MW-Ks.

1325 Starting to tremie MW-Ks with cement grout.

1340-1430 Drillers finished grouting MW-Ks and they complete the surface matching for MW-Ks and MW-18s. Then making sure all equipment is strapped down. During this time I collected a water sample although all water appeared to be contaminated with creosote. Water sample

was MBWD0812-1. Collected to be held for possible analysis.

1430 Cascade is off site.

1500 The following drums are left on site: 1 soil drum from MW-2s, 1 soil drum from MW-3s, 1 soil drum from MW-18s, 2 soil drums from EW-9s, and 3 Decon water drums (each drum containing water from several wells and appear to be contaminated). HC is off site

Drilling/Grouting Time: 3 hr 40 min

Mob Time: 2 hr 15 min

Decon/Cleanup Time: 1 hr 30 min

Wells Decommissioned: MW-18s, MW-Ks

Distribution (e-mail):

- Scott Mazano, ODEQ
- Tim Skrotzki, Hart Crowser
- Ryan Galbreth, CDI

Unresolved Issues List

Item No.	Date	Issue	Date Resolved
1	7/30/12	~~Unable to remove older monument from MW-Ks; request variance to grout in place~~	**8/1/12 Variance granted**

* Note: Resolved items will remain on list for at least 1 day, then will be marked with a strike-through for at least 1 day, and then will be removed from the list.

BY: Jason Miles

I have read and understand the content of this field report.

HART CROWSER REPRESENTATIVE HART CROWSER PROJ. MANAGER CONTRACTOR REPRESENTATIVE

File: F:\Data\Jobs\DEQ\15670-xx M&B\15670-07 O&M\Field Reports - Decommissioning\15670-07 FR2 7-31-12 JL.doc

MONITORING WELL REPORT - continuation page

MULT 111101

10/29/2012

Map of Hole

Oregon
John A. Kitzhaber, MD, Governor

Water Resources Department
North Mall Office Building
725 Summer St. NE, Suite A
Salem, OR 97301
Phone 503-986-0900
FAX 503-986-0904
www.wrd.state.or.us

August 1, 2012

DARRYL METZGER #10423
CASCADE DRILLING INC
13600 SE AMBLER RD
CLACKAMAS OR 97015

FINAL ORDER

Dear Darryl:

The Special Standards Request Form you submitted for owner: McCormick and Baxter Creosoting Inc., Start Card number 1017264 (MW-Ks), is hereby approved for the following: You may abandon this monitoring well utilizing the method described in OAR 690-240-0510(2). *Bentonite grout may only be used to abandon the portion of the wells that is below the static water level.* Above the static water level another approved sealing material must be used. Your Special Standards Request Form is enclosed. All other standards must be adhered to.

The Well Construction Standards serve to protect ground water resources. By approving and issuing this special construction standard the Oregon Water Resources Department is not representing that a well constructed in accordance with this condition will maintain structural integrity or that it meets engineering standards. The well constructor/or landowner is responsible for ensuring that a well is constructed in a manner that protects ground water resources as required under Oregon Administrative Rules 690-200 through 690-240.

If you have any questions regarding this letter, I may be contacted at (503) 986-0851, or by e-mail at Kristopher.R.Byrd@wrd.state.or.us.

Sincerely,

Kristopher Byrd, Coordinator
Well Construction Program
Well Construction and Compliance Section

enclosure

cc: Bill Ferber, W Region Manager
File

This is a final order in other than a contested case. This order is subject to judicial review under ORS 183.484. Any petition for judicial review must be filed within the 60 day time period specified by ORS 183.484(2). Pursuant to ORS 536.075 and OAR 137-004-0080 you may either petition for judicial review or petition the Director for reconsideration of this order. A petition for reconsideration may be granted or denied by the director, and if no action is taken within 60 days following the date the petition was filed, the petition shall be deemed denied.

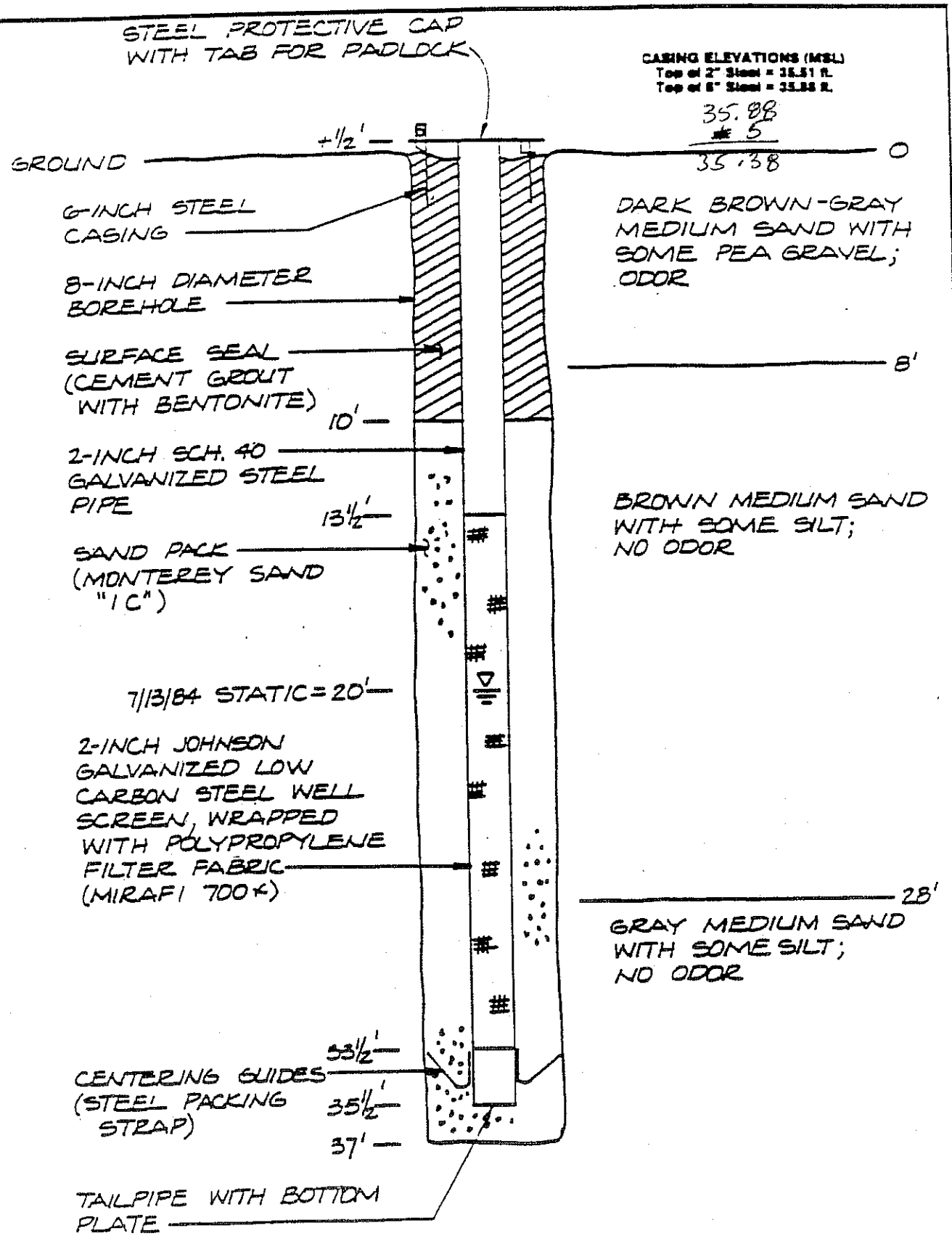

FIGURE B-7
MW-K Record Drawing
McCormick & Baxter Creosoting Co.
Portland, Oregon

P1TT74.A0

Oregon
John A. Kitzhaber, MD, Governor

Water Resources Department
North Mall Office Building
725 Summer St. NE, Suite A
Salem, OR 97301
Phone 503-986-0900
FAX 503-986-0904
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Sincerely,

Kristopher Byrd, Coordinator
Well Construction Program
Well Construction and Compliance Section

enclosure

cc: Bill Ferber, W Region Manager
File

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Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem Oregon 97301-1266
(503) 986-0900
www.wrd.state.or.us

Special Standards
Request Form

REQUEST FOR WRITTEN APPROVAL TO USE CONSTRUCTION METHODS NOT INCLUDED IN OREGON ADMINISTRATIVE RULES 690-200 THROUGH 690-240

Before the request can be considered, this form must be completed. Requests shall be submitted to the Well Construction Program Coordinator, Water Resources Department, 725 Summer Street NE, Suite A, Salem OR 97301-1266. Requests may also be considered by the appropriate Regional Manager.

Date of request: 8/1/2012 **Oral approval date (if applicable):** _____

Bonded Well Constructor (**name, license #, and mailing address**): Bruce Niemeyer - 1522

13600 SE AMBLER RD, CLACKAMAS, OR 97015

(1) Location of Well: SW 1/4 SW 1/4 Tax lot 100 Section 7,
Township 1N, Range 1E, Multnomah County
Address at well site: 6900 N Edgewater Ave
Portland, OR 97203

(2) Start Card Number(s)(for work to be done): S.C. 1017264

(3) Name and Address of Land Owner: McCormick / Baxter Creosoting inc.
PO box 3344 Portland, OR 97208

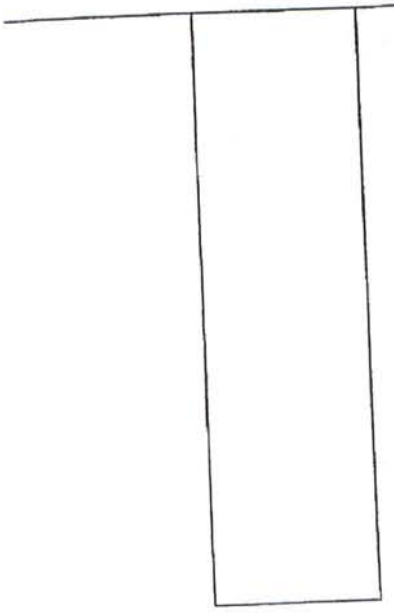
(4) Distance to the nearest septic tank, drainfield, closed sewage line (if water supply well)
Unknown

(5) The unusual site conditions which necessitate this request: Analytical, Consultant well log. Well monument has added (raised) to other monument, unable to remove.

(6) The proposed construction methods that the bonded well constructor believes will be adequate for this well: (attach additional pages if needed)
abandon in place instead of overdrilling.

Bid 5991

(7) Diagram showing the pertinent features of the proposed well design and construction:
(attach additional pages if needed)



Concrete Seal 0' to 1'

Bentonite Seal 1' to 35.5'

Blank Casing _____ to _____

Well Screen _____ to _____

Filter Pack _____ to _____

Well Diameter 2"

Total Depth 35.5'

PLEASE NOTE:

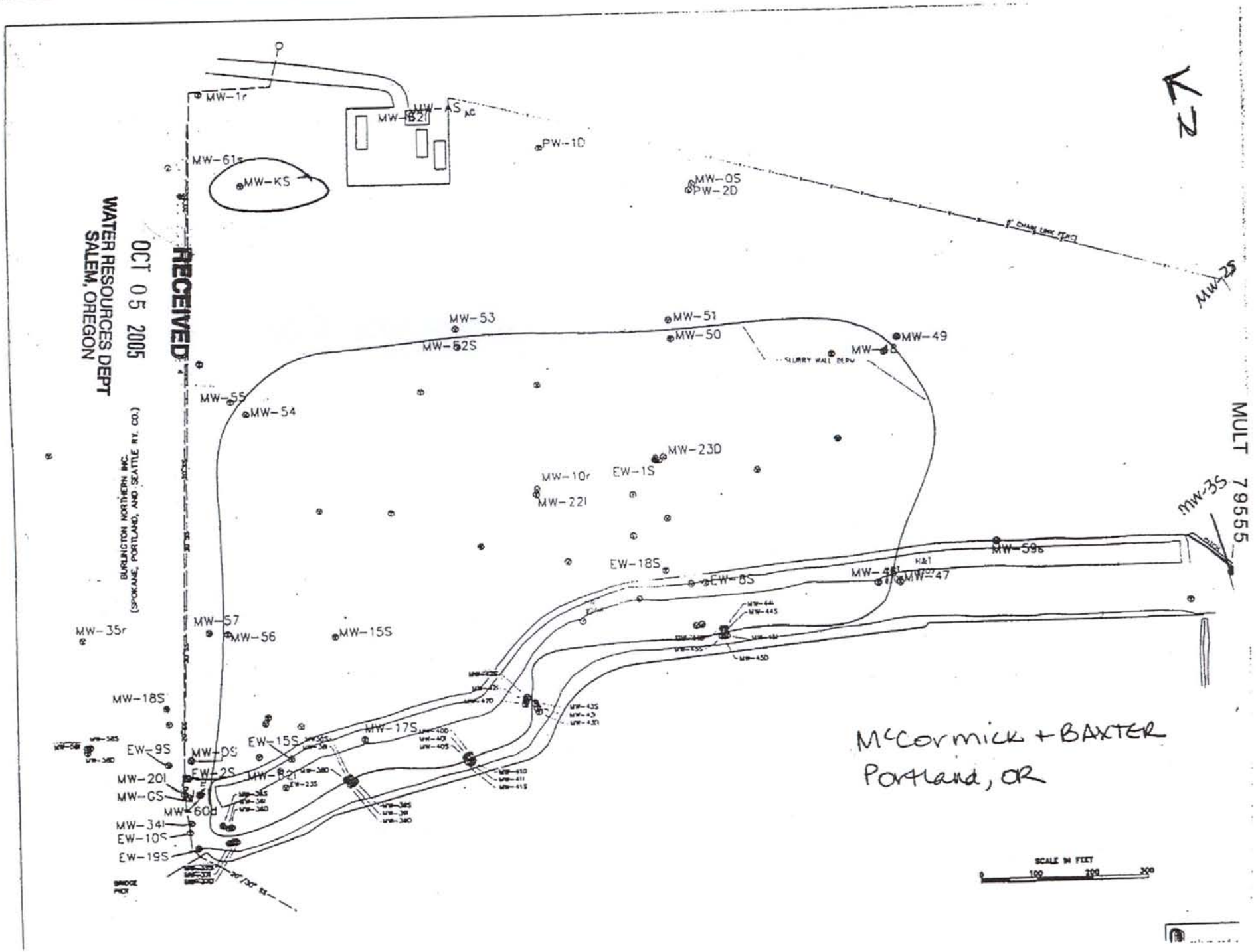
(1) The Well Construction Standards serve to protect ground water resources. By approving and issuing this special construction standard the Oregon Water Resources Department is not representing that a well constructed in accordance with this condition will maintain structural integrity or that it meets engineering standards. The well constructor/or landowner is responsible for ensuring that a well is constructed in a manner that protects ground water resources as required under Oregon Administrative Rules 690-200 through 690-240.

(2) If it should be determined at some future date that the well, due to its construction, is allowing ground water contamination, waste or loss of artesian pressure, the undersigned shall return to the site and rectify the problem.

(3) If oral approval was granted, a written request must be submitted to the Department either within three (3) working days of the date of oral approval or prior to the completion of the associated well work. Failure to submit a written request as described above may void prior oral approval.

I have read and understand the above information. I further attest that the information provided is accurate to the best of my knowledge.

Bonded Constructor Signature: _____


K2
MULT 79555
RECEIVED
OCT 05 2005
WATER RESOURCES DEPT
SALEM, OREGON
MW-1r
MW-B2I
MW-AS
PW-1D
MW-61s
MW-KS
MW-05
PW-2D
MW-25
MW-53
MW-52S
MW-51
MW-50
MW-49
MW-48
SLURRY WALL DEPO
MW-55
MW-54
MW-23D
MW-10r
EW-1S
MW-22I
MW-35
MW-59S
EW-18S
EW-8S
MW-46I
MW-47
MW-57
MW-56
MW-15S
MW-35r
MW-18S
MW-17S
EW-15S
EW-9S
MW-DS
EW-2S
MW-B2I
MW-20I
MW-GS
MW-60d
MW-34I
EW-10S
EW-19S
McCormick + BAXTER
Portland, OR
SCALE IN FEET
0
100
200
300

APPENDIX C
VEGETATION MANAGEMENT

OPERATION AND MAINTENANCE REPORT
JANUARY 2012 THROUGH DECEMBER 2012

APPENDIX C
CONTENTS

FIGURE

ATTACHMENT

ACRONYMS

BES	Bureau of Environmental Services
NOAA	National Oceanic and Atmospheric Administration
O&M	Operation and Maintenance
Site	McCormick & Baxter Superfund Site

APPENDIX C
VEGETATION MANAGEMENT
OPERATION AND MAINTENANCE REPORT
JANUARY 2012 THROUGH DECEMBER 2012
MCCORMICK & BAXTER SUPERFUND SITE

1.0 INTRODUCTION

This Appendix C to the *January 2012 through December 2012 Operation and Maintenance* (*O&M*) *Report* (*O&M Report*) summarizes the 2012 vegetation management activities at the McCormick & Baxter Superfund Site (Site). Vegetation management activities were conducted in accordance with the McCormick & Baxter *Vegetation Management Plan* dated August 16, 2011 (Hart Crowser/GSI, 2011). The location of the Site, the Site layout, and surface elevations are shown on Figures 1 through 3 in the main section of the *O&M Report*.

The upland cap consisting of the Riparian Area and the Upland Area is managed as four distinct components, corresponding with the goals and objectives for management of hydrology, soils, and wildlife habitat. These components are:

- Riparian Area
- Upland Area
  - Impermeable Cap
  - Stormwater Retention Pond and Swale (permeable pond and swale area)
  - Earthen Cap

Vegetation management components are shown on Figure C-1.

2.0 BACKGROUND

In 2005, a soil cap with bank layback (Riparian Area) was installed at the Site as part of the remedial action. The City of Portland, Bureau of Environmental Services (BES), entered into an Intergovernmental Agreement with the Oregon Department of Environmental Quality to provide vegetation planning and vegetation management services at the Site from 2006 through 2010 as described in the *Upland Sediment and Soil Cap Vegetation Management Strategy* (BES, 2005). In February 2006, the soil cap was planted and an irrigation system was installed. After the fifth growing season, the vegetation is fully established and the irrigation system is no longer needed at the Site. Hart Crowser assumed responsibility of

vegetation management at the Site in 2011 upon completion of the initial Vegetation Management Strategy by the City of Portland's Bureau of Environmental Services (BES) (BES, 2005). A brief summary of the planting goals and activities is provided below.

The goal for the Riparian Area and subsequent plantings was to create habitat elements, such as large wood material, riparian vegetation for food, habitat cover and shelter, and shading (NOAA, 2004). Performance standards to assess whether the planting goals are met include the following.

- Bare soil spaces are small and well dispersed.
- Soil movement, such as active rills or gullies and soil deposition around plants or in small basin, is absent or slight and local.
- Plant litter is well distributed and effective in protecting the soil with few or no litter dams present.
- Native woody and herbaceous vegetation, and germination microsites, are present and well distributed across the site.
- Vegetation structure is resulting in rooting throughout the available soil profile.
- Plants have normal, vigorous growth form and a high probability of remaining vigorous, healthy, and dominant over undesired competing vegetation.
- Streambanks have less than 5 percent exposed soils with margins anchored by deeply rooted vegetation or coarse-grained alluvial debris.
- A continuous corridor of shrubs and trees provides shade for the entire streambank.

In February 2008, the Riparian Area was inter-planted with an additional 500 alder trees and irrigation was extended to this portion of the property to meet the performance standard planting goals. The installed plant materials have completed their sixth growing season. The irrigation system and piping have been inactive since 2009 and were decommissioned in place in 2012. Semiannual noxious weed control activities, including herbicide application, were conducted by BES from the spring of 2006 through the spring of 2010. Semiannual herbicide application was continued using a private subcontractor (Native Ecosystems Northwest of Portland, Oregon, under subcontract to Hart Crowser) in the fall of 2010, in the spring and fall of 2011, and in the spring and fall of 2012.

Rodents remain a minor concern; however, with the exception of some earlier targeted damage to the grand fir seedlings (BES, 2010), there has been limited damage to other plantings. Rodent control measures are limited to monitoring.

Current vegetation conditions are evaluated by comparing current conditions to those observed during a baseline reconnaissance visit completed by Hart Crowser in June 2011. Photographs of current conditions and comparisons to baseline visit photographs can be viewed in the Photograph Log in Attachment A of this appendix.

3.0 BASELINE CONDITIONS

A baseline reconnaissance Site visit was conducted on June 10, 2011, by Hart Crowser to confirm the vegetation conditions discussed in the final 2010 BES report contained within the 2010 Annual Report. The baseline inspection included visual observation of vegetation planting areas, species identification (native, non-native, and invasive), growth, density, and general coverage throughout the Site. Photograph documentation of the inspection was completed to create a baseline against which to evaluate the progress of future vegetation treatments and qualitative observations at the Site (Attachment A). The following section summarizes baseline conditions at the Site.

3.1 Riparian Area

The Riparian Area is divided into two components, lower and upper. Each of these areas received similar vegetation treatments. The lower riparian component is subject to fluctuations in the Willamette River, which influences vegetation conditions in this area.

The lower riparian component originally was planted with a variety of native trees and shrubs including: Oregon ash (*Fraxinus latifolia*), black hawthorn (*Crataegus suksdorfii*), cascara (*Rhamnus purshiana*), hardhack (*Spiraea douglasii*), red-osier dogwood (*Conus sericea*), Pacific ninebark (*Physocarpus capitatus*), swamp rose (*Rosa pisocarpa*), river willow (*Salix fluviatilis*), Sitka willow (*S. sitchensis*), rigid willow (*S. rigida*), Piper's willow (*S. piperi*), and black twinberry (*Lonicera involucrata*). Groundcover species installed in the lower riparian component included: California brome (*Bromus carinatus*), blue wildrye (Elymus glaucus), meadow barley (*Hordeum brachyantherum*), slender hairgrass (*Deschampsia elongata*), spike bentgrass (*Agrostis exerata*), globe gilia (*Gilia capitata*), lupine (*Lupinus albicaulis*), and Canada goldenrod (*Solidago canadensis*). No tree plantings were installed at lower elevations in this area because of periodic and late season inundation from the fluctuating river levels.

Instead, appropriate shrubs, primarily willows, were planted along the lower edge of the Riparian Area to provide food and shading. A significant quantity of large wood was observed along the lower portion of this area. Trees and shrubs within the lower riparian component were observed to be well established and growing both vertically and laterally. No indications of stress were seen on the plants. Localized areas of bare ground were observed at lower elevations, likely a result of river fluctuations and movement of large woody debris along the lower shoreline. Thistle (*Cirsium arvense*) was the most common noxious weed with lesser quantities of knapweed (*Centaurea* sp.) and butterfly bush (*Buddleia davidii*) present.

The upper riparian component also was planted with native vegetation including: red alder (*Alnus rubra*), big-leaf maple (*Acer macrophyllum*), Western red cedar (*Thuja plicata*), madrone (*Arbutus menziesii*), grand fir (*Abies grandis*), Garry oak (*Quercus garryana*), Oregon ash, black hawthorn, cascara, red elderberry (*Sambucus racemosa*), blue elderberry (*S. cerulea*), Nootka rose (Rosa nutkana), tall Oregon-grape (*Mahonia aquifolium*), snowberry (*Symphoricarpos albus*), red-flowering currant (*Ribes sanguineum*), oceanspray (*Holodiscus discolor*), red-osier dogwood, twinberry, and ninebark. Groundcover species in this area were identical to the lower riparian component. Similar to the lower riparian component, trees and shrubs in the upper riparian component were well established and appeared healthy. Few areas containing bare ground were observed. Thistle and knapweed were present in small quantities among the groundcover plantings throughout the area.

In general, the lower and upper riparian components were observed to be performing well with the planted trees and shrubs looking healthy and spreading. Groundcover species provided relatively good coverage of the soil with the exception of a few areas containing bare ground. In addition, large wood was present throughout the lower riparian component and in smaller quantities within the upper riparian component. Thistle, knapweed, and butterfly bush continue to grow in the Riparian Area.

3.2 Upland Area

The Upland Area is divided into three components: the earthen cap, perimeter pond and swale area, and the impermeable cap. The topsoil cap was planted with a variety of native trees, shrubs, and herbaceous species. The perimeter pond and swale area was planted with native shrubs and herbaceous species. The impermeable cap was seeded with meadow grasses and herbs.

The earthen cap was originally planted with a variety of native trees and shrubs including: Garry oak, Ponderosa pine (*Pinus ponderosa*), madrone, snowberry,

blue elderberry, Oregon-grape, Nootka rose, red-flowering currant, oceanspray, serviceberry (*Amelanchier alnifolia*), and mock orange (*Philadelphus lewisii*). Herbaceous species planted on the topsoil cap included: chewings fescue (*Festuca rubra var. comutata*), California brome, meadow barley, slender hairgrass, Spanish clover (*Lotus purshiana*), claria (*Clarkia amoena*), globe gilia, meadow checkermallow (*Sidalcea campestris*), large-leaved lupine (*Lupinus polyphullus*), and Canada goldenrod. Trees and shrubs on the topsoil cap were observed to be well established and growing both vertically and laterally. No indications of stress were seen on the plants. Localized areas of moss were observed within the grasses and herbaceous vegetation. Small quantities of knapweed and thistle were present.

The perimeter pond and swale area was planted with a native shrub overstory consisting of hardhack, Sitka willow, and Piper's willow. Volunteer red alder and black cottonwood (*Populus balsamifera*) were observed among the shrub plantings. Understory herbaceous species were planted on the basis of anticipated inundation within the perimeter pond and swale area and included: water plantain (*Alisma plantago aquatica*), slough sedge (*Carex obnupta*), soft stem bulrush (*Scirpus tabernaemontanii*), small-fruited bulrush (*Scirpus microcarpus*), Western sloughgrass (*Beckmania syzigachne*), Western mannagrass (*Glyeria occidentalis*), tufted hairgrass (*Deschapsia cespitosa*), slender hairgrass, meadow barley, spike bentgrass, meadow foxtail (*Alopecuris geniculatus*), self heal (*Prunella vulgaris*), Spanish clover, and gumweed (*Grindelia integrifolia*). The shrub plantings in the perimeter pond and swale area were well established and appeared healthy. Many of the grasses and herbs in the pond area did not survive and the understory is dominated by sand and bare ground. No noxious weeds were observed in this area.

The impermeable cap was seeded with a grassland mixture including: chewings fescue, California brome, meadow barley, slender hairgrass, large-leaved collomia (*Collomia grandiflora*), globe gilia, large-leaved lupine, and Canada goldenrod. Grassland species provide excellent cover of the impermeable cap. Moss is present in localized areas in this zone where grasses and herbs did not become established. Small quantities of knapweed, thistle, and skeletonweed (*Chondrilla juncea*) were present within the southwestern portion of this zone and did not appear to be encroaching on desirable vegetation.

In general, the upland components were observed to be performing well with the planted trees and shrubs looking healthy and spreading on the topsoil cap, shrubs well established within the perimeter pond and swale area, and good soil coverage and vegetative diversity on the impermeable cap. Groundcover species provided excellent coverage with the exception of a few areas containing bare ground and the relatively bare understory in the pond area.

Limited quantities of noxious weeds were observed in the Upland Area and were primarily limited to the southwestern edge of the impermeable cap.

4.0 FALL INSPECTION SUMMARY

On October 16, 2012, Hart Crowser conducted a field inspection to document vegetation conditions at the Site. Qualitative data were recorded on species composition, cover and density of vegetation, growth and vigor, and effectiveness of noxious weed treatments. Photograph documentation of the inspection was completed as a baseline against which to evaluate the progress of future vegetation treatments and qualitative observations at the Site (Attachment A). Observations are summarized below.

4.1 Riparian Area

At the time of the investigation, water levels in the Willamette River were low and the mid to upper beach face was exposed. The species originally planted in the lower riparian component continued to perform well during the summer months in 2012. Many of the trees and shrubs planted in this area reached 9 to 10 feet tall and continue to grow vertically and branch out laterally. As the tree species continue to develop, they will increase shading along the shoreline of the river. A small number of stressed trees or shrubs were observed in this area. A few Oregon ash, Western red cedar, hawthorne, ninebark, and cascara plants showed signs of stress, likely attributed to drought, which typically occurs in the late summer to early fall. In general, plants within the western half of the lower riparian area appeared less stressed than plants in the eastern half. The individual species identified during the baseline Site visit were present with a few volunteer red alder and black cottonwood saplings colonizing the area between the upper and lower riparian components. A limited amount of thistle was observed throughout the lower riparian component.

Native trees and shrubs in the upper riparian component also appeared to be performing well. Grand fir, Ponderosa pine, madrone, Nootka rose, snowberry, Oregon-grape, and elderberry performed the best and appeared well established within this area. Individual plants including oceanspray, cascara, twinberry, and ninebark appeared stressed. However, overall these species and other plantings originally planted in this area were healthy, well rooted, and growing vertically and laterally. Groundcover plantings also appeared healthy. Limited areas of bare ground were observed. Thistle was the most notable noxious weed observed in small quantities within this zone.

The upper and lower riparian components were performing well; trees and shrubs are spreading. Groundcover species provided good coverage of the Site soils, with the exception of a few small areas of bare ground. Large wood continued to be present along the shoreline to the middle of the bank near the break between the upper and lower riparian components. This large wood provides habitat for birds, small mammals, and other wildlife using this portion of the Site. Thistle continues to colonize the Riparian Area and is a target species for noxious weed control efforts. Knapweed and butterfly bush also are present in lesser quantities.

Ongoing spot-spraying and manual pulling of noxious weeds are being completed on a semiannual basis by Native Ecosystems Northwest to control noxious weeds throughout the Riparian Area and within portions of the Upland Area of the Site. A summary of these efforts is provided in Section 5 of this appendix.

4.2 Upland Area

Tree and shrub plantings on the topsoil cap were healthy and growing well. Ponderosa pine, Oregon-grape, elderberry, and serviceberry were performing the best. Trees and shrubs ranged from approximately 5 to 9 feet in height. Herbaceous species provided full coverage of the ground. A small number of stressed Ponderosa pine, willow, and madrone were observed. Localized areas of moss were observed among the herbaceous layer. No invasive vegetation was observed in this portion of the Site.

The perimeter pond and swale area was performing well, with the exception of the volunteer red alder and many of the planted willows. Shrubs ranged from 10 to 20 or more feet in height. Several alder and willow shrubs were observed in poor condition within the northern and eastern portion of this area. The poor vegetative health is attributed to the dominance of sandy soil and lack of moisture retention resulting in a notable reduction of vegetation cover in this area. It is anticipated that many of the willow and alder that appear dead and/or dying are stressed and will regenerate within this area. Limited areas containing water plantain, slough sedge, and other emergent vegetation were present. Most of the herbaceous and emergent plantings in this area did not survive because of lack of soil moisture retention and inundation to support all of the original plant species during the dry months of the year. No noxious weeds were observed in this area.

The grassland species on the impermeable cap provided excellent coverage of the ground. Gumweed was observed along the southwestern edge of the impermeable cap and provides increased diversity in this area. The remaining grasses and herbs were thriving. Moss was present in localized areas in the

central portion of this zone where grasses and herbs did not become established. Limited quantities of thistle were observed within the western portion of this zone.

The upland components were performing well, with the exception of small areas of alder and willow in the perimeter pond and swale area. Groundcover (herbaceous) species provided excellent coverage of the ground, except for a few areas containing bare ground and the relatively bare understory in the pond. Limited quantities of noxious weeds were observed in the upland and were primarily present on the western edge of the impermeable cap.

5.0 NOXIOUS WEED CONTROL

A preventative noxious weed control approach continues to be implemented at the Site as part of an ongoing effort to control the spread of noxious weed species. Native Ecosystems Northwest completed noxious weed control activities in April and October 2012. The scope of work completed by Native Ecosystems Northwest included completing application (spot spraying) of glyphosate herbicide and manual hand pulling to mitigate thistle, knapweed, Scotch broom (*Cytisus scoparius*), sweet clover (*Melilotus* sp.), mustards (*Brassica* sp.), and other noxious weeds at the 41-acre Site. Fall 2012 noxious weed control efforts focused on controlling thistle within the Riparian Area and impermeable cap as well as other noxious weeds identified during the fall 2012 Site inspection.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The tree, shrub, and groundcover plantings continue to perform well throughout the Site. A limited number of stressed, dying, or dead plants were observed. Vegetation performance in recent years indicated irrigation is no longer needed and the irrigation system was decommissioned in-place in 2012. Some volunteer species were noted on the Site and will help to increase species diversity where present. Groundcover species provide excellent coverage of the Site. Noxious weeds continue to be a problem at the Site and will require ongoing management and control to prevent them from colonizing larger areas. Thistle was the most notable noxious weed detected in 2012. Semiannual noxious weed control activities are recommended, primarily in the Riparian Area, to maintain a thriving and functional riparian habitat. Additionally, semiannual inspections should be continued in 2013 to assess and monitor vegetation planting areas, species identification (native, non-native, and invasive), growth, density, and general coverage throughout the Site.

7.0 REFERENCES

BES, 2005. *Upland Sediment and Soil Cap Vegetation Management Strategy, McCormick & Baxter Creosoting Company, Portland, Oregon.* City of Portland, Bureau of Environmental Services. August 2005.

BES, 2010. *Vegetation Management Report (January 2009 through December 2009), McCormick & Baxter Creosoting Company, Portland, Oregon.* City of Portland, Bureau of Environmental Services. January 2010.

Hart Crowser/GSI, 2011. *Vegetation Management Plan, McCormick and Baxter Superfund Site, Portland, Oregon.* August 2011.

NOAA, 2004. *Endangered Species Act - Section 7 Consultation. Biological Opinion & Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation. McCormick and Baxter Creosoting Company Site, Willamette River Remediation Sediment Cap, Multnomah County, Oregon*. National Marine Fisheries Service, Northwest Region. March 2004.

ENTRANCE AREA
Fence (Typ.)
Property Line
Gravel Road
Union Pacific Railroad
Burlington Northern Inc.
(Spokane, Portland, and Seattle Railway Co.)
DRAINAGE SWALE
EARTHEN CAP
Barrier Wall
Stormwater
Retention
Pond
Riprap
IMPERMEABLE CAP
Rock Pile
RIPARIAN AREA
Willamette Cove
Sand Pile
SEDIMENT CAP
Willamette River
Gate
1
2
3
4
5
6
7
8
9

1 Photograph Location, Number, and Direction Taken

N

0 200 400
Scale in Feet

McCormick and Baxter Superfund Site
Portland, Oregon

Site Plan

12/12

HARTCROWSER
GSI Water Solutions, Inc.

Figure
C-1

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ATTACHMENT A
PHOTOGRAPH DOCUMENTATION

OPERATION AND MAINTENANCE REPORT
JANUARY 2012 TO DECEMBER 2012
MCCORMICK AND BAXTER SUPERFUND SITE
PORTLAND, OREGON

Photograph 1 – Earthen cap and drainage swale in the foreground with the impermeable cap in the background. Photograph taken from Photo Station 1 looking south (Left - June 2011 [baseline]; right - October 2012 [current]).

Photograph 2 – Tree and shrub plantings on the earthen cap are healthy and spreading. Photograph taken from Photo Station 2 looking south (October 2012).

Photograph 3 – Eastern edge of the earthen cap with perimeter road in foreground. Photograph taken from Photo Station 3 looking west (October 2012).

Photograph 4 – Stormwater pond dominated by willow and alder. Photograph taken from Photo Station 4 looking northeast (Left - June 2011 [baseline]; right - October 2012 [current]).

Photograph 5 – Willow plantings on the earthen cap. Photograph taken from Photo Station 5 looking northeast (October 2012).

Photograph 6 – Impermeable cap dominated by grasses and herbaceous vegetation in the early summer (left) and fall (right). Photograph taken from Photo Station 6 looking east (Left - June 2011 [baseline]; right - October 2012 [current]).

Photograph 7 – Vegetation growth within the lower riparian component. Photograph taken from Photo Station 7 looking south (May 2012).

Photograph 8 – Upper riparian component with trees, shrubs, and herbaceous plants. Photograph taken from Photo Station 8 looking southwest (Left – June 2011 [baseline]; right - October 2012 [current]).

Photograph 9 – Lower riparian component with large wood along the edge. Photograph taken from Photo Station 9 looking northwest (Left – June 2011 [baseline]; right - October 2012 [current]).