



Pier 69 • 2711 Alaskan Way  
Seattle, WA 98121

**Letter of Transmittal**

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To: Ms. Piper Peterson Lee Date: August 6, 2008  
USEPA, Region 10  
1200 Sixth Avenue, Suite 900, ECL-111  
Seattle, Washington 98101 -3140

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From: Roy Kuroiwa – Project Coordinator

Project reference: Terminal 117 Early Action Area

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Hardcopy:	Electronic:	Description:
2	X	Deeper Well Installation Work Plan, dated August 6, 2008

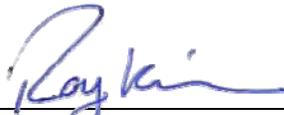
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Hardcopy:	Electronic*:	Name:	Company:
1	X	Kym Takasaki	U.S. Army Corps of Engineers
2	X	Rick Thomas and Brad Helland	Washington Department of Ecology
	X	Marla Steinhoff	NOAA
	X	B.J. Cummings	Duwamish River Cleanup Coalition
	X	Glen St. Amant	Muckleshoot Tribe
2	X	Tom Meyer	Seattle City Light
4	X	T-117 Technical Team Warren Hansen	Windward, DOF, ENSR, Integral

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\*Electronic version will be available at: <http://www.windwardenv.com/t117docs/default.htm>

  
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Roy Kuroiwa



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August 6, 2008

Ms. Piper Peterson Lee  
USEPA – Region 10  
1200 Sixth Avenue, Suite 900, ECL-111  
Seattle, Washington 98101 -3140

**Subject: Deeper Well Installation Work Plan  
Terminal 117 Early Action Area of the Lower Duwamish Waterway Superfund Site**

Dear Ms. Peterson Lee,

The letter presents the work plan for installation of a deeper monitoring well at the Terminal 117 (T-117) Early Action Area (EAA). The Port of Seattle and the City of Seattle propose to install the deeper monitoring well in the Dallas Avenue Right-of-Way approximately 5 feet north of MW-10 (Figure 1). The purpose of this well is to further assess the potential for recontamination of the T-117 EAA in light of the presence of low level chlorinated volatile organic compound (VOC) detections in the upper few feet of the aquifer at both MW-9 and MW-10. The location of, and the approach to, installation of this well were discussed with Rick Thomas on July 17, 2008.

**Site Geology**

Shallow soil at T-117 typically consists of fill material that ranges from 3 to 10 feet in thickness with the fill thickness increasing toward the Lower Duwamish Waterway (LDW). This fill consists of sand with varying amounts of silt mixed with anthropogenic material (e.g., bricks, rubble, and wood). Shallow boreholes typically terminate in a silt unit present beneath the fill. All stratigraphic information below the fill/silt contact is provided from a geotechnical borehole advanced along the west bank of the Duwamish Waterway (Hart Crowser, 2003). This borehole indicates that the silt unit is 10 feet thick and it is underlain by a sand unit that is about 20 feet thick. Silt and sand interbeds are present beneath the sand unit. The shallow silt unit has not been observed at the exploration locations within the Dallas Avenue Right-of-Way (MW-9 and MW-10) or further east (MW-1) to the maximum explored depth of 14 feet.

A bedrock outcropping is present immediately south of the T-117 EAA (Booth and Herman, 1998), a feature that is unique within the Duwamish valley. This bedrock has not been encountered by any of the boreholes advanced in the T-117 EAA but the bedrock may locally influence geology and hydrogeology.

**Well Installation**

One new monitoring well (MW-11) will be installed to monitor groundwater for potential recontamination of the T-117 EAA. MW-11 will be installed approximately 5 feet north of MW-10 (Figure 1) to ensure that it is positioned in an area where chlorinated VOCs are suspected to be present based on previous MW-9 and MW-10 analytical results and to provide additional hydrogeologic information. This new monitoring well will be drilled using a hollow-stem auger drill rig. MW-11 will be installed in accordance to the Quality Assurance Project Plan (QAPP) and Washington Administrative Code (WAC) Chapter 173-160. Borehole advancement and well installation will be overseen by a licensed professional geologist or hydrogeologist. The deeper well will be drilled to where the on-site geologist first observes a low-permeability silt layer. The observation of silt could be as shallow as 15 feet below ground surface (bgs) if the shallow silt unit is present or it could be as deep as 40 to 60 feet bgs. This deeper silt layer indicates the stratigraphic transition from alluvium to a post-glacial and glacial stratigraphic unit. This silt

is a regionally significant aquitard, allowing very little movement of groundwater. This silt layer has been observed at depths between 40 and 60 feet bgs in local soil borings and monitoring well logs.

Split spoon soil samples will be collected every 5 feet in the upper 15 feet, continuously from 15 to 25 feet bgs to ensure the shallow silt, if present, is not punctured, and every 2.5 feet to full borehole depth if a shallow silt unit is not observed. The borehole will be terminated within a silt unit once 2 feet of silt has been observed. Soil will be classified and described using the Unified Soil Classification System and standard geological terminology from ground surface to maximum depth explored. A sample of soil collected using EPA Method 5035A from immediately above the silt will be analyzed for chlorinated VOCs by EPA Method 8260B. Other soil samples will not be collected for analysis unless the on-site geologist observes visual or olfactory evidence of contamination in the soil cores. Blow counts will also be recorded during the advancement of MW-11. Soil descriptions, blow counts, and other observations during drilling will be recorded on a monitoring well log.

MW-11 will be constructed in accordance with WAC Chapter 173-160. The well components will consist of 2-inch-diameter Schedule 40 polyvinyl chloride (PVC) pipe with flush-threaded couplings. The casing and screen will arrive at the drill site wrapped in the original, unopened manufacturer's packaging.

MW-11 will be completed with 10 feet of 0.010-inch machine-slotted well screen. The bottom of the screen will be fitted with a flush-threaded bottom cap no greater than 6 inches long. The screen will be set in one of the following locations:

- Just above the silt layer if the shallow silt unit is observed
- At a location containing visual or olfactory evidence of contamination if the shallow silt is not encountered
- From 25 to 35 feet bgs if the shallow silt layer is not encountered and no visual or olfactory evidence of contamination exists, since this is the location of deeper water most likely to present a risk of recontamination to the T-117 EAA.

If visual or olfactory evidence of contamination is present at multiple locations, the well screen will be placed at the most impacted location.

The actual completion details will be recorded on a monitoring well log form. The well screen, bottom cap, and casing materials will be assembled and lowered into the borehole through the center of the augers until the screen is placed at the proper depth. The annular materials (sandpack, seal and grout) will then be emplaced through the center of the augers as the augers are withdrawn from the borehole.

A sand pack consisting of 10/20 silica sand will be placed from the bottom of the borehole to 2 feet above the top of the screen in the monitoring well. The monitoring well will be surged prior to placement of the bentonite seal to prevent bridging and facilitate settling of the sand pack. A bentonite seal consisting of bentonite pellets will be placed directly on the sand pack to a depth of 1.5 feet bgs. The depth to the top of the sand pack and the bentonite seal will be tagged with a weighted tape to ensure well completion materials are installed to the correct depth. Surface completion will be flush-mount completed. The top of the riser pipe will be fitted with a watertight locking cap. Upon construction completion, the monitoring well will be surveyed. This data will be used to generate a revised map of the site.

The drill rig mast and all augers and drilling tools will be steam cleaned on site prior to and after the monitoring well has been installed. All decontamination water will be disposed of properly.

### **Well Development**

MW-11 will be developed (a minimum of 24 hours after installation) using pumping and surging methods described in the QAPP. Specific conductance, pH, and temperature of the water will be monitored and

recorded on a well development form, an example of which is provided in Attachment A of the QAPP. After stabilization of the groundwater parameters has occurred and development is deemed complete, pumping or bailing will cease and the general rate of recovery of the water level will be observed and recorded on the well development form.

It is our objective to have MW-11 installed in time to be sampled during the 3<sup>rd</sup> Quarter 2008 Interim Groundwater Monitoring Event, which is scheduled for September 10 to 12, 2008. MW-11 groundwater will be sampled and analyzed in accordance with the QAPP, consistent with the other wells at the T-117 EAA.

Please respond by August 22, 2008 with your comments or approval to facilitate installation of the deeper well in sufficient time to allow groundwater sampling in September. Please feel free to call us with any comments or questions.

Sincerely,



Roy Kurpiwa  
Project Coordinator

**Distribution List:**

Kym Takasaki – U.S. Army Corps of Engineers  
Rick Thomas and Brad Helland – Dept of Ecology  
Tom Meyer – Seattle City Light  
Warren Hansen and Joanna Florer – Windward  
Reid Carscadden – Integral  
Grant Hainsworth – ENSR

**Attachments:**

Proposed Deep Well Location Map

**References:**

ENSR, 2008a. *Interim Groundwater Monitoring Plan*. Prepared for the Port of Seattle and the City of Seattle. ENSR, Seattle, WA.

ENSR, 2008b. *Quality Assurance Project Plan-Non-Time Critical Removal Action- Preliminary Investigation and Interim Groundwater Monitoring Plan*. Prepared for the Port of Seattle and the City of Seattle. ENSR, Seattle, WA.

Hart Crowser, Inc., 2003. *Geotechnical and Environmental Engineering Design Study – Proposed Duwamish Transmission Towers*. Prepared for Seattle City Light.

Wilbur, 2002. *Draft Technical Report, South Park Bridge Project, Geology and Soils, Hazardous Materials Appendices*. Prepared for King County Department of Transportation. Submitted by Parsons Brinckerhoff, Inc., Seattle, WA. Wilbur Consulting, Inc., Seattle, WA.

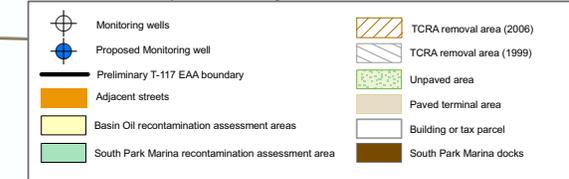


Figure 1. Proposed Deep Well Location Map