from SIT 5.13**

Cleanup Action Report
Offsite Area Soil Remedial Excavation
Former Unocal Seattle Marketing Terminal 0724
Order on Consent DE88-N223
Seattle, Washington
File No. 0161-357-07
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CLEANUP ACTION REPORT
OFFSITE AREA SOIL REMEDIAL EXCAVATION
FORMER UNOCAL SEATTLE MARKETING TERMINAL 0724
ORDER ON CONSENT DE88-N223
SEATTLE, WASHINGTON
FOR
UNOCAL RRMC

1.0 INTRODUCTION

This report documents the soil remedial excavation activities completed between July and October 2005 within the Offsite Area of the Unocal Former Seattle Marketing Terminal (SMT) site. The site is defined in Order on Consent DE88-N223 and is divided into four contiguous areas: Upper Yard, Lower Yard, Elliott Avenue and the Offsite Area. The Offsite Area generally comprises the BNSF railroad tracks right-of-way and Alaskan Way between Bay Street and Broad Street. The Offsite Area address used for permitting the 2005 excavation project is 2 Broad Street. The site location is shown in relation to surrounding physical features in Figure 1. The site layout is shown in Figure 2.

The Upper Yard and Lower Yard property of the SMT site were sold by Unocal to the Trust for Public Land for the Seattle Art Museum (SAM) in 1999. In 2004, SAM began construction for redevelopment of the property, including the Offsite Area (which is now owned by the City of Seattle Parks and Recreation), as the Olympic Sculpture Park (OSP). SAM entered a Pre-purchaser Agreement with the Washington State Department of Ecology (Ecology) prior to their purchase of the property. As part of the agreement, SAM has submitted reports to Ecology pertaining to remediation design for the OSP. The report regarding the Offsite Area is the "Engineering Design Report for Phase II Remediation, Olympic Sculpture Park" dated March 24, 2005 by Aspect Consulting.

Unocal's planned 2005 soil excavation project for the Offsite Area is described in the report "Draft Cleanup Action Plan (CAP) Addendum, Offsite Area, Former Unocal Seattle Marketing Terminal 0724, Seattle, Washington," dated March 7, 2005 by GeoEngineers. The CAP Addendum documents the rationale for selection of hot spot soil excavation as a supplemental cleanup action for the Offsite Area. The purpose of the 2005 cleanup action in the Offsite Area was to remove a source area of petroleum and light non-aqueous phase liquid (LNAPL) in soil to improve groundwater quality in the Offsite Area. This source area is referred to as the "hot spot."

2.0 BACKGROUND

Unocal has been conducting cleanup of the Former Seattle Marketing Terminal site as required by Order on Consent DE88-N223 and Amendments 1 through 4. The original Order on Consent was signed by Unocal and Ecology in December 1988. In July 1995, Amendment No. 4 to the Order on Consent was signed by Unocal and Ecology. Amendment No. 4 contains cleanup targets and remedial action levels (RALs) for groundwater in the Offsite Area. For a summary of the assessment and cleanup work performed in the Offsite Area to date as required by the Order on Consent, please refer to section ES-3.0 of the CAP Addendum; for a summary of groundwater conditions prior to hot spot excavation activities please refer to section 1.3 of the CAP Addendum. As of early 2005, groundwater in the Offsite Area was not fully in compliance with the cleanup targets and RALs.

Prior to 1999 when Unocal sold the property, soil excavation had not been selected as a preferred remedy for the Offsite Area (Focused Feasibility Study [FFS] [June 9, 1997] and Offsite Area Cleanup Action Plan [CAP] [June 18, 1997]) primarily because soil excavation was not consistent with existing site uses

(railroad, paved parking of Alaskan Way right-of-way, seawall, boardwalk, entrance to Myrtle Edwards Park and Trolley Barn) at that time. However, two years after publishing the FFS and CAP, Unocal sold the Upper and Lower Yards and redevelopment planning for the Olympic Sculpture Park (OSP) began. The OSP redevelopment made hot spot excavation in the Offsite Area a feasible alternative because an area of petroleum-impacted soil was accessible for excavation in 2005, as OSP earthwork and construction activities were underway.

Cleanup targets and remedial action levels (RALs) for soil in the Offsite Area are not established in Unocal's Order on Consent; cleanup targets and RALs for groundwater are established. Therefore, evaluation of groundwater quality and compliance with groundwater RALs and cleanup targets will be made to assess effectiveness of the 2005 hot spot excavation.

3.0 PURPOSE AND SCOPE

The purpose of the 2005 hot spot excavation was to remove a source area of petroleum and light, non-aqueous phase liquid (LNAPL) in soil to improve groundwater quality in the Offsite Area and to remove the accessible portions of Unocal former product pipe corridor (previously decommissioned) as mandated by the City of Seattle. GeoEngineers' specific scope of services completed for this phase of activities is listed below:

1. Participated in a pre-construction site meeting with representatives to discuss project logistics and schedule.
2. Notified Ecology's site manager at least one week prior to beginning site work.
3. Obtained pre-approval for receipt of petroleum-contaminated soil from the site at Rinker Materials, Everett, Washington.
4. Obtained pre-approval from King County for short-term discharge to the sanitary sewer of accumulated water removed during remedial excavation activities.
5. Prepared a written site safety plan for GeoEngineers personnel during performance of the work.
6. Observed and documented the decommissioning of selected monitoring wells in the hot spot excavation area in general accordance with state regulations.
7. Observed the installation of 10 dewatering wells around the perimeter of the hot spot excavation area.
8. Observed and documented the construction of an engineered shoring wall at the eastern excavation sidewall.
9. Observed soil conditions and used soil field screening to advise the contractor regarding the segregation of apparent non-contaminated overburden. Soil field screening methods consisted of visual observation, water sheen and headspace vapor screening.
10. Obtained soil samples from non-contaminated overburden stockpiles before reusing the material as backfill in the excavation.
11. Obtained soil samples from the limits of the excavation.
12. Field screened soil samples and submitted samples to North Creek Analytical laboratory for chemical analyses of one or more of the following: benzene, ethylbenzene, toluene and xylenes (BETX) by EPA Method 8021B, gasoline-range hydrocarbons by Ecology Method WTPH-G, diesel- and heavy oil-range hydrocarbons by Ecology Method NWTPH-Dx, polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270 using GC/MS-SIM and lead by EPA 6000/7000 series.

13. Performed air monitoring during excavation activities both in the worker breathing zone and at the site perimeters.

14. Evaluated the performance of the dewatering well system and discharge of groundwater to the sanitary sewer.

15. Obtained two characterization samples of the pumped and treated groundwater for testing in accordance with sanitary sewer discharge criteria. Submitted the water samples for analyses of BETX by EPA Method 8021B, gasoline-range hydrocarbons by Ecology Method WTPH-G and diesel- and heavy oil-range hydrocarbons by Ecology Method NWTPH-Dx.

16. Evaluated the field and laboratory data and prepared a summary report of the remedial excavation activities.

4.0 2005 HOT SPOT REMEDIAL EXCAVATION

4.1 General

Remedial excavation activities were performed between July and October 2005. Wyser Construction performed the excavation and restoration activities at the site. GeoEngineers was the project environmental consultant and geotechnical engineer. A geologist or engineer from GeoEngineers observed and documented the remedial excavation. Remediation activities were conducted in general accordance with the "Draft Cleanup Action Plan Addendum, Offsite Area, Former Unocal Seattle Marketing Terminal 0724," prepared by GeoEngineers, dated March 7, 2005 and related documents and permits.

4.2 Pre-Excavation Site Conditions

The site use in the planned excavation area prior to excavation activities consisted primarily of surface parking for Myrtle Edwards Park. Additionally, the King County Metro Trolley Barn facility was located within the Offsite Area south of the excavation. Ground surface conditions at the site consisted of asphalt and concrete pavement. The Offsite Area is bounded by the entrance to Myrtle Edwards Park to the north and Broad Street to the south. The Burlington Northern Santa Fe right-of-way and fencing extend east of the parking area. The seawall and boardwalk extend along the west side of the site. Elliott Bay is west of the seawall.

Decommissioned product pipes, associated with the former Unocal Seattle Marketing Terminal facility, extended in an east-west direction across the Offsite Area (Figure 2) at a depth of approximately 7 to 9 feet below ground surface (bgs) and removal of accessible portions of these decommissioned pipes was mandated by the City of Seattle.

4.3 Authorizations and Permits

The Washington State Department of Ecology approved the "Draft Cleanup Action Plan Addendum, Offsite Area, Former Unocal Seattle Marketing Terminal 0724," dated March 7, 2005 via e-mail on May 20, 2005. The CAP Addendum was subject to a 30-day public comment period that ended May 5, 2005 with no public comments received by Ecology.

Copies of the permits and approvals obtained for this hot spot excavation project are included in Appendix A and are listed below.

- Exemption from Shoreline Management Act Substantial Development permit and SEPA review (City of Seattle)

- Shoring and Grading Permit, including drainage and erosion control (City of Seattle and Seattle Parks and Recreation)
- Revocable Permit to Use or Occupy Park Property (Seattle Parks and Recreation)
- Wastewater discharge to sanitary sewer (King County)
- Approval to remove two fire hydrants (City of Seattle Fire Marshal)

Based on previous soil sample data from the site, Rinker provided authorization for acceptance of petroleum-contaminated soil excavated from the site for treatment by thermal desorption and landfill reclamation.

4.4 Decommissioned Wells and Water Line

On July 7, 2005, four monitoring wells (MW-9, 36, 68 and 72), four recovery wells (RW-17, 18, 19 and 20) and one piezometer (PZ-18.5) located within the planned hot spot excavation area were decommissioned. Well decommissioning well reports are included in Appendix B.

Prior to beginning excavation activities, a 21-inch diameter water line that supplied water to Myrtle Edwards Park for irrigation and to two fire hydrants located north of the Trolley Barn were cut and capped near the northwest corner of the Trolley Barn. A 1¼-inch diameter temporary water line at the ground surface was installed during excavation activities for the irrigation needs of Myrtle Edwards Park. The temporary water line was installed by Seattle Public Utilities. Section 5.3 describes final replacement of the water line.

4.5 Shoring

Engineered shoring was required to excavate and remove contaminated soil adjacent to the BNSF right-of-way along the eastern excavation perimeter (Figure 2). The engineered shoring system consisted of a cantilevered soldier pile and timber lagging wall. The shoring design is presented in the permit drawing set "Unocal Seattle Marketing Terminal 0724, Offsite Area Hot Spot Excavation, Temporary Soldier Pile & Timber Lagging Wall" dated April 4, 2005.

Twenty five steel piles were installed, spaced at approximately 8 feet on center, with wooden lagging boards placed between the piles. Controlled density fill (CDF) was used behind the wall to aid in stabilizing loose soil. Once the hot spot excavation was completed, the excavation was backfilled and the shoring wall was left in place with the upper 4 feet of the wall (both soldier piles and timber lagging) below final surface grade cut off and removed. Installation and performance of the shoring wall are described in GeoEngineers "Summary Letter, Construction Observation Services, Offsite Area, Former Unocal Marketing Terminal 0724" dated November 21, 2005 (presented in Appendix C). Representative photographs of the shoring wall are shown in Figure 6.

The Elliott Bay seawall was originally proposed for use as vertical shoring at the western-most edge of the hot spot excavation; however, prior to doing so, the connection between the seawall and the relieving platform was inspected by a geotechnical engineer from GeoEngineers. The relieving platform comprises a combination of wood piles and wood timber lattice tied into the seawall for stability (see CAP Addendum).

Based on our visual observations at the time the relieving platform was exposed, deterioration of the timber decking was noted and it was the opinion of the geotechnical engineer that the timber joists connecting the seawall footing to the timber platform would show similar deterioration to that observed on the timber decking. The extent of deterioration could not be readily evaluated; however, it was our

opinion that a similar amount as observed in the timber decking would likely impact the performance of the seawall if the overburden soil behind the seawall and above the timber platform was completely removed. Therefore, remedial excavation of hot spot soil adjacent to the seawall was completed using trench boxes rather than exposing the seawall for vertical excavation support. CDF backfill was placed in this area of the excavation to reduce the potential for vibrations near the sidewalk and seawall. This option resulted in an area of hot spot soil left-in-place adjacent to the seawall. A cross section of the backfilled excavation is shown in Figure 5.

4.6 Dewatering

Dewatering was performed during the remedial excavation and shoring wall installation to facilitate removal of soil below the static water table. Dewatering activities were initiated on July 21, 2005. Dewatering occurred continuously through the duration of excavation except for short-term shut-downs for equipment maintenance.

A well point system was designed and installed to lower water levels to at least 2 feet below the base of the excavation. Ten dewatering wells, DW-1 through DW-10, were installed along the perimeter of the excavation, at the approximate locations shown in Figure 4. Appendix D contains the dewatering well drilling field procedures and a representative well construction log. Downhole submersible pumps were used in the dewatering wells.

Water from the dewatering wells was discharged to a settling tank and oil/water separator prior to permitted discharge to the sanitary sewer. On occasion as needed, the excavation was supplementally dewatered with sump pumps placed directly in the excavation. Excavation water removed by sump pump was also conveyed to the settling tank and oil/water separator for treatment prior to discharge.

Discharge flow rates and volumes were monitored in accordance with permit requirements. An inline flowmeter was installed upstream of the discharge point. Flow rates and discharge volumes were recorded daily. Flow rates during dewatering varied depending on how many wells were simultaneously being operated; each individual well produced approximately 5 gpm. Flow rates from the dewatering system ranged up to 52 gpm. The total volume of fluids recovered by the 2005 dewatering system, including supplemental excavation dewatering by sump pumps, was approximately 2,040,500 gallons.

On July 22 and September 22, 2005 water samples were obtained from the final treatment section within the oil/water separator, just upstream of the sanitary sewer discharge point. The water samples were submitted for analysis of BETX by EPA Method 8021B, gasoline-range hydrocarbons by Ecology Method NWTPH-G and diesel- and heavy oil-range hydrocarbons by Ecology Method NWTPH-Dx. Testing for settleable solids was also performed on the samples. Results from the two groundwater samples for the analytes tested either were not detected or were detected at concentrations less than the discharge criteria (King County Authorization 10576-01). Water sample chemical analytical data are summarized in Table 1.

4.7 Remedial Excavation Overview

Soil remedial excavation activities were performed by Wyser Construction of Bothell, Washington between July and October 2005. The hot spot remedial excavation size, depth, and locations were pre-determined as outlined in the CAP Addendum. GeoEngineers' representative was present on site daily during soil excavation, shoring and dewatering activities. The shoring wall, hot spot excavation area and excavation limit soil sample approximate locations are identified in Figure 3. Excavation and stockpile soil sample chemical analytical data are summarized in Tables 2 through 4. Field procedures are

described in Appendix D. Chemical analytical data sheets and our review of the laboratory quality control (QC) data are provided in Appendix E.

The 2005 hot spot excavation was completed in two phases. The first phase consisted of excavation and backfill of the northwest portion of the excavation extending from the seawall to approximately 25 feet west of the shoring wall. The initial excavated area was then backfilled, paved, and the site was vacated August 16 through August 23, 2005 for Hempfest activities at Myrtle Edwards Park. The northwest excavation extended to a maximum depth of 14 feet bgs in this area due to the presence of the seawall relieving platform.

The second phase of the excavation consisted of excavation and backfill of the remaining hot spot excavation area. Prior to excavating, the soldier piles for the temporary shoring were installed, the 21-inch diameter water line was capped and water service to Myrtle Edwards was re-routed via a temporary water line. Lagging installation for the shoring was completed in combination with the excavation activities. The excavation extended to the target depth of 16 feet bgs in this area.

Segregation of overburden soil (to be reused on site as backfill) from impacted soil (to be transported off site for disposal) was based on the previous sampling data from the site (depths and locations as described in the CAP Addendum) and on the results of field screening of soil samples obtained during the hot spot soil excavation. Soil samples were obtained from the excavation limits for chemical analyses. These samples were obtained to document the conditions of the soil at the limits of the excavation. Overburden soil was sampled before reuse to confirm that contaminant concentrations were less than the reuse criteria (see Section 4.9 Overburden Soil).

Groundwater was encountered in the excavation at approximately 12 to 14 feet bgs during excavation activities. Accumulation of groundwater in the excavation while dewatering wells were pumping was generated during high tides.

Subsurface soil conditions in the excavation consisted of fill comprised of silty sand with varying amounts of gravel from ground surface to 16 feet bgs. During excavation activities, a historic seawall was observed extending in a north-south orientation at 13 feet bgs approximately 7 feet west of the temporary shoring (Figure 5). Wood debris and rip rap were observed near the historic seawall.

4.8 Former Unocal Pipe Corridor Removal

As mandated by the City of Seattle, all accessible portions of the former Unocal pipe corridor were removed during the 2005 hot spot excavation. The pipe corridor comprised 25 individual former product pipes, ranging in diameter from 2 to 8 inches. The corridor was originally decommissioned in the mid-1980s by filling with grout. A 65 foot-long section of this pipe corridor was removed during the 2005 hot spot excavation activities. The 65-foot-long section of the pipe corridor beginning just east of the seawall and ending just east of the temporary shoring wall was removed as shown in Figures 3 and 5. A small hole was drilled into each pipe to inert the pipe if not previously grouted with concrete. Each pipe was then cut with a saw and removed. A photograph representative of pipe corridor removal activities is shown in Figure 6.

4.9 Overburden Soil

Overburden soil that did not show evidence of petroleum based on field screening was removed from the excavation and segregated for stockpiling and testing to confirm reuse options. In general, overburden extended from below the original pavement to a depth of approximately 9 to 12 feet bgs. Seven separate stockpiles were generated during the course of excavation. Soil samples representative of each stockpile

were obtained as the stockpiles were generated; the samples were tested to confirm that the soil met reuse criteria for the site (see below). Approximately 5,620 tons (3,500 in-place cubic yards) of non-contaminated soil overburden was stockpiled.

Discrete soil samples were obtained from each stockpile: four samples from stockpile SP-1 (SP-1 through SP-4), three discrete soil samples from SP-2 (SP-2-1 through SP-2-3), one discrete soil sample from SP-3 (SP-3-1), three discrete soil samples from SP-4 (SP-4-1 through SP-4-3), five discrete soil samples from SP-5 (SP-5-1 through SP-5-5), five discrete soil samples from SP-6 (SP-6-1 through SP-6-5) and three discrete soil samples from SP-7 (SP-7-1 through SP-7-3). The stockpile samples were submitted for chemical analysis of BETX and petroleum hydrocarbons. Six of the stockpile samples were additionally tested for lead. Overburden soil did not contain visual evidence of debris and so was not additionally tested for carcinogenic PAHs. BETX, petroleum hydrocarbons and lead either were not detected or were detected at concentrations less than the reuse criteria in the overburden stockpile soil samples (Table 4).

The reuse criteria for non-contaminated excavated overburden used as backfill on site are presented below.

Reuse Soil Criteria – Concentrations of Petroleum-Related Constituents (mg/kg)								
Benzene	Ethyl-benzene	Toluene	Xylenes	Gasoline-Range Petroleum Hydrocarbons	Diesel-Range Petroleum Hydrocarbons	Heavy Oil-Range Petroleum Hydrocarbons	Carcinogenic PAHs[1]	Lead
<=0.5	<=20	<=40	<=20	<=100	<=2,000	<=2,000	<=0.6	<=250

Notes:

[1]cPAHs refers to the sum of the benzo(a)pyrene-TECs (toxicity equivalent concentrations) per Amendment No. 4 to the Order on Consent. This is the soil Remedial Action Level (RAL) that was specified for Lower Yard.
mg/kg =milligram per kilogram

4.10 Disposition of Petroleum-Contaminated Soil

Rinker Materials accepted the petroleum-contaminated soil excavated from the site during the 2005 remedial activities. A total of 4,435 tons of petroleum-contaminated soil were removed from the excavation. Petroleum-contaminated soil either was temporarily stockpiled before loading or was loaded directly into trucks and transported to Rinker Materials in Everett, Washington. The soil was treated by thermal desorption and placed in Rinker's landfill. Treatment and disposal of the contaminated soil was performed by Rinker Materials in general accordance with applicable federal, state and local laws and regulations. The tipping receipts are presented in Appendix F.

4.11 Product Removal

LNAPL (sheen to 1/8-inch thickness) periodically accumulated on standing water in the open excavation. The LNAPL was collected from the open excavation using product absorbent booms, vacuum trucks and supplemental dewatering sump pumps. A total of 59,450 gallons of LNAPL/oily water was collected from the open excavation and transported off site for disposal by Marine Vacuum Services of Seattle, Washington. Waste manifests are presented in Appendix G. A representative photograph of product removal activities is shown in Figure 6.

4.12 Excavation Base and Sidewall Sampling

Soil samples were obtained from the excavation limits for chemical analyses. Eight base samples and 17 sidewall samples were obtained from the excavation. The base samples were obtained from depths ranging from 14 to 16 ft bgs and the sidewall samples were obtained from depths between 11 and 15 feet bgs. These samples were obtained to document the conditions of the soil at the limits of the excavation.

The approximate locations of the excavation soil samples are shown in Figure 3. Soil sample chemical analytical data are summarized in Tables 2 and 3. Field procedures are described in Appendix D. Chemical analytical data sheets and our review of the laboratory quality control (QC) data are provided in Appendix E.

5.0 EXCAVATION RESTORATION

5.1 Backfilling and Resurfacing

Backfilling, compaction and resurfacing were conducted by Wyser. GeoEngineers monitored backfilling, compaction activities and resurfacing as discussed in the "Summary Letter, Construction Observation Services, Offsite Area, Former Unocal Marketing Terminal 0724" dated November 21, 2005 (Appendix C).

Figure 5 illustrates a representative cross section of the backfilled excavation. Two- to 4-inch minus quarry spalls (approximately 711 tons) were placed in the base of the excavation, approximately 3 feet thick. Quarry spalls also were placed along the eastern shoring wall, as shown in Figure 5. The quarry spall layer along the eastern excavation sidewall is approximately 4 feet thick. A geotextile filter fabric was placed over the quarry spalls and below general backfill material. Clean overburden meeting site reuse criteria, combined with approximately 3,209 tons of imported pit run material, was used as backfill above the quarry spalls up to final grade. A representative photograph of backfilling activities is shown in Figure 6.

An approximate 3-inch thick layer of asphalt pavement was placed at final surface grade. The pavement functions as a surface cap replacement.

5.2 Decommissioned Wells

On October 31, 2005, monitoring wells MW-8, 10, 20, 25, 26, 52, 67, 70, 71 and 76 and dewatering wells DW-1, 2, 7, 8, 9 and 10 were decommissioned. These wells were decommissioned so that SAM/OSP would not have to protect them during park construction activities. The wells were decommissioned by chipping in place with bentonite and filling the monument with concrete by a licensed well driller. Copies of the decommissioning reports are included in Appendix B.

Dewatering wells DW-3, 4, 5 and 6 were not decommissioned. These wells may be used by Sellen Construction during OSP construction activities and are expected to be decommissioned after their use.

5.3 Water Line Replacement

After excavation activities were completed, Wyser installed a section of replacement 6-inch diameter water line at a depth of approximately 3.5 feet below final subgrade elevation. The replacement of 6-inch diameter water line location was determined by the SAM/OSP design team. The replacement section of water line was pressure tested by Wyser. Sellen Construction, the general contractor for the OSP, will

connect the section of 6-inch diameter water line to the remaining piping and restore water service for the Park's irrigation system in the future.

5.4 Monitoring Well Replacement

Compliance monitoring wells are expected to be replaced by SAM in spring or summer 2006. The March 2005 EDR references the planned monitoring well replacement locations.

6.0 SUMMARY OF 2005 HOT SPOT SOIL REMOVAL

Soil remedial excavation was conducted between July and October 2005 to remove the previously identified "hot spot" area of contaminated soil in the Offsite Area in general accordance with the Cleanup Action Plan addendum for the Offsite Area. A total of approximately 4,435 tons of petroleum-impacted soil was removed during the 2005 remedial excavation activities. Approximately 5,620 tons of overburden material was reused on site as backfill. Following soil removal, the excavation was backfilled and the surface was restored with asphalt pavement. Tables 2 and 3 document the soil chemical analytical data for soil samples obtained from the final limits of the 2005 excavation.

7.0 LIMITATIONS

We have prepared this report for use by Unocal for remedial excavation monitoring services completed in the Offsite Area of the Unocal Former Seattle Marketing Terminal.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

Please refer to Appendix H titled "Report Limitations and Guidelines for Use" for additional information pertaining to use of this report.

TABLE 2
SUMMARY OF SOIL CHEMICAL ANALYTICAL DATA
OFFSITE AREA HOT SPOT EXCAVATION LIMITS
PETROLEUM RELATED COMPOUNDS AND LEAD
FORMER UNOCAL SEATTLE MARKETING TERMINAL
SEATTLE, WASHINGTON

10/25 8/25 6/25

Sample Identification[1]	Sample Date	Sample Depth (feet bgs)	Headspace Vapors (ppm)	Water Sheen	BETX[3] (mg/kg) 10/25 3/25 2/25				Gasoline-range Hydrocarbons[4] (mg/kg)	Diesel-range Hydrocarbons[5] (mg/kg)	Lube Oil-range Hydrocarbons[5] (mg/kg)	Lead[6] (mg/kg)
					B	E	T	X				
Base Samples												
EX-55-50-14	07/29/05	14	>2000	HS	21.9	11.9	<2.50	5.70	5,830	1,950	1,140	--
EX-55-30-14	07/29/05	14	>2,000	HS	5.23	7.06	<1.46	17.2	3,130	1,140	744	--
EX-20-30-16	08/08/05	16	250	HS	0.720	0.110	0.161	0.706	126	1,770	2,050	94.0
EX-15-130-16	09/29/05	16	>200	HS	0.415	0.264	<0.0500	1.19	175	4,870	3,760	--
EX-15-160-16	10/03/05	16	>1,000	HS	<0.172	0.278	<0.172	2.43	479	1,200	332	22.4
EX-15-40-16	10/19/05	16	--	HS	<0.532	<0.532	<0.532	1.21	237	8,110	5,840	--
EX-15-70-16	10/24/05	16	>1,200	HS	1.20	<0.760	0.814	5.12	1,330	16,700	5,310	--
EX-15-100-16	10/25/05	16	1,100	HS	1.82	0.970	<0.914	6.10	1,090	4,880	3,220	70.0
Sidewall Samples												
EX-40-20-12	07/29/05	12	<10	NS	<0.0500	<0.0500	<0.0500	<0.100	10.3	108	272	--
EX-60-60-13	08/01/05	13	256	HS	<0.0500	0.127	<0.0500	0.512	207	230	215	16.2
EX-60-35-11	08/03/05	11	>2,000	HS	9.97	6.48	1.17	18.2	2,960	1,230	997	--
EX-20-20-14	08/08/05	14	870	HS	0.549	0.375	<0.166	0.620	252	988	1,130	--
EX-30-180-15	09/26/05	15	<10	NS	<0.0500	<0.0500	<0.0500	<0.100	<5.00	<10.0	<25.0	--
EX-35-150-15	09/26/05	15	69	NS	<0.0500	<0.0500	<0.0500	<0.100	<5.00	11.7	<25.0	--
EX-5-175-15	09/28/05	15	>2,000	HS	0.401	0.451	<0.0346	1.72	723	5,430	1,250	--
EX-0-155-15	09/28/05	15	>1,000	MS	0.0677	0.537	<0.0416	2.30	501	873	<250	7.35
EX-0-105-13	09/29/05	13	559	HS	0.0891	0.427	<0.0369	1.38	242	865	<250	--
EX-0-130-14	09/30/05	14	>500	HS	<0.367	1.04	<0.367	3.86	794	3,490	512	--
EX-30-125-15	10/05/05	15	<10	MS	<0.0358	<0.0358	<0.0358	<0.0716	6.35 OK	<10.0	<25.0	--
EX-0-35-14	10/19/05	14	--	HS	0.196	<0.0545	0.0545	<0.109	6.89	13	<31.6	--
EX-0-55-15	10/20/05	15	220	HS	0.242	0.289	0.0422	1.25	198	1,060	501	26.8
EX-0-80-14	10/20/05	14	>1,000	HS	<0.581	0.732	<0.581	3.31	730	5,490	<1,810	--
EX-30-55-15	10/21/05	15	>3,000	HS	3.80	1.51	0.500	3.01	526	3,120	2,890	--
EX-30-75-14	10/25/05	14	4,000	HS	1.08	0.585	<0.184	0.766	257	106	87.4	--
EX-30-100-13	10/25/05	13	520	HS	0.0470	<0.0379	<0.0379	<0.0757	12.4 OK	17.7	<30.9	5.31

Notes appear on page 2 of 2

File No. 0161-357-07
January 26, 2006

MTCA method A 2007 0.03 6 7 9 100/30 2000 2000 250 mg/kg
methA 2001 0.03 6 7 9 w/o benz/ethyl " " " "

TABLE 3
SUMMARY OF SOIL CHEMICAL ANALYTICAL DATA
OFFSITE AREA HOT SPOT EXCAVATION LIMITS
CARCINOGENIC POLYCYCLIC AROMATIC HYDROCARBONS (cPAHs)
FORMER UNOCAL SEATTLE MARKETING TERMINAL
SEATTLE, WASHINGTON

Sample Identification[1]	Sample Date	Carcinogenic PAHs[2] (mg/kg)						
		Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (k) fluoranthene	Chrysene	Dibenz (a,h) anthracene	Indeno (1,2,3-cd) pyrene
EX-20-30-16	08/08/05	0.536	0.251	<0.200	<0.200	0.821	<0.200	<0.200
EX-5-175-15	09/28/05	0.198	<0.100	<0.100	<0.100	0.205	<1.00	<1.00

method A 0.1

Notes:

[1]Approximate sample locations are shown in Figure 3.

[2]Analyzed by EPA Method 8270 SIM.

mg/kg = milligrams per kilogram

Chemical analyses by North Creek Analytical of Bothell, Washington.

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TABLE 4
SUMMARY OF SOIL STOCKPILE CHEMICAL ANALYTICAL DATA
OFFSITE AREA HOT SPOT EXCAVATION STOCKPILES
FORMER UNOCAL SEATTLE MARKETING TERMINAL
SEATTLE, WASHINGTON

Sample Identification	Date	Field Screening Results[1]		BETX[2] (mg/kg)				Gasoline-range Hydrocarbons[3] (mg/kg)	Diesel-range Hydrocarbons[4] (mg/kg)	Lube Oil-range Hydrocarbons[4] (mg/kg)	Lead[5] (mg/kg)
		Headspace Vapors (ppm)	Water Sheen	B	E	T	X				
SP-1	07/27/05	<10	SS	<0.0412	<0.0412	<0.0412	<0.0824	<4.12	135	230	--
SP-2	07/27/05	<10	MS	<0.0420	<0.0420	<0.0420	<0.0840	16.6	256	340	--
SP-3	07/27/05	<10	SS	<0.0500	<0.0500	<0.0500	<0.100	<5.00	56.1	146	--
SP-4	07/29/05	<10	SS	<0.0434	<0.0434	<0.0434	<0.0867	<4.34	<10.0	<25.0	3.92
SP-2-1	08/04/05	<10	SS	<0.0500	<0.0500	<0.0500	<0.100	<5.00	<10.0	<25.0	--
SP-2-2	08/04/05	<10	SS	<0.0428	<0.0428	<0.0428	<0.0855	<4.28	<10.0	<25.0	--
SP-2-3	08/04/05	<10	SS	<0.0407	<0.0407	<0.0407	<0.0814	<4.07	15.3	52.0	--
SP-3-1	08/05/05	<10	SS	<0.0500	<0.0500	<0.0500	<0.100	<5.00	<10.0	<25.0	3.68
SP-4-1	09/21/04	--	SS	<0.0500	<0.0500	<0.0500	<0.100	<5.00	<10.0	<25.0	--
SP-4-2	09/21/04	--	SS	<0.0500	<0.0500	<0.0500	<0.100	<5.00	11.6	35.9	4.41
SP-4-3	09/21/04	--	SS	<0.0500	<0.0500	<0.0500	<0.100	<5.00	<10.0	<25.0	--
SP-5-1	09/27/05	<10	SS	<0.0436	<0.0436	<0.0436	<0.0871	<4.36	33.1	92.2	--
SP-5-2	09/27/05	<10	SS	<0.0500	<0.0500	<0.0500	<0.100	10.7	62.4	90.9	--
SP-5-3	09/27/05	<10	SS	<0.0418	<0.0418	<0.0418	<0.0836	<4.18	82.8	158	12.2
SP-5-4	09/27/05	<10	SS	<0.0353	<0.0353	<0.0353	<0.0706	<3.53	21.2	54.6	--
SP-5-5	09/27/05	<10	SS	<0.0341	<0.0341	<0.0341	<0.0682	<3.41	40.1	87.5	--
SP-6-1	10/13/05	<10	SS	<0.0408	<0.0408	<0.0408	<0.0816	<4.08	26.9	80.5	--
SP-6-2	10/13/05	<10	SS	<0.0443	<0.0443	<0.0443	<0.0887	<4.43	92.2	253	--
SP-6-3	10/13/05	<10	SS	<0.0449	<0.0449	<0.0449	<0.0898	<4.49	25.3	81.3	14.6
SP-6-4	10/13/05	<10	SS	<0.0448	<0.0448	<0.0448	<0.0895	<4.48	30	81.4	--
SP-6-5	10/13/05	<10	SS	<0.0424	<0.0424	<0.0424	<0.0847	<4.24	20.6	62.9	--
SP-7-1	10/17/05	<10	SS	<0.0423	<0.0423	<0.0423	<0.0847	<4.23	53.4	124	--
SP-7-2	10/17/05	<10	SS	<0.0430	<0.0430	<0.0430	<0.0859	<4.30	46.1	104	7.98
SP-7-3	10/17/05	<10	SS	<0.0500	<0.0500	<0.0500	<0.100	<5.00	25.1	64.5	--
Reuse Soil Criteria[6]				0.5	20	40	20	100	2,000	2,000	250

Notes:

[1]Field methods are described in Appendix A. NS = no sheen, SS = slight sheen, MS = moderate sheen, HS = heavy sheen, Headspace measurements obtained using a photoionization detector.

[2]B=benzene, E = ethylbenzene, T = toluene, X = xylenes. Analyzed by EPA Method 8021B.

[3]Analyzed by Ecology Method WTPH-G.

[4]Analyzed by Ecology Method NWTPH-D extended (with sulfuric acid/silica gel cleanup).

[5]Analyzed by EPA 6000/7000 Series Method.

[6]Reuse soil criteria as taken from the "Page Insert to Draft Cleanup Action Plan (CAP) Addendum, Offsite Area, Former Unocal Seattle Marketing Terminal 0724, Seattle, Washington," dated March 25, 2005, prepared by GeoEngineers.

bgs = below ground surface ppm = parts per million
mg/kg = milligrams per kilogram
"--" = not tested
Chemical analyses by North Creek Analytical of Bothell, Washington.

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EXPLANATION:

MW-27 ● EXISTING WELL

MW-67 ◎ DECOMMISSIONED WELL

▨ HOT SPOT SOIL EXCAVATION

UPPER YARD

LOWER YARD

ELLIOTT AVENUE

BAY STREET

BROAD STREET

BNSF RIGHT-OF-WAY

ALASKAN WAY

METRO TROLLEY BARN

OFFSITE AREA

ELLIOTT BAY

DETAIL - SEE FIGURES 3 AND 4

MW-65 MW-59 MW-30 MW-66 MW-21 RW-22 RW-16 MW-33 RW-23 RW-24 MW-44 MW-34 MW-43 MW-35 MW-42

RW-01 PZ-1.5 RW-02 PZ-2.5 RW-03 PZ-3.5 RW-04 PZ-4.5 RW-05 PZ-5.5 RW-06 PZ-6.5 RW-07 PZ-7.5 RW-08 PZ-8.5 RW-09 PZ-9.5 RW-10 PZ-10.5 RW-11 PZ-11.5 RW-12 PZ-12.5 RW-13 PZ-13.5 RW-14 PZ-14.5 RW-15

MW-27 MW-67 MW-76 MW-72 MW-25 MW-8 MW-71 MW-69 MW-10 MW-70 MW-20 MW-52 MW-26

RW-20 MW-68 RW-19 MW-18 PZ-18.5 RW-17 MW-36

TRUE N

SITE

60 0 60

FEET

Notes:
1. The locations of all features shown are approximate.
2. This figure is for informational purposes only. It is intended to assist in the identification of features discussed in a related document. Data were compiled from sources as listed in this figure. The data sources do not guarantee these data are accurate or complete. There may have been updates to the data since the publication of this figure. This figure is a copy of a master document. The master hard copy is stored by GeoEngineers, Inc. and will serve as the official document of record.
3. Future OSP features are outlined in this figure. Refer to OSP documents for identification.

Reference: Drawing entitled "Proposed Disposition of Wells, Alternative 2–Pipe Corridor and Hot Spot Excavation, Seattle Art Museum/Olympic Sculpture Park, Seattle, Washington" dated November 2004 by Aspect Consulting In–Depth Perspective, and "Boundary & Topographic Survey, Olympic Sclupture Park, Seattle Art Museum" dated 10/10/02, and CAD file "X–SP01" provided 12/15/04, both by Bush, Roed & Hitchings, Inc.

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SITE PLAN

FIGURE 2

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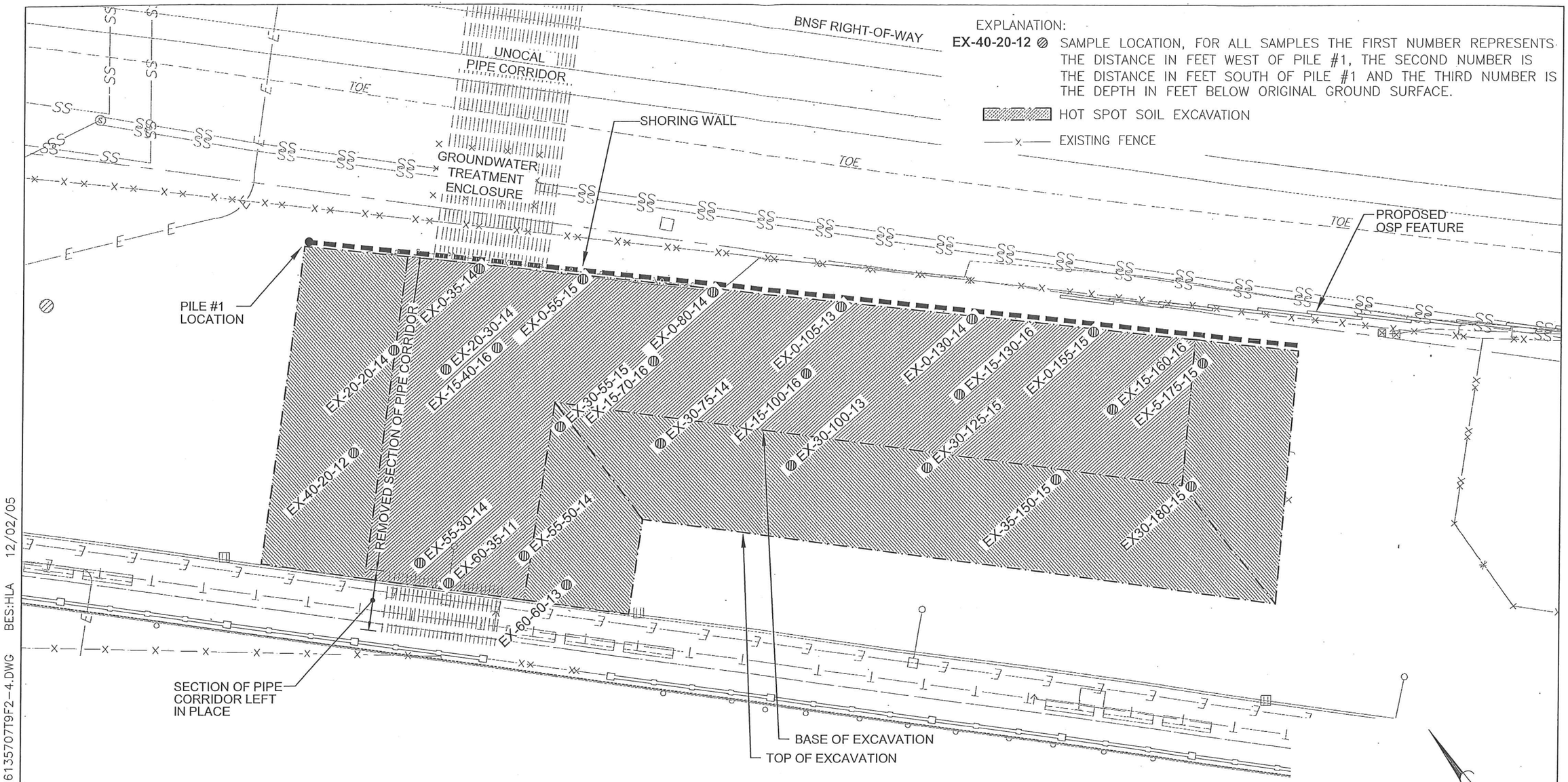

Notes:
1. The locations of all features shown are approximate.
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3. Future OSP features are outlined in this figure. Refer to OSP documents for identification.
4. All underground utilities shown are existing.

Reference: Drawing entitled "Proposed Disposition of Wells, Alternative 2–Pipe Corridor and Hot Spot Excavation, Seattle Art Museum/Olympic Sculpture Park, Seattle, Washington" dated November 2004 by Aspect Consulting In–Depth Perspective, and "Boundary & Topographic Survey, Olympic Sclupture Park, Seattle Art Museum" dated 10/10/02, and CAD file "X–SP01" provided 12/15/04, both by Bush, Roed & Hitchings, Inc.

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SAMPLE LOCATIONS

FIGURE 3