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REPORT OF UNDERGROUND STORAGE TANK DECOMMISSIONING, SOIL EXCAVATION AND SAMPLING ACTIVITIES PORT OF SEATTLE TERMINAL 106E PROPERTY 4746 OHIO AVENUE SOUTH, BUILDING 6 SEATTLE, WASHINGTON

JULY 6, 2004

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SIGNATURE PAGE

I certify that the work described in this report was performed under my direction and in conforms with environmental regulations and laws in effect at the time the work was completed.

Sincerely,

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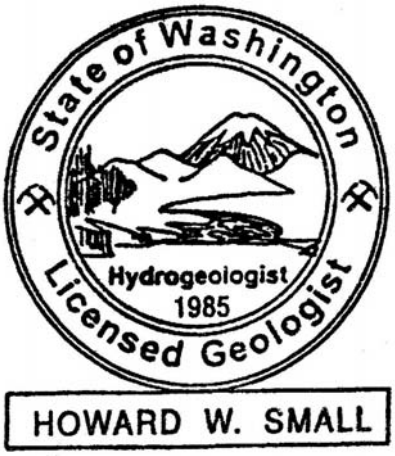

1.0 INTRODUCTION

EMS Consultants, Inc. (EMS) completed decommissioning of three underground storage tanks (USTs) on the Terminal 106E property owned by the Port of Seattle (Port). The work was performed as part of a sales agreement between the Port and Charlie's Produce, who is in the process of purchasing the property. EMS' work was performed in general accordance with Chapter 173-360, Underground Storage Tank Regulations, and associated guidance, and Chapter 173-340, the Model Toxics Control Act regulation, and state and local waste disposal regulations.

1.1 Site Location and Description

The project site is located at 4746 Ohio Avenue South in Seattle (Figure1), at the southeast corner of the intersection of East Marginal Way South and Diagonal Avenue South. The property is approximately 9.8 acres in size, with one 312,000 square feet warehouse building, designated Building 6 (Figure 2). Building 6 is a single-story, wood-frame building with a dock-height floor constructed by the Corps of Engineers for the War Department in 1943 for use as a military warehouse depot. It is approximately 208 feet wide by 1,500 feet long. An approximately 3,160 square–foot Quonset hut is located on the northeastern corner of the property, and is referred to as Building 7. The area surrounding the warehouse is level and paved. The property is bordered to the north by Ohio Avenue South, and a second Port of Seattle warehouse (Building 4) located north of Ohio Street South. The site is bordered to the east by Colorado Avenue South and two metals handling companies; Alaska Copper and Brass to the southeast, and Bloch Steel to the northeast, to the south by South Hudson Street and parking for Totem Electric, to the southwest by a parking lot for General Services Administration, and to the west by Ohio Avenue South. The surrounding area has been industrial property for many years.

The Port is in the process of selling the property, and has commissioned several environmental investigations to evaluate the potential for environmental impacts at the site. Previous environmental work on the property identified three underground storage tanks (USTs) at the site: 1) One approximately 2,500-gallon Bunker C tank located approximately midway along the eastern side of the warehouse; and 2) One approximately 6,500-gallon gasoline tank, and one approximately 1,750-gallon diesel tank located immediately north of the warehouse. Minor soil and groundwater impacts were identified in the previous investigations near the two north tanks. This report documents the decommissioning by removal of the three USTs, soil excavation, sampling and disposition of soils.

1.2 Overview of Site History

The Terminal 106E property was evaluated by two investigations commissioned by the Port in support of the sale of the property. Both investigations were conducted by Pinnacle Geosciences, Inc., and the information pertaining to the tank areas, is summarized below.

1.2.1 Phase I Environmental Site Assessment and Limited Phase 2 Study, Terminal 106E, Building 6 Property, 4746 Ohio Avenue South, Seattle, WA, dated June 9, 2003

Pinnacle's Phase I report focused on the site and surrounding properties to identify potential "Recognized Environmental Conditions". Pinnacle identified one UST and a second possible UST north of the building. The larger tank was sampled and determined to contain gasoline residuals. The possible second tank was not accessible. A former pump island was also identified north of the tanks. Pinnacle was unable to determine when the tanks where last in service. They also identified one tank containing Bunker C oil near the loading dock along the western side of the warehouse.

1.2.1.1 Fuel Tanks at Northern End of Building 6

Pinnacle advanced and sampled several geoprobe soil borings adjacent to the tanks to evaluate soil and groundwater conditions. Borings DP-2, DP-4, DP-5, and DP-7 were advanced around the northern tank complex (Figure 2). Boring DP-3 was also advanced immediately southeast of the tank complex, but due to the lack of field indications of impacts, no samples were analyzed. One soil was collected at a depth of 9 feet below ground from boring DP-2 located immediately northeast of the tanks, and was analyzed for gasoline-diesel-, and oil-range petroleum hydrocarbons by Methods NWTPH-Gx, and –Dx, respectively, and for benzene, toluene, ethylbenzene, and xylenes (BTEX, EPA Method 8021b). All target analytes were below analytical method detection limits. One soil sample was collected at a depth of 7 feet below ground in boring DP-4 located immediately southwest of the tank complex, and analyzed for gas, diesel and oil and BTEX. Pinnacle reported that diesel-range hydrocarbons were detected at a concentration of 200 mg/kg. The mg/kg units approximate parts per million (ppm) concentrations. All other target analytes were not detected at or above the method reporting limits. One soil sample was collected at a depth of 10 feet below ground in boring DP-5 located immediately northwest of the tank complex, and analyzed for gas, diesel and oil and BTEX. Pinnacle reported that gasoline-range hydrocarbons were detected at a concentration of 9.9 mg/kg. All other target analytes were not detected at or above the method reporting limits. One soil sample was also collected at a depth of 13 feet below ground in boring DP-7, located north of the tank complex in the area of a former dispenser island, and analyzed for gas, diesel and oil and BTEX. Pinnacle reported that all target analytes were not detected at or above the method reporting limits. Detected concentrations in soil samples in all Pinnacle's borings around the tanks were below the MTCA Method A cleanup levels for unrestricted land use.

Groundwater grab samples were collected from three of the five probe borings, DP-2, DP-4, and DP-7. The groundwater sample from boring DP-2 contained 210 ug/L gasoline, 2 ug/L benzene, 12 ug/L toluene, 2.7 ug/L ethylbenzene, and 20.6 ug/L xylenes. The ug/L units approximate parts per billion (ppb) concentrations. Diesel and oil-range hydrocarbons were not reported at or above the method reporting limits. The groundwater sample from boring DP-4 contained 470 ug/L gas, 970 ug/L diesel, 26 ug/L benzene, 12 ug/L toluene, 3.2 ug/L ethylbenzene, and 21.7 ug/L xylenes. The groundwater sample from boring DP-7 contained 200 ug/L gas, 2.4 ug/L benzene, 18 ug/L toluene, 3.8 ug/L ethylbenzene, and 30 ug/L xylenes. The benzene concentration in the groundwater sample from boring DP-4, and also the diesel concentration, were both slightly above the MTCA Method A cleanup levels for unrestricted land use of 5 ug/L benzene, and 500 ug/L diesel. All other target analytes in the groundwater samples were below the MTCA Method A cleanup levels for unrestricted land use.

1.2.1.2 Bunker C Tank

A bunker oil tank was identified by Pinnacle approximately mid-way along the east side of the warehouse, adjacent to an elevated loading dock. The tank was connected to a fuel oil burner inside the warehouse, and was apparently used as recently as the 1960s. Pinnacle reported that the tank still contained product.

1.2.2 Supplemental Phase 2 Services, Terminal 106 East Property, Seattle, WA, dated September 22, 2003

As a result of the Phase I findings, Pinnacle installed several groundwater monitoring wells at the site, and obtained additional soil and groundwater samples for analyses.

1.2.2.1 Fuel Tanks at Northern End of Building 6

Well DPF-13 was installed on the south edge of the northern tank complex. One soil sample was obtained from boring DPF-13 at a depth of 8 feet below ground and analyzed for gas-, diesel-, and oil-range hydrocarbons and BTEX compounds. Gas was reported at a concentration of 5.5 mg/kg, ethylbenzene was detected at 78 ug/kg, and xylenes were detected at 68 ug/kg., oil was reported at a concentration of 74 mg/kg. All other target analytes were below the method reporting limits. The detected concentrations were below the MTCA Method A cleanup levels for unrestricted land use. The groundwater sample from DPF-13 was also analyzed, and no target analytes were detected at or above the method reporting limits.

1.2.2.2 Bunker C Tank

Two probe borings and one monitoring well were completed by Pinnacle next to the Bunker C tank location; DPB-1, DPB-2, and DPB-3, respectively. Soil samples from the borings were submitted for analyses for diesel- and oil-range hydrocarbons. With the exception of 270 mg/kg at a depth of 8 feet below ground in boring DPB-3, all target analytes were below the method detection limits. The 270 mg/kg detection was well below the 2,000 mg/kg cleanup level for unrestricted land use under Method A of MTCA. A groundwater sample collected from well DPB-3 also did not contain diesel- or oil-range hydrocarbons above the method reporting limit.

1.3 Scope of Services

Based on the existing environmental information, the Port elected to remove the USTs at the site. EMS was retained to provide decommissioning and site assessment services during the UST removals, and to provide project documentation and the final report. Actual soil excavation, tank removal, soil staging and transportation and site restoration were performed under separate contract to the Port by Port Construction Services (PCS). Impacted soil which was transported off site for disposal was taken to Waste Management's Alligator Ridge disposal facility in Roosevelt, Washington. Excavation water was pumped by both Philips Services Corporation (PSC) and River's Edge Construction, under contract to PCS. Pumped excavation water and tank rinsate was disposed of at PSC's Kent, WA disposal facility. Laboratory analytical work for the project was performed by OnSite Analytical Laboratories, Inc. under contract to the Port.

2.0 SOIL EXCAVATION

UST removals, soil excavation and sampling, and groundwater removal and sampling were conducted over a period of several weeks in April and May 2004. For clarity of presentation, the description and discussion of the work presented below has been divided into two sections corresponding to the Bunker C tank location and the northern UST complex. Figure 2 presents a site plan showing the property and layout for Building 6 and the UST locations. Figure 3 presents the approximate locations of the soil and groundwater samples collected during decommissioning of the Bunker C tank. Figure 4 presents the approximate locations of the soil and groundwater samples collected during decommissioning of the two northern USTs. Table 1 lists the excavation and soil stockpile sample results, by tank location, and indicates whether the samples were excavated or represent soil which was left in place at the limits of the excavation. Excavated samples are also shown on the figures as "grayed out", indicating the soil was subsequently removed. Attachment A contains photographs taken during the excavation process. Attachment B contains laboratory reports and chain-of-custody records for the samples analyzed for this project. Attachment C contains waste disposal documentation.

2.1 Bunker C Tank Decommissioning

2.2.1 Excavation and Removal

Excavation began on April 6, 2004, at the Bunker C tank location (Figure 4). The tank was pumped out by PSC, and surficial concrete was broken and removed by PCS. Minor staining and odor was observed around the fill pipe. This material was segregated and placed on plastic next to the excavation. Soil which did not contain noticeable odor or staining was also stockpiled adjacent to the excavation. After removal of approximately two feet of dirt from over the tank, a large concrete slab was encountered, presumably installed to counter buoyancy of the tank during high groundwater conditions. The corner of the slab and the tank extend approximately 2 feet beneath the corner of the adjacent loading dock.

After removal of the concrete hold-down slab, soil was removed from the east side and the south side of the tank to allow removal. Soils generally consisted of damp, brown, gravely, silty sand, which we interpret as fill materials, to a depth of approximately 4 feet below ground. Below the fill, we encountered a gray, silty to very silty, fine sand, grading to sandy silt below approximately 7 feet below ground. An 8-inch diameter concrete storm drain was encountered and broken running north-south along the western side of the tank. The tank was inerted with dry ice, and after inspection and approval to remove the tank was obtained from the Seattle Fire Marshal, the tank was removed from the ground on April 8, 2004. The tank appeared to be in good condition, with no obvious holes and minor pitting and corrosion. The tank measured 12 feet long by 6 feet in diameter (approximately 2,500 gallons). Supply lines running into the building from the tank were drained and capped and left in place. The excavation was then cleaned out with the trackhoe excavator, removing loose materials so that samples could be collected, and the material placed in the "dirty stockpile". The final limits of the excavation measured approximately 10 feet east-west by 16 feet north-south, by 8 feet deep.

2.2.2 Soil and Groundwater Sampling

Soil samples were then collected from the limits of the excavation sidewalls, using the trackhoe bucket, and designated Bunker C NW-1, Bunker C EW-1, Bunker C SW-1 and Bunker C WW-1. Care was taken to obtain the samples from the teeth of the bucket from fresh soil to minimize the potential for cross-contamination. No sample was collected from the excavation bottom due to the presence of groundwater. Samples were also collected from the "clean soil stockpile", designated Bunker C SP-1, Bunker C SP-2, and Bunker C SP-3, and from the "dirty stockpile" designated Bunker C SP-4. All samples were analyzed for diesel- and oil-range hydrocarbons. In addition, sample Bunker C SP-1 was analyzed for polynuclear aromatic hydrocarbons (PAHs) by EPA method 8270C SIM.

A small amount of groundwater (approximately 1 foot deep) was observed at a depth of approximately 7 feet below ground which contained small, localized areas of dark frothy oil. This material was pumped out (approximately 800 gallons) by River's Edge on April 9, 2004 and disposed of at Philips Services Corporation's Kent disposal facility. The excavation was allowed to re-fill with water, and a sample of the groundwater was collected on April 14, 2004, by submerging the bottle beneath the water surface. The sample was analyzed for diesel- and oil-range hydrocarbons and benzene. Due to the laboratory analytical results, (see Section 2.2.3 of this report), the excavation water was pumped out a second time (approximately 300 gallons) and the excavation allowed to fill with groundwater again. A second groundwater sample was collected on April 22, 2004, and analyzed for diesel- and oil-range hydrocarbons. Laboratory results indicated that target analytes were below the MTCA Method A cleanup levels for unrestricted land use.

2.2.3 Laboratory Analyses

Results of laboratory analyses are presented in Table 1. Laboratory Reports are contained in Attachment B. Analyses of the sidewall soil samples indicated that diesel- and oil-range hydrocarbons were not detected above the analytical method reporting limits. The analytical laboratory reported diesel results as either Jet A fuel or Diesel, both of which are technically in the "diesel range" as specified by the state analytical method NWTPH-Dx. Results of the clean stockpile samples indicated that Jet A was present in sample SP-1 at a concentration of 51 mg/kg, diesel was present at 73 mg/kg, and oil was present at 230 mg/kg. Oil was present in sample SP-2 at a concentration of 140 mg/kg. Diesel and oil were present in sample SP-3 at concentrations of 44 mg/kg and 280 mg/kg, respectively. All other target analytes were not detected above the method reporting limits. All reported data was below the MTCA Method A cleanup level for unrestricted land use. Sample SP-1 was also analyzed for PAH compounds. Results indicated that a number of PAH compounds were present above detection limits. Carcinogenic PAHs (CPAHs) totaled 0.43 mg/kg, which is above the MTCA Method A cleanup level for CPAHs (as benzo(a)pyrene). However, the Method A cleanup level for industrial sites is 2 mg/kg. As the site has been an industrial site for many years, is surrounded by industrial sites, and will continue to be an industrial site in the future, the Port believes that the 2 mg/kg cleanup level for Method A industrial sites is a more appropriate target cleanup level. The detected 0.43 CPAHs in sample Bunker C SP-1 are well below this 2 mg/kg cleanup level.

The groundwater sample collected on April 14, 2004 was also analyzed for diesel- and oil-range hydrocarbons and benzene. No benzene, Jet A- or diesel-range hydrocarbons was detected above the method reporting limit. However, oil was reported at a concentration of 920 ug/L. The Method A cleanup level for oil in groundwater for unrestricted land use is 500 ug/L. After the excavation was pumped out again and allowed to refill, a second sample was collected of the groundwater on April 22, 2004. Analyses of this sample indicated that all target analytes were below the method detection limits.

2.2.4 Site Restoration

The storm drain line was repaired, and the bottom approximately 5 feet of the excavation was filled with imported crushed rock material. The clean stockpiled soil was then replaced in the excavation, and a base course of crushed rock was placed and compacted, and the area was repaved to match surround grade. Soil density (compaction) testing was provided by Mayes testing, under contract to PCS. Results of the density testing will be provided under separate cover.

2.2 Decommissioning of Northern Tanks

2.2.1 Excavation and Removal of Tanks and Lines

Excavation began on April 9, 2004, at the northern tanks location (Figure 5). The tanks were pumped out by PSC (gasoline tank), and River's Edge (diesel tank), and surficial concrete was broken and removed by PCS. Minor staining and odor was observed around the fill pipes for both tanks, and along the supply lines above the tanks. Soil was screened during removal using a photoionization detector (PID) calibrated to isobutylene, which is sensitive to volatile gasoline vapors. Readings generally below 50 ppm were placed in the "clean stockpile", while readings above 50 were generally placed in the "dirty stockpile. Soils from above both tanks were excavated and soil from along the north side of the diesel tank was excavated to allow the tanks to be removed from the ground.

Soils generally consisted of damp, dark brown and black, gravelly, silty sand, with scattered pieces of metal, concrete rubble and wood debris to a depth of approximately 2 to 3 feet. Below the fill, approximately 2 feet of damp, dark gray silt to sandy silt was encountered, overlying horizontally laminated damp, dark gray silty fine sand to a depth of approximately 8 feet below ground. Wet, gray, sandy silt was encountered beneath the sand to the bottom of the excavation at a depth of approximately 10 to 11 feet below ground. The tanks were inerted with dry ice, and after inspection and approval to remove the tanks was obtained from the Seattle Fire Marshal, they were removed from the ground on April 13, 2004 (diesel tank) and April 14, 2004 (gasoline tank). Both tanks appeared to be in good condition, with no obvious holes and minor pitting and corrosion. The gasoline tank measured 31 feet long by 6 feet in diameter (approximately 6,500 gallons). The diesel tank measured 12 feet long by 5 feet in diameter (approximately 1,750 gallons). The excavation was then cleaned out with the trackhoe excavator, removing loose materials so that samples could be collected, and the material placed in the "dirty stockpile". Concrete hold-down slabs were present beneath each tank, and were left in place. In addition, wooden shoring was observed around the gas tank excavation area, presumably remaining from when the tanks were originally installed.

Additional soil excavation was conducted, based on the results of laboratory analyses (See Section 2.2.3), on the northwest wall, the northeast wall, the east wall and southwest wall. Existing well DPF-13 installed previously by Pinnacle, was abandoned with bentonite chips and largely removed by the excavator. The areas where Pinnacle's borings DP-2, DP-3, DP-4, and DP-7 were located, were also excavated.

Vent and supply lines were also excavated and removed. The vent lines extended from both tanks to the north property line. The supply lines extended northward for approximately 25 feet and then turned west to where the old dispenser island had been located (Figure 5). An apparent valve control box was encountered beneath the eastern portion of the former dispenser location. All piping and the control box were removed. Elevated PID readings from excavated soil (up to 500 ppm) were encountered immediately north of the tank pit, and also near the former dispenser island. As a result, the former pump island area, control valve box area and vent line area were Pinnacle's boring DP-5 was located were over-excavated.

In addition, two vertical concrete pipe headers were observed, one located west of the former dispenser island location, and one located along the fence line near the UST vent stacks. Two, 2-inch diameter steel pipes extended between the concrete headers, but did not extend southward toward the tanks. These pipes were also removed. It appears that these pipes were likely associated with a former propane above ground storage tank, no longer present, which had been located in the fenced area between the concrete headers.

2.2.2 Soil and Groundwater Sampling

Soil samples were collected from the limits of the excavation sidewalls, using the trackhoe bucket, and designated Gas W Wall-1, Gas NW Wall-1, Gas SW Wall-1, Gas NE Wall-1, Gas E Wall-1, and Gas SE Wall-1 at approximately 7 to 8 feet below ground. Care was taken to obtain the samples from the teeth of the bucket

from fresh soil to minimize the potential for cross-contamination. No sample was collected from the excavation bottom due to the presence of groundwater at approximately 8.5 to 9 feet below ground, and the concrete hold-down slabs. Two samples, designed VLine-1 and VLine-2 were collected at a depth of approximately two to three feet along the vent line trench after the piping had been removed. In addition, four soil samples were collected from the supply line trench, designated PLine-1, PLine-2, PLine-3, and PLine-4, at depths of between 2 and 3 feet below ground. One soil sample was also collected beneath each concrete header for the suspected propane piping, designated North Header-1 and South Header-1 at approximately two to three feet below ground. All samples were analyzed for the potential presence of gasoline-, diesel-, and oil-range hydrocarbons and BTEX. In addition, samples VLine-1 and PLine-2 were analyzed for total lead by EPA 6000/7000 series methods.

Results of analyses indicated that several areas remained above MTCA Method A cleanup levels for unrestricted land use. After additional soil was removed, one soil sample was collected from the over-excavated area of the vent line trench and designated VLine-4 at a depth of approximately 4.5 to 5.5 feet. Samples were also collected from the over excavated northwest sidewall (NW-1-5 at 5-6 feet), east sidewall (E-1-7 at 7-8 feet), southwest sidewall (SW-1-8 at 8-9 feet), northeast sidewall (Gas NE Wall-2 at 7-8 feet), and former dispenser island area (PLine-5 at 4.5-5.5 feet and PLine-6 at 4.5-5.5 feet). With two exceptions, these samples were also analyzed for gasoline-, diesel-, and oil-range hydrocarbons and BTEX. Sample Gas NE Wall-2 was not analyzed for diesel and oil as the initial sample did not detect these compounds, and sample VLine-4 was not analyzed for Gas/BTEX for similar reasons.

Samples were also collected from the “clean soil stockpile”, designated SP-1 through SP-5. No samples were collected from the “dirty stockpile” as in-place samples, later excavated, where used for waste characterization purposes. All samples were analyzed for diesel- and oil-range hydrocarbons. In addition, sample SP-1 was analyzed for total lead.

Groundwater (approximately 2 feet deep) was observed beneath the gasoline tank which contained small, localized areas of dark frothy product. This material was pumped out by River’s Edge on April 14, 2004, and disposed of at PSC’s Kent facility. The excavation was allowed to re-fill with water, and a sample of the groundwater was collected on April 20, 2004, by submerging the bottle beneath the water surface. The sample was analyzed for gasoline-, diesel- and oil-range hydrocarbons, BTEX compounds, Methyl Tertiary Butyl Ether (MTBE, EPA Method 8260b), Ethylene DiBromide (EDB, EPA method 8011), 1,2-Dichloroethane (EDC, EPA method 8260b), and total and dissolved lead (EPA 6000/7000 series methods). Due to the laboratory analytical results, (see Section 2.2.3 of this report), the excavation water was pumped out a second time, and the excavation allowed to fill with groundwater again. A second groundwater sample was collected on April 28, 2004, and analyzed for diesel- and oil-range hydrocarbons. Laboratory results indicated that target analytes were still above the MTCA Method A cleanup levels for unrestricted land use. On May 7, 2004, PSC pumped out the excavation a third time, and PCS excavated an additional approximately 80 cubic yards of soil from the excavation bottom and slough along the base of the sidewalls. This material was designated as “dirty” and hauled directly to Waste Management for disposal. After the excavation had filled with groundwater again, a third groundwater sample was collected on May 10, 2004, and submitted for laboratory analyses for diesel- and oil-range hydrocarbons. Results indicated that groundwater met MTCA Method A cleanup levels for unrestricted land use. A total of 16,877 gallons of excavation water was pumped and disposed of at PSC’s Kent, WA facility.

2.2.3 Laboratory Analyses

Results of laboratory analyses are presented in Table 1. Laboratory Reports are contained in Attachment B. Analyses of the sidewall soil samples indicated that gasoline-range hydrocarbons and/or benzene were detected above the MTCA Method A level for unrestricted land use in samples from the northwest sidewall, the southwest sidewall, the northeast sidewall, and the east sidewall. However, reported concentrations were generally low, with the highest benzene concentration at 0.044 mg/kg, and the highest gasoline concentration at 300 mg/kg. The cleanup levels for benzene and gasoline under MTCA Method A for unrestricted land use are 0.030 mg/kg benzene, and 30 mg/kg gasoline if benzene is present. In addition, samples from the vent line and product line trenches also contained target analyte concentrations above MTCA Method A levels; VLine-1, Pline-2, and PLine-3, with the highest benzene concentration at 1.6 mg/kg, and the highest gasoline concentration at 1,500 mg/kg. Total lead was reported at concentrations of 360 mg/kg in soil sample VLine-1, and at 13 mg/kg and 9.5 mg/kg in soil samples PLine-2 and Gas SP-1, respectively. The Method A cleanup level for total lead in soil is 250 mg/kg. Elevated concentrations of Jet A, diesel and oil were reported in soil sample VLine-1, at 1,600 mg/kg, 1,800 mg/kg, and 790 mg/kg, respectively. While these concentrations are below the MTCA Method A cleanup level for unrestricted land use of 2,000 mg/kg, this area was over-excavated due to the presence of benzene at 0.066 mg/kg. All areas above MTCA Method A cleanup levels for unrestricted land use were over-excavated and re-sampled (Table 1).

Two of the soil stockpile samples also contained gasoline at concentrations above Method A levels; SP-1 at 71 mg/kg, and SP-2 at 36 mg/kg. This material was segregated from the stockpile and transported off site to Waste Management for disposal.

The groundwater sample collected on April 20, 2004 was analyzed for gasoline-, diesel- and oil-range hydrocarbons, BTEX, MTBE, EDB, EDC and total and dissolved lead concentrations. Gas, benzene and xylenes were reported at concentrations of 450 ug/L, 1.6 ug/L, and 1.2 ug/L, respectively, which are below the MTCA Method A cleanup level for unrestricted land use. However, Jet A, diesel and oil were reported at concentrations of 700 ug/L, 850 ug/L, and 1,200 ug/L, all slightly above the MTCA level of 500 mg/L. MTBE, EDB and EDC were all not detected above the method reporting limits. Total and dissolved lead were reported in this groundwater sample at concentrations of 55.1 ug/L and <1 ug/L, respectively. The MTCA Method A cleanup level for unrestricted land use for total lead in groundwater is 15 ug/L. However, because the sample was collected from an open excavation, suspended sediment in the water is probably the reason for the slightly elevated total lead concentration. This conclusion is supported by the dissolved lead result which was below method reporting limits.

After the excavation was pumped a second time and allowed to re-fill, Jet A was present at a concentration of 1,100 ug/L, and diesel was reported at 1,400 ug/L, while oil was reported at 420 ug/L. The excavation was cleaned out with the excavator, removing an additional approximately 80 cubic yards of soil, and allowed to re-fill again. A sample collected of the groundwater from the bottom of the excavation on May 10, 2004 did not contain gas, diesel or oil-range hydrocarbons at concentrations above the method reporting limits.

2.2.4 Site Restoration

The bottom approximately 6 feet of the excavation was filled with imported crushed rock material. The clean stockpiled soil was then replaced in the excavation, and a base course of crushed rock was placed and compacted, and the area was repaved to match surround grade. Soil density (compaction) testing was provided by Mayes testing, under contract to PCS. Results of the density testing will be provided under separate cover.

3.0 Terrestrial Ecological Evaluation

WAC 173-340-7490(2) states that " In the event of the release of a hazardous substance to the soil, one of the following actions shall be taken:

(a) Document an exclusion from any further terrestrial ecological evaluation using the criteria in WAC 173-340-7491;

(b) Conduct a simplified terrestrial ecological evaluation as set forth in WAC 173-340-7492; or

(c) Conduct a site-specific terrestrial ecological evaluation as set forth in WAC 173-340-7493.

For industrial or commercial properties, current or future potential for exposure to soil contamination need only be evaluated for terrestrial wildlife protection. Plants and soil biota need not be considered unless:

(i) The species is protected under the federal Endangered species Act; or

(ii) The soil contamination is located on an area of an industrial or commercial property where vegetation must be maintained to comply with local government land use regulations.

Neither of these conditions apply, so plants and soil biota need not be included in the terrestrial ecological evaluation process.

Industrial properties, as defined under Chapter 173-340-200 means properties that are, or have been characterized by, or are to be committed to, traditional industrial uses such as processing or manufacturing or materials, marine terminal and transportation areas and facilities, fabrication, assembly, treatment, or distribution of manufactured products, or storage of bulk materials that area either:

- Zoned for industrial use by a city or county conducting land use planning under chapter 36.70A RCW (Growth Management Act); or
- For counties not planning under chapter 36.70A RCW (Growth Management Act) and the cities within them, zoned for industrial use and adjacent properties currently used or designated for industrial purposes.

The Building 6 site meets the first criteria listed above as an industrial property, as it is zoned IG1 (Attachment D).

WAC 173-340-7492 Simplified Terrestrial Ecological Evaluation Procedures states that "the process is intended to identify those sites which do not have a significant potential for posing a threat of significant adverse effects to terrestrial ecological receptors, and thus may be removed from further ecological consideration during the remedial investigation and cleanup process." WAC 173-340-7492(2)(c)(i) states that "the evaluation may be ended if the following statement is true:"

(i) No hazardous substance listed in table 749-2 for which a value is listed is, or will be, present in soil at a depth not exceeding the point of compliance established under WAC 173-340-7490(4) (15 feet below ground).

All identified contaminants were cleaned up to either the MTCA Method A cleanup level for unrestricted land use, or, as in the case of CPAHs, to the MTCA Method A industrial level for unrestricted land use. No identified target analytes for this project, which remain in place at the site, exceed the threshold values listed in Table 749-2. Therefore, the Terminal 106E, building 6 property meets the intent of the terrestrial ecological regulations in Chapter 173-340 WAC.

4.0 SUMMARY OF FINDINGS AND CONCLUSIONS

A total of three USTs were decommissioned and impacted soil and groundwater removed from the site during April and May 2004; one 2,500-gallon Bunker C tank, one 1,750-gallon diesel tank, and one 6,500-gallon gasoline tank. The tanks were pumped, rinsed, inerted and removed from the ground in general accordance with local state and federal UST laws and regulations. The tanks were then cut and cleaned, and taken to Bloch Steel for scrap metal recycling. Tank contents were transported to PSC's Kent, WA facility for appropriate disposal.

4.1 Bunker C Tank Location

A total of 8 soil samples and 2 groundwater samples were collected from the excavated soil stockpiles and excavation for the Bunker C tank. While the analytical results for all the soil samples were below MTCA Method A cleanup levels for unrestricted land use, with one exception, a total of 23.80 tons of material from the excavation bottom and from around the fill pipe was transported off site to Waste Management for disposal. Stockpile sample SP-1 contained 0.43 mg/kg CPAHs, while the Method A cleanup level for unrestricted land use is 0.1 mg/kg. However, the cleanup level for Method A for industrial sites for CPAHs is 2 mg/kg, which is a more appropriate cleanup level for the site. Consequently, the soil represented by sample Bunker C SP-1 was placed back into the excavation above the level of groundwater as backfill. The final limits of the excavation measured approximately 10 feet east-west by 16 feet north-south, by approximately 8 feet deep.

Two groundwater grab samples were obtained from the bottom of the excavation after the tank had been removed. Sample Bunker C Water collected on April 14, 2004 contained 920 ug/L oil, which is above the MTCA Method A cleanup level for unrestricted land use of 500 ug/L. The excavation was pumped out and allowed to re-fill with groundwater. The groundwater was sampled again on April 22, 2004 (Bunker C Water #2). Analytical results indicated that target analyte concentrations were below the method reporting limits.

Consequently, based on the results of the soil and groundwater analyses, it is EMS' opinion that the Bunker C tank location now meets Method A industrial levels for soil, and Method A levels for unrestricted land use for groundwater. No further actions are required at this location.

4.2 Northern USTs Location

A total of 26 soil samples were collected from the excavation sidewalls, vent and product piping trenches, suspected propane line concrete headers, and soil stockpiles, and three groundwater grab samples were obtained from the excavation. Several phases of soil excavation were required to over excavate those areas where initial sampling results indicated that cleanup levels had not been met. During the course of this over excavation, five areas where Pinnacle Geosciences had completed soil borings previously (DP-2, DP-3, DP-4, DP-5 and DP-7) and one monitoring well also installed by Pinnacle (DPF-13), were excavated. Concrete hold-down slabs beneath the tanks were left in place. A total of 377.62 tons of soil was transported off site to Waste Management for disposal.

A total of three groundwater grab samples were collected from the excavation. The first two samples contained slightly elevated levels of one or more target analytes. Groundwater was pumped from the excavation a total of 5 times, removing 16,877 gallons of water. Soil from the bottom of the excavation, above the concrete hold-down slabs, and from base of the sidewalls was cleaned out using the excavator and the excavation allowed to re-fill with groundwater. The third groundwater grab sample did not contain target analytes above the analytical method reporting limits.

Consequently, based on the results of the soil and groundwater analyses, it is EMS' opinion that the northern USTs location now meets Method A industrial levels for unrestricted land use for soil, and Method A levels for unrestricted land use for groundwater. No further actions are required at this location.

4.3 Terrestrial Ecological Evaluation

All identified contaminants were cleaned up to either the MTCA Method A cleanup level for unrestricted land use, or, as in the case of CPAHs, to the MTCA Method A industrial level for unrestricted land use. No identified target analytes for this project, which remain in place at the site, exceed the threshold values listed in Table 749-2. Therefore, the Terminal 106E, building 6 property meets the intent of the terrestrial ecological regulations in Chapter 173-340 WAC.

5.0 REFERENCES

Pinnacle Geosciences, Inc., 2003a. *Phase I Environmental Assessment and Limited Phase 2 Study, Terminal 106E, Building 6 Property, 4746 Ohio Avenue South, Seattle, WA. Prepared for Port of Seattle, June 9, 2003.*

Pinnacle Geosciences, Inc., 2003b. *Supplemental Phase 2 Services, Terminal 106 East Property, Seattle, WA. Prepared for Port of Seattle, September 22, 2003.*

Washington State Department of Ecology, Toxics Cleanup Program 1992. *Guidance for Site Checks and Site Assessments for Underground Storage Tanks. Publication No. 90-52, October 1992.*

Washington State Department of Ecology, Toxics Cleanup Program 1994. *Guidance for Remediation of Petroleum Contaminated Soils. Publication No. 91-30, April 1994.*

Washington State Department of Ecology, 2001. *Model Toxics Control Act Regulations; Chapter 173-340 Washington Administrative Code. Amended February 2001.*

6.0 LIMITATIONS

The services described in this report were performed consistent with generally accepted professional consulting principles and practices in the State of Washington at the time the work was performed. No other warranty, express or implied, is made. Judgements leading to conclusions and recommendations are generally made with an incomplete knowledge of the subsurface and historical conditions applicable to the study area. Our assessment of the property may change as new data becomes available during additional site exploration, remediation, or development.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

Our services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

TABLE

Table 1
Soil and Groundwater Sample Analytical Results

Table 1
Soil Sample Analytical Results
for UST Removals
Port of Seattle Terminal 106E,
Seattle, Washington

Sample ID	Approximate Sample Location	Date Sampled	Approximate Depth (feet)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	Gasoline (mg/kg)	Jet A mg/kg	Diesel (mg/kg)	Oil (mg/kg)	Total / Dissolved Lead (mg/kg)	MTBE (mg/kg)	EDB / EDC (mg/kg)	Total CPAHs (mg/kg)	Excavated/In Place
Soil Samples - Bunker C Tank Excavation																
Bunker C NW-1@6.5	Sidewall	4/12/2004	6.5-7.5	--	--	--	--	--	<33	<33	72	--	--	--	--	In-Place
Bunker C SW-1@6.5	Sidewall	4/12/2004	6.5-7.5	--	--	--	--	--	<37	<37	<75	--	--	--	--	In-Place
Bunker C EW-1@6.5	Sidewall	4/12/2004	6.5-7.5	--	--	--	--	--	<38	<38	<76	--	--	--	--	In-Place
Bunker C WW-1@6.5	Sidewall	4/12/2004	6.5-7.5	--	--	--	--	--	<35	<35	<70	--	--	--	--	In-Place
Bunker C SP-1	Soil Stockpile	4/12/2004	--	--	--	--	--	--	51	73	230	--	--	--	***0.43***	Backfilled
Bunker C SP-2	Soil Stockpile	4/12/2004	--	--	--	--	--	--	<31	<31	140	--	--	--	--	Backfilled
Bunker C SP-3	Soil Stockpile	4/12/2004	--	--	--	--	--	--	<30	44	280	--	--	--	--	Backfilled
Bunker C SP-4	Soil Stockpile	4/13/2004	--	--	--	--	--	--	120	210	1,100	--	--	--	--	***Disposed of***
Soil Excavation Samples - Gasoline and Diesel Tanks Excavation																
Gas W Wall-1@7	Sidewall	4/15/2004	7-8	<0.016	<0.082	<0.082	<0.082	11	<41	<41	<82	--	--	--	--	In-Place
Gas NW Wall-1@7	Sidewall	4/15/2004	7-8	***0.037***	<0.081	0.17	0.15	***51***	<40	<40	<81	--	--	--	--	***Excavated***
Gas SW Wall-1@7	Sidewall	4/15/2004	7-8	0.025	<0.061	0.3	0.51	***300***	430	480	520	--	--	--	--	***Excavated***
Gas NE Wall-1@7	Sidewall	4/15/2004	7-8	0.013	<0.056	0.074	0.089	***35***	<28	39	230	--	--	--	--	***Excavated***
Gas E Wall-1@7	Sidewall	4/15/2004	7-8	***0.044***	0.083	0.83	1.22	***250***	160	330	1,300	--	--	--	--	***Excavated***
Gas SE Wall-1@7	Sidewall	4/15/2004	7-8	<0.011	<0.057	0.069	<0.057	33	<29	36	290	--	--	--	--	In-Place
NW-1-5	Sidewall	4/19/2004	5-6	<0.011	<0.055	<0.055	<0.055	<5.5	<28	<28	<55	--	--	--	--	In-Place
E-1-7	Sidewall	4/19/2004	7-8	<0.014	<0.070	<0.070	<0.070	18	<35	<35	<70	--	--	--	--	In-Place
SW-1-8	Sidewall	4/19/2004	8-9	<0.014	<0.068	<0.068	<0.068	<6.8	<34	<34	<68	--	--	--	--	In-Place
Gas NE Wall-2@7	Sidewall	4/28/2004	7-8	<0.015	<0.077	<0.077	0.079	<7.7	--	--	--	--	--	--	--	In-Place
Vline-1@2	Bottom	4/20/2004	2-3	***0.066***	<0.13	<0.13	0.32	<13	1,600	1,800	790	***360***	--	--	--	***Excavated***
Vline-2@2	Sidewall	4/20/2004	2-3	<0.011	<0.056	<0.056	0.058	<5.6	<28	<28	<56	--	--	--	--	In-Place
Vline-4@4.5	Sidewall	4/28/2004	4.5-5.5	--	--	--	--	--	<25	<25	<50	--	--	--	--	In-Place
Pline-1@2	Sidewall	4/20/2004	2-3	0.013	<0.056	<0.056	0.089	<5.6	64	120	680	--	--	--	--	In-Place
Pline-2@2	Sidewall	4/20/2004	2-3	***1.6***	***21***	***11***	***62***	***1,500***	<27	<27	150	13	--	--	--	***Excavated***
Pline-3@2	Sidewall	4/20/2004	2-3	***0.041***	0.085	<0.055	0.15	<5.5	<28	<28	110	--	--	--	--	***Excavated***
Pline-4@2	Sidewall	4/20/2004	2-3	<0.011	<0.053	<0.053	<0.053	<5.3	<27	38	240	--	--	--	--	In-Place
Pline-5@4.5	Sidewall	4/28/2004	4.5-5.5	<0.011	<0.056	<0.056	<0.056	<5.6	--	--	--	--	--	--	--	In-Place
Pline-6@4.5	Sidewall	4/28/2004	4.5-5.5	<0.011	<0.056	<0.056	<0.056	<5.6	--	--	--	--	--	--	--	In-Place
North Header-1@2	Sidewall	4/20/2004	2-3	<0.011	<0.056	<0.056	<0.056	<5.6	<28	<28	170	--	--	--	--	In-Place

Table 1
Soil Sample Analytical Results
for UST Removals
Port of Seattle Terminal 106E,
Seattle, Washington

Sample ID	Approximate Sample Location	Date Sampled	Approximate Depth (feet)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	Gasoline (mg/kg)	Jet A mg/kg	Diesel (mg/kg)	Oil (mg/kg)	Total / Dissolved Lead (mg/kg)	MTBE (mg/kg)	EDB / EDC (mg/kg)	Total CPAHs (mg/kg)	Excavated/In Place
South Header-1@2	Sidewall	4/20/2004	2-3	<0.011	<0.053	<0.053	<0.053	<5.3	<26	<26	<53	--	--	--	--	In-Place
Gas SP-1	Soil Stockpile	4/13/2004	--	0.013	<0.059	0.064	0.074	***71***	--	--	--	9.5	--	--	--	***Disposed of***
Gas SP-2	Soil Stockpile	4/13/2004	--	0.015	<0.058	0.068	0.13	***36***	--	--	--	--	--	--	--	***Disposed of***
Gas SP-3	Soil Stockpile	4/13/2004	--	<0.013	<0.063	0.088	0.092	47	--	--	--	--	--	--	--	Backfilled
Gas SP-4	Soil Stockpile	4/13/2004	--	<0.011	<0.057	0.057	0.059	18	--	--	--	--	--	--	--	Backfilled
Gas SP-5	Soil Stockpile	4/22/2004	--	<0.011	<0.056	<0.056	<0.056	14	<140	<140	1,200	--	--	--	--	Backfilled
MTCA Method A Cleanup Levels - Soil (mg/kg)				0.03	7	6	9	30 / 100 (1)	2,000	2,000	2,000	250	0.1	--	0.1 / 2.0 (2)	
Excavation Water - Bunker C Tank Excavcation				**(ug/L)**	**(ug/L)**	**(ug/L)**	**(ug/L)**	**(ug/L)**	**(ug/L)**	**(ug/L)**	**(ug/L)**	**(ug/L)**	**(ug/L)**	**(ug/L)**	**(ug/L)**	
Bunker C Water	Excavation	4/14/2004	--	<1	--	--	--	--	<260	<260	***920***	--	--	--	--	***Pumped***
Bunker C Water #2	Excavation	4/22/2004	--	--	--	--	--	--	<250	<250	<400	--	--	--	--	In-place
Excavation Water - Gasoline and Diesel Tanks Excavation				**(ug/L)**	**(ug/L)**	**(ug/L)**	**(ug/L)**	**(ug/L)**	**(ug/L)**	**(ug/L)**	**(ug/L)**	**(ug/L)**	**(ug/L)**	**(ug/L)**	**(ug/L)**	
Gas UST Pit Water #1	Excavation	4/20/2004		1.6	<1	<1	1.2	450	***700***	***850***	***1,200***	***55.1*** / <1	<0.002	<0.0095 / <0.002	--	***Pumped***
Gas Pit Water #2	Excavation	4/28/2004		--	--	--	--	--	***1,100***	***1,400***	420	--	--	--	--	***Pumped***
Gas Tank Water #3	Excavation	5/10/2004		--	--	--	--	--	<250	<250	<410	--	--	--	--	In-place
MTCA Method A Cleanup Levels - Groundwater (ug/L)				5	1,000	700	1,000	800 / 1,000 (3)	500	500	500	15 (4)	20	0.01 / 5	--	

Notes:

-- indicates that the sample was not analyzed for a particular constituent, or Not Applicable.

Bold indicates that the result is above the MTCA Method A Cleanup level.

Benzene, ethylbenzene, toluene, and total xylenes using EPA Method 8021B.

Gasoline-range hydrocarbons using Method NWTPH-Gx.

Jet A fuel, Diesel-, and Oil-range hydrocarbons using Method NWTPH-Dx.

MTBE means Methyl Tertiary Butyl Ether by EPA Method 8021B

EDC means 1,2-Dichloroethane by EPA Method 8021B

EDB means Ethylene Dibromide by EPA Method 8260B

MTCA Method A cleanup levels from "Model Toxics Control Act (MTCA), WAC 173-340, amended February 12, 2001.

Pumped means water was pumped into a vacuum truck and disposed of off-site.

Backfilled means excavated soil was used as backfill above the level of groundwater.

In-place means the sample represents material left in place in the excavation.

Excavated means the sample represents soil which was later excavated and disposed of off site.

(1) Method A clenaup level for gasoline in soil is 30 mg/kg if benzene is present, and 100 mg/kg if benzene is not present.

(2) Method A cleanup level for total CPAHs / Method B Cleanup level for total CPAHs

(3) Method A clenaup level for gasoline in groundwater is 800 ug/L if benzene is present, and 1,000 ug/L if benzene is not present.

(4) There is currently no Method A cleanup level for dissolved lead in groundwater.

All soil data reported in mg/kg which approximates parts per million (ppm) concentrations, and all water data reported in ug/L, which approximates parts per billion (ppb) concentrations.