CDM

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Phase II Environmental Site Assessment
Harrington-Beall Greenhouse Property
18531 Beall Road S.W.
Vashon Island, Washington

May 9, 2006

Prepared For:

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CDM Project No. 19897.47506

A Report Prepared For:

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**PHASE II ENVIRONMENTAL SITE ASSESSMENT
HARRINGTON-BEALL GREENHOUSE PROPERTY
18531 BEALL ROAD S.W.
VASHON ISLAND, WASHINGTON**

May 9, 2006

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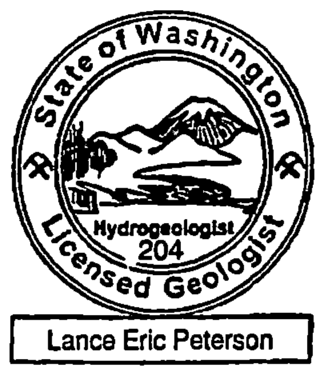

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Executive Summary

This report presents the results of a Phase II environmental site assessment (ESA) performed by Camp Dresser & McKee Inc. (CDM) at the Harrington-Beall Greenhouses property (site) located at 18531 Beall Road S.W. on Vashon Island, Washington. This Phase II ESA was conducted on behalf of King County.

CDM's field investigation, conducted on January 26, 27, and 31, 2006 and February 2, 2006, included collecting 40 near-surface soil samples within the upper two feet of the land surface and excavating 17 test pits to depths ranging from 2 to 6 feet below ground surface. Selected near-surface and subsurface soil samples were submitted for analytical testing for total petroleum hydrocarbons (TPH) quantified as diesel and lube oil by Northwest Method NWTPH-Dx, hydrocarbon identification method NWTPH-HCID, organochlorine pesticides by Environmental Protection Agency (EPA) Method 8081A), organophosphorus pesticides (EPA Method 8141A), chlorinated acid herbicides (EPA Method 8151A), total metals (EPA Method 6010B), volatile organic compounds (VOCs) by EPA Method 8260B, and polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C using selected ion monitoring (SIM) to achieve lower detection limits. In addition, five discrete soil samples were analyzed for percent asbestos by polarized light microscopy/dispersion staining using EPA Methods 600/M4-82-020 and 600/R-93/116.

The analytical testing identified the presence of Bunker C oil, residual pesticides, metals, and asbestos in soil. The analytical laboratory data were screened against tabulated Model Toxics Control Act (MTCA) Method A and Method B cleanup levels to evaluate if the identified contaminant concentrations exceed levels that are considered protective of human health. The analytical results were also compared to tabulated ecological indicator concentrations available in MTCA to evaluate if there is a potential for adverse effects to ecological receptors (soil biota, plants, and wildlife) from exposure to contaminants of concern identified at this site.

Bunker C

Bunker C is present in soil around the two AST areas on the property. Bunker C is not very mobile in the environment and at this site it is likely confined to near surface soil. Soils that exceed the MTCA Method A cleanup level of 2,000 milligrams per kilogram (mg/kg) for diesel and oil are estimated to extend to an average depth of 3 feet below ground surface (ft bgs) around the easternmost ASTs and to an estimated 8 ft bgs around the westernmost ASTs. Carcinogenic polycyclic aromatic hydrocarbons (cPAHs) are also associated with the Bunker C. Near the easternmost ASTs cPAH concentrations exceeded the 0.1 mg/kg Method A cleanup level. PAH concentrations approached the Method A cleanup level in the area of the westernmost ASTs.

The presence of Bunker C in soil may pose a risk to terrestrial receptors (plants and animals); however, no tabulated ecological indicator concentrations exist specifically for Bunker C.

Residual Pesticides

Residual pesticides are present on the property and appear to be most prevalent within the greenhouses where 4,4'-DDT and its degradation products 4,4'-DDE, 4,4'-DDD, were consistently detected. Of the 23 samples analyzed for pesticides, only one sample exceeded the Method A cleanup level for DDT. This sample, plus two additional greenhouse composite samples exceeded the combined DDT/DDD/DDE ecological indicator concentration for wildlife exposure. In addition, one of three discrete samples collected to the west of the chemical mixing shed (Building #100) exceeded the combined DDT/DDD/DDE ecological indicator concentration for wildlife exposure.

The highest concentrations of residual pesticides are present in greenhouses reportedly used to grow orchids. DDT is not mobile in the environment and is likely confined to near surface soils.

Metals

Of the ten samples analyzed for metals, seven samples exceeded ecological indicator concentrations for lead and arsenic, four of which also contained concentrations exceeding Method A cleanup levels for lead and/or arsenic. Areas impacted include the stockpile near the Quonset hut, four greenhouse area composite samples, and the open area on the east side of the site.

The source of the metals contamination is unknown. Possible sources include historical use of lead-arsenate pesticides or fallout from the historical ASARCO facility located in Ruston, Washington. Additional sampling may be warranted at the site to better define the distribution of metals.

Asbestos

Insulation is present around former steam pipes and former product piping located between the easternmost ASTs and Building #83. The insulation on all the piping is severely deteriorated and has become incorporated into the soil below the pipes in many areas. Asbestos was identified in two of five soil samples collected under former steam pipes. Care should be taken to minimize disturbance in areas containing the pipe wrapping until proper asbestos containing material abatement takes place.

Additional investigation may be necessary to fully evaluate the nature and extent of contamination requiring remedial actions in accordance with MCTA. In addition, cleanup levels need to be determined for this site that are protective of both human health and the environment. This may require completing a site-specific terrestrial ecological evaluation (TEE) to evaluate cleanup levels that are protective of the environment. Site-specific TEEs need to be conducted in consultation with the Washington State Department of Ecology.

Although the vertical extend of contamination was not determined, we do not believe the identified contamination warrants investigation of groundwater quality below the site. The Vashon Island regional aquifer is located at an estimated 130 feet below the ground surface in the site vicinity. All of the identified hazardous materials at the site have a low potential for vertical migration and, therefore, have a low potential to impact the regional aquifer.

The preliminary option for cleanup is source removal. Other cleanup technologies may be viable, but would require feasibility studies to further evaluate their applicability.

Section 1 Introduction

This report summarizes Phase II environmental site assessment (ESA) activities performed by Camp Dresser & McKee Inc. (CDM) on behalf of King County (the County) at the Harrington-Beall Greenhouse property (the site) located on the east side of Vashon Island, approximately 1 mile southeast of downtown Vashon (**Figure 1**). The site address is 18531 Beall Road S.W. CDM's services were performed in accordance with our October 5, 2005 proposal, Work Order No. 12, Contract No. E23023E, and our January 16, 2006 amended proposal. In addition, a November 21, 2005 Sampling and Quality Assurance Plan (SQAP) prepared by CDM was used to direct field activities.

1.1 Purpose and Scope

The purpose of this study is to determine the presence, type, and general magnitude of residual chemicals in site soils. The scope of this investigation was developed from information provided by the County and our September 27, 2005 site visit. CDM identified ten general areas that required investigation. These areas, shown on the site plan (**Figure 2**) and discussed in greater detail in Section 2, include:

1. Five former above-ground fuel storage tanks (ASTs) located in two separate areas in the center of the property
2. A water reservoir mixing tank
3. A chemical mixing shed and portable mixing tanks
4. An experimental garden site/former greenhouse area
5. A storage (potting) shed with chemical containers
6. Greenhouse buildings
7. Exterior open areas
8. Two former laboratory buildings
9. Former steam pipes containing deteriorated insulation wrapping
10. Soil/debris stockpiles

CDM's scope of services for this investigation included:

- Developing a project Sampling and Quality Assurance Plan (SQAP) for review and approval by U.S. Environmental Protection Agency (EPA) Region 10 as part of Brownfields' grant funding. The SQAP describes the project scope/objectives, field sampling procedures and analytical methods, and laboratory information (reporting limits, Quality Assurance/Quality Control (QA/QC) protocol, etc.). A health and safety plan (HASP) was also prepared to mitigate potential exposure to hazardous substances during fieldwork activities.

- Collecting 40 surface/near surface soil samples for laboratory chemical analysis. Selected samples were screened for petroleum hydrocarbons by hydrocarbon identification method NWTPH-HCID, and analyzed for total petroleum hydrocarbons (TPH) quantified as diesel and lube oil by Northwest Method NWTPH-Dx, organochlorine pesticides (EPA Method 8081A), organophosphorus pesticides (EPA Method 8141A), chlorinated acid herbicides (EPA Method 8151A), metals on the totals basis (EPA Method 6010B), volatile organic compounds (VOCs) by EPA Method 8260B, and polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C using selected ion monitoring (SIM) to achieve lower detection limits. In addition, five discrete samples were analyzed for percent asbestos by polarized light microscopy/dispersion staining using EPA Methods 600/M4-82-020 and 600/R-93/116.

- Excavating 17 test pits using a mini-excavator. Two test pits were completed near the chemical mixing shed, seven were located near the former ASTs, and eight were completed in the experimental garden area. Selected soil samples collected from the test pits were analyzed for diesel and lube oil-range TPH by Northwest Method NWTPH-Dx, organochlorine pesticides (EPA Method 8081A), organophosphorus pesticides (EPA Method 8141A), and PAHs by EPA Method 8260B/SIM.

- Preparing this report documenting the field activities and analytical laboratory sample results.

1.2 Site Background

The Harrington-Beall Greenhouses were incorporated in 1888, a year before Washington attained statehood. In 1994, the site was designated a King County Landmark within the 23-acre Harrington-Beall Greenhouse Company Historic District. The Harrington-Beall Greenhouse site was first developed to grow vegetables – primarily tomatoes and cucumbers. After World War I, the business focused on flowers, including orchids, roses, carnations, camellias, and gardenias.

The greenhouses were originally heated with coal-fired boilers. Oil heat probably came into use in the 1930s or 1940s. Bunker C oil was imported by barge via the dock at Ellisport Creek 1½ miles southeast of the site. The oil was trucked to the site and stored in tanks before being consumed as boiler fuel.

The greenhouse operations reached their peak of activity in the 1960s, when it was the largest greenhouse complex in the western hemisphere. In the 1970s, the business moved to South America due to rising fuel costs and competition from California growers. Information from HistoryLink.org indicates horticultural activities may have occurred at the site through 1989.

1.3 Site Location and Description

The site is located on the east side of Vashon Island approximately 1 mile southeast of downtown Vashon (**Figure 1**). The site elevation is estimated to be 330 feet above Mean Sea Level. The site vicinity consists primarily of rural residences and undeveloped, wooded land.

The site consists of two contiguous parcels totaling 16.57 acres located at 18531 Beall Road SW: Parcel No. 3223039094 is 16.03 acres, and Parcel No. 3223039154 is 0.54 acre. Nearly 50 percent of the parcels (369,000 square feet) are covered by the footprints of 56 greenhouses and 16 ancillary structures, many of which were built in the 1920s. By the late 1980s most of the greenhouses were abandoned. Since that time, they have become overgrown with trees (e.g., alder, cottonwood) and blackberries. An additional 100,000 square feet is covered by roads and unpaved parking. A site plan of the property is provided as **Figure 2**. Photographs taken during the Phase II ESA are included in **Appendix A**.

Five ASTs are located at the site, including two approximately 40,000-gallon vertical cylindrical tanks, two irregular-shaped bow tanks (estimated 3,000- to 5,000-gallon capacity), and one horizontal cylindrical tank (estimated 8,000-gallon capacity). These tanks were used to store Bunker C oil for fueling boilers. The two cylindrical ASTs contain several feet of petroleum "sludge" or old Bunker C oil. The status of the contents of the other three tanks is unknown. Several debris piles containing a mixture of soil and demolition debris are also located at the site.

1.4 Areas of Concern

In December 2005 CDM completed a Phase I ESA for the Harrington-Beall Greenhouse property (CDM, 2005). The purpose of the Phase I ESA was to identify potential environmental conditions on the site, if any. Speculated contamination issues included spills and possible leaks from the ASTs; pesticide and herbicide residues in greenhouses and areas formerly used for mixing botanical sprays; asbestos materials from insulated piping in and around greenhouses; and miscellaneous discarded paint and related materials. Specifically, CDM's Phase I ESA identified the following potential environmental conditions in connection with the subject property:

- Possible residues of pesticides and fungicides in soils inside the greenhouses and in areas where these chemicals were handled, such as the Chemical Mixing Shed (Building #100) and Lab Buildings (Buildings #88 and #92).

- A floor drain in the chemical mixing shed and a possible floor drain in the flocking shed, which may have provided a conduit for contaminants to enter the subsurface.

- Contamination of soils around and beneath the ASTs due to leaks and/or spillage of petroleum products stored in them.

- Asbestos, which may be present in insulation materials wrapped on steam pipes and in bags at various locations on the site. Some of the pipe wrap has deteriorated and become incorporated into the soil, which may, therefore, contain asbestos as well.

- Piles of debris (soil, electrical equipment, insulation, etc.) and containers of unidentified material located throughout the site that may contain hazardous materials

- Possible leakage of vehicle fluids (oil, fuel, coolant/antifreeze) that may have occurred in one of the greenhouses (Building #54) that had been used for vehicle storage and maintenance.

- A possible waste disposal area located in the northwestern portion of the site near the Experimental Garden.

- Possible arsenic and other metals (i.e., lead, cadmium) in soils, based on an earlier limited soil sampling event that identified an elevated concentration of arsenic in soil at Greenhouse #6, the proximity of the site to the former ASARCO Copper Smelter located at Ruston (near Tacoma), and the known coverage area of the smelter fallout plume.

1.5 Geology, Surface Water, and Groundwater Conditions

Vashon Island is located within the Puget Sound physiographic region, which consists of a topographic basin between the Cascade and Olympic Mountains. The area is characterized by gently rolling glacial drift plains covered with small ridges, hills, and depressions formed by the continental ice sheet that covered the area during the Pleistocene Epoch. Vashon Island characteristically has steep slopes around most of its shoreline. The island's upland rises to an elevation of approximately 400 feet above sea level.

Soils located above sea level on the island are generally derived from the Vashon stade of the Fraser glaciation, which ended some 11,000 years ago (J.R. Carr & Associates, 1983). The island is typically mantled with glacial drift comprised primarily of till. The till is typically a heterogeneous mixture of gravel, sand, silt, and clay deposited and compacted by glacial ice. Some of the till is less dense because it was deposited as the glacial ice melted. Below the glacial drift is a sandy unit that serves as the principal aquifer on the island. Soils located below sea level are primarily silts and clays.

A review of water supply well logs from the area indicates the principal island aquifer is located in a brown to gray sand. The aquifer occurs at an estimated depth of 130 feet below the site. The static water level within the principal aquifer is estimated at 100 feet below ground surface (ft bgs) at the subject site. Groundwater appears to occur under confined or semi-confined conditions (CDM, 2005).

Subsurface exploration during this Phase II ESA encountered primarily brown to gray silty sand with some fine gravel and organics within the 6-ft maximum depth of exploration. Several of the test pits excavated during CDM's subsurface exploration encountered till-like soils with iron oxidation mottling. Groundwater seepage was noted in 10 test pits at depths between 1½ and 4½ ft bgs. Groundwater was not encountered in the other seven test pits. The water seepage is believed to be perched groundwater that resulted from recent heavy precipitation. The 8-week period prior to CDM's investigation saw 18.5 inches of rain as measured at SeaTac International Airport; normal precipitation for this period is 10.75 inches (National Weather Service web site). Some standing water was noted in the Experimental Garden area on the east side of the site.

1.6 Previous Environmental Assessment Work

In March 2005, a current tenant, the Institute for Environmental Research and Education (IERE) collected 7 soil samples from the Experimental Garden Area and one sample was collected from Greenhouse #6 The samples were analyzed for heavy metals to quantify and delineate the extent of possible contamination caused by a former ASARCO smelter in Ruston, located 9 miles south of the site. With the exception of one sample collected from Greenhouse #6, metals concentrations were within normal background ranges. The sample collected from Greenhouse #6, located at the northeast corner of the site, contained 26 milligrams per kilogram (mg/kg) arsenic. This one sample exceeded the Model Toxics Control Act (MTCA) Method A unrestricted land use soil cleanup level of 20 mg/kg.

Section 2
Field Investigation

CDM's field investigation was conducted from January 26 through February 2, 2006 and included collecting soil samples from backhoe-dug test pits and hand-dug test holes. Field exploration and sampling procedures are summarized below and detailed in **Appendix B**. Specific exploration and sampling activities for each of the ten general areas of investigation are summarized in the following sections.

Prior to conducting the Phase II ESA, AMEC Earth and Environmental conducted a Cultural Resources Assessment of the property (see **Appendix C**) to evaluate whether there are sensitive archaeological resources on the site that would be adversely impacted by the field investigation efforts. AMEC determined that no historic properties would be affected by this project and that the investigation could proceed. If evidence of culturally significant artifacts had been encountered during test pit excavation, such as stone tools, shell fragments, etc., site work would have ceased and AMEC would have been notified. No evidence of culturally significant artifacts was encountered during the test pit investigation.

Prior to initiating test pit excavation the "call before you dig" utility locate was performed as required by state law. A private utility locate was also conducted at proposed test pit areas to search for underground utilities, and also to attempt to locate buried piping between the chemical mixing shed and the westernmost vertical AST.

Test pits were excavated on February 2, 2006. Test pit locations are shown on **Figure 3**. Test pits were dug using a mini-excavator operated by a representative from Hokkaido Drilling, Inc. of Graham, Washington. A CDM hydrogeologist observed the test pit excavation and logged each test pit according to the Unified Soil Classification System (shown on **Figure D1 in Appendix D**). Logs of the test pits are provided in **Appendix D** as **Figures D2** though **D18**. Soil samples from test pits were collected directly from the excavation or from the excavator bucket. All removed soil was replaced in the respective test pit and compacted with the backhoe bucket.

Over the course of the investigation, 28 discrete near-surface soil samples (S13 through S29, S35, S38, S41, S42, S45, TP2,TP3, TP4, TP5, TP8, and TP9) and 18 near-surface composite soil samples (S1 through S11, S30 through S34, S39, and S40) were collected using hand tools (i.e., shovels, stainless steel spoons). Discrete sample locations are shown on **Figure 4.** Composite soil sample locations are shown on **Figure 5**. Near-surface soil sample depths ranged between 3 inches and 2 feet bgs. Composite soil samples were collected at about 3 inches bgs, after scraping away any vegetation and leaf litter. Discrete samples were collected at depths between 1 and 2 ft bgs. Stockpile samples were collected from a minimum of 1 foot into the pile.

At each sample and test pit location, soil samples were field screened for evidence of contamination, which included noting any staining or odor. Any areas exhibiting evidence of contamination were specifically sampled. Soil samples were collected using a stainless steel spoon and packed with a minimum of headspace into 4-ounce laboratory-supplied glass jars. The sample containers were labeled, placed in a cooler, and chilled with ice for transport to the laboratory under chain-of-custody protocol. Soil samples were submitted to OnSite Environmental Inc. (OnSite) of Redmond, Washington for chemical analysis.

2.1 Former Fuel Storage Tanks

Five ASTs are present in the central area of the site that contained or are suspected to have contained Bunker C oil (see **Figure 2**). Site observations indicated that the land surface around the tanks had not been significantly altered, and therefore surface and test pit samples were collected in this area to assess for Bunker C contamination. In addition, IERE indicated that wastes may have been buried in the area of the three westernmost ASTs, and the test pits would help verify this.

Field investigation of the AST areas was conducted on January 27, and 31, and February 2, 2006. Eight test pits (TP1 and TP3 through TP9) were dug, ranging from 3 to 5.5 ft bgs total depth. TP1 was excavated in an attempt to investigate a suspected buried fuel line between the westernmost ASTs and a former boiler in the chemical mixing shed. A soil sample was not collected from TP1 because there was no indication of a buried fuel line and no field evidence of contamination. Test pits TP2 through TP8 were excavated in the area of the westernmost ASTs to investigate for buried waste and Bunker C oil; only Bunker C-stained soil was noted in some of the test pits. TP9 was excavated adjacent to the easternmost 40,000-gallon AST to investigate for Bunker C oil. Soils encountered in the test pits consisted of brown to gray silty sand with some fine gravel and organics.

Nine discrete soil samples (S13 through S20 and S35) were collected from the AST areas using hand tools (i.e., shovels, stainless steel spoons). Discrete sample locations are shown on **Figure 4**. S13 through S16 were collected alongside the above-ground product piping located between the easternmost vertical AST and the former boiler house (Building #83, see **Figure 4**). S17 was collected immediately adjacent to the easternmost cylindrical AST. The remaining discrete soil samples (S18 through S20 and S39) were collected around the three westernmost AST areas.

Both discrete and test pit samples were analyzed by the analytical method appropriate for Bunker C (diesel and oil-range hydrocarbons by Northwest Method NWTPH-Dx). Three samples containing relatively high concentrations of Bunker C (TP3, TP5, and S16) were also analyzed for PAHs by EPA Method 8270B/SIM. Analytical results are discussed in Section 3.

2.2 Water Reservoir Mixing Tank

A mixing tank is located on the east side of the water reservoir (see **Figure 2**). The tank was used to amend irrigation water piped to the greenhouses. Chemicals used in the mixing tank are unknown. Using the protocol described above, one discrete soil sample (S26) was collected adjacent to the mixing tank. The sample location is shown on **Figure 4**. The sample was submitted for analysis of organochlorine pesticides by EPA Method 8081A and organophosphorus pesticides by EPA Method 8141A. Analytical results are discussed under Section 3.

2.3 Chemical Mixing Shed/Portable Mixing Tanks

The chemical mixing shed (Building #100), shown on **Figure 2**, contains equipment formerly used to mix chemicals (likely pesticides) for application on plants. It was suspected that a floor drain in the chemical mixing shed may have provided a conduit for contaminants to enter the subsurface. Two small portable steel tanks located approximately 75 feet away from the mixing shed were apparently used to mix and carry chemicals for spraying inside greenhouses. The tanks are in very poor condition (severely rusted).

During the initial stages of our fieldwork we investigated the drain to determine its diameter and if it was still operable. The drain is an approximately 1-foot diameter round hole in the concrete floor and there are two 8-inch diameter concrete pipes terminating at the drain. One pipe runs to the east and the other to the west. A plumbing contractor, Northwest Cascade, Inc. of Puyallup, Washington, attempted to trace the line to its termination point. The contractor followed the line utilizing a camera and a water jet probe from the floor drain approximately 25 feet east toward the AST area, where the line was found to be plugged and obstructed with dirt. The line heading west was completely plugged/obstructed with dirt.

One test pit (TP2) was completed adjacent to the chemical mixing shed per the protocol described above. The test pit location is shown on **Figure 3**. A soil sample from TP2 was collected and submitted to OnSite for analysis of organochlorine pesticides by EPA Method 8081A and organophosphorus pesticides by EPA Method 8141A.

Three discrete soil samples (S27, S28, and S29) were collected adjacent to the mixing shed, as shown in **Figure 4**. The samples were analyzed for organochlorine pesticides by EPA Method 8081A and organophosphorus pesticides by EPA Method 8141A.

In the event this was the typical storage location for the portable mixing tanks, three 5-point composite soil samples (S30, S31, and S32) were collected around the portable mixing tanks. Composite sample locations are shown on **Figure 5**. Composite soil sample collection procedures are detailed in **Appendix B**. All composite samples were analyzed for organochlorine and organophosphorus pesticides by EPA Methods 8081A and 8141A, respectively. Analytical results are discussed in Section 3.

2.4 Experimental Garden Site/Former Greenhouse Areas

The Experimental Garden and adjacent undeveloped area to the southeast (see **Figure 2**) were formerly covered with greenhouses. IERE staff reportedly has had difficulty with successful cultivation in the Experimental Garden. The soil also reportedly has an unusual odor. Based on this and information obtained from the Phase I ESA, buried wastes were suspected in the Experimental Garden area.

In order to investigate the potential presence of buried wastes, eight test pits were excavated (TP10 through TP17) within the Experimental Garden area. Test pit locations are shown on **Figure 3**. Because we encountered no evidence of buried wastes in any of the Experimental Garden area test pits, no samples were collected from the test pits. However, two 5-point composite soil samples were collected – one in the Experimental Garden area (S34) and one southeast of the Experimental Garden area (S10). Both samples were analyzed for organochlorine pesticides by EPA Method 8081A; organophosphorus pesticides by EPA Method 8141A; and total arsenic, cadmium, and lead by EPA Method 6010B. The composite sample from the Experimental Garden (S34) was also analyzed for chlorinated acid herbicides by EPA Method 8151A. Analytical results are discussed in Section 3.

2.5 Storage (Potting) Shed with Chemical Containers

A storage shed located in the south-central area of the site (between buildings #36 and #38) contains an assortment of containers that appear to be mostly empty. Containers noted include antifreeze, paint thinner, and paint. One surface soil sample (S38) was collected adjacent to the storage shed. The sample was screened for petroleum hydrocarbons NWTPH-HCID and VOCs by EPA Method 8260B. The VOC sample was collected in accordance with EPA Method 5035. The sample location is shown on **Figure 4**. Analytical results are discussed in Section 3.

2.6 Greenhouse Assessment

The 54 greenhouse buildings remaining at the site are in poor condition. All but one greenhouse is overgrown with vegetation. One greenhouse near the site entrance is being renovated and is cleared of vegetation. Based on the features observed at this greenhouse, a typical greenhouse on the property has a concrete paved entranceway and concrete paved walkway down the center. The remaining areas are soil.

A total of nine composite soil samples (S1 through S9) were collected from nine groups of greenhouses. The composite sample locations are shown on **Figure 5**. The greenhouse groups forming the composite samples and their designated sample numbers are shown below.

Greenhouse Group	Composite Sample Designation	No. of Greenhouses in Group	Assumed Past Use
3-8	S1	6	Rose cultivation
9-15	S2	7	Rose cultivation
16-20	S3	5	Rose cultivation

Greenhouse Group	Composite Sample Designation	No. of Greenhouses in Group	Assumed Past Use
21-30	S4	10	Orchid cultivation
31-35	S5	5	Orchid cultivation
37-38	S6	2	Orchid cultivation
39-46	S7	8	Rose cultivation
47-53	S9	7	Rose cultivation
54-58	S8	5	Rose cultivation

The samples were analyzed for organochlorine pesticides by EPA Method 8081A and organophosphorus pesticides by EPA Method 8141A. Four of the samples (S3, S4, S8, and S9) were also analyzed for chlorinated acid herbicides by EPA Method 8151A and the total arsenic, lead, and cadmium by EPA Method 6010B. Analytical results are discussed in Section 3.

2.7 Exterior Open Areas

Because of the likely past use of herbicides to control invasive weeds in open areas around the greenhouses, two 5-point composite soil samples (S39 and S40) were collected and submitted for analysis of chlorinated acid herbicides by EPA Method 8151A and total arsenic, lead, and cadmium by EPA Method 6010B. Sample locations are shown on **Figure 5**. Analytical results are discussed in Section 3.

2.8 Former Lab Locations

Buildings No. 88 and 92 were formerly used for lab work that may have included pesticide formulation experimentation. For this reason, one surface soil was collected adjacent to each former lab building—S41 at Building 92 and S42 at Building 88 (see **Figure 4**). Both samples were analyzed for organochlorine pesticides by EPA Method 8081A and organophosphorus pesticides by EPA Method 8141A. Analytical results are discussed in Section 3.

2.9 Asbestos Testing in Soil

The insulation wrapping around former steam pipes is assumed to contain asbestos. The condition of pipe wrapping is very poor. The wrapping is missing at many locations and has been incorporated into underlying soil. CDM collected five discrete soils samples (S21 through S25) below steam pipe areas that appeared to have degraded insulation wrapping. Sample locations are shown on **Figure 4**. The samples were analyzed for percent asbestos by polarized light microscopy/dispersion staining using EPA Methods 600/M4-82-020 and 600/R-93/116. Analytical results are discussed in Section 3.

2.10 Soil Stockpiles

Multiple debris piles exist throughout the site. A typical pile is a mixture of soil and demolition debris; however, several are primarily soil. A covered pile containing debris is located west of the Quonset hut (Building No.101). This pile reportedly contains soil that was removed from a demolished shed formerly located adjacent to the Quonset hut. The soils have been covered with debris and a tarp. No odor was noted under the tarp.

At the western edge of the site is a pile of soil that was removed from the top 6 to 12 inches of the Experimental Garden area due to the potential presence of heavy metals. This pile was analyzed for metals as part of soil sampling conducted by IERE (see Section 1.5).

Several other soil/debris stockpiles are located throughout the site, including one adjacent to Greenhouse 8 in the northeast portion of the site. The debris in these soil piles includes electrical equipment, insulation, and containers of unidentified material Composite and discrete samples were collected from several representative debris piles to evaluate the potential presence of contaminants.

As shown on **Figure 5**, one 3-point composite soil sample was collected from the stockpile located west of the Experimental Garden area (S33) and another composite sample was collected from the stockpile located near the northeast corner of the site adjacent to Greenhouse 8 (S11). In addition, a discrete soil sample (S45) was collected from the stockpile located west of the Quonset hut. The samples were analyzed for organochlorine pesticides by EPA Method 8081A and organophosphorus pesticides by EPA Method 8141A. Samples S33 and S45 were also analyzed for the total arsenic, lead, and cadmium by EPA Method 6010B. Analytical results are discussed in Section 3.

Section 3
Analytical Testing Results

This section presents the analytical laboratory results for each of the ten areas investigated. Sample locations are shown on **Figures 3, 4,** and **5.** Copies of the laboratory reports are presented in **Appendix E.** Analytical results are summarized in **Tables 1 through 11.**

3.1 Former Fuel Storage Tanks

A total of five test pit (TP3, TP4, TP5, TP8, and TP9) and nine discrete (S13 through S20 and S35) soil samples collected from the former fuel storage tank areas were submitted for hydrocarbon analysis. Sample locations are shown on **Figures 3** and **4.** Analytical results are summarized in **Table 1.**

Bunker C oil was detected in test pit samples TP3-3', TP4-4.5', and TP5-5' at concentrations of 5,300 mg/kg, 1,600 mg/kg, and 1,700 mg/kg, respectively. Bunker C oil was detected in six of the nine discrete soil samples, ranging in concentrations from 110 mg/kg (S14) to 180,000 mg/kg (S20). Diesel-range hydrocarbons were not detected in any of the samples.

Three samples containing over 1,000 mg/kg of Bunker C-range hydrocarbons (from TP3-3', TP5-5', and S16) were further analyzed for PAHs by EPA Method 8270C/SIM. As shown in **Table 1,** various PAH compounds were detected in all four samples at concentrations ranging from 0.013 to 0.66 mg/kg.

3.2 Water Reservoir Mixing Tank

One discrete surface soil sample (S26) was collected adjacent to the water reservoir mixing tank. The sample location is shown on **Figure 4.** The sample was submitted for analysis of organochlorine pesticides and organophosphorus pesticides. Test results are summarized in **Table 2.** As shown in **Table 2,** none of the analytes were present at or above their respective detection limits.

3.3 Chemical Mixing Shed/Portable Mixing Tanks

One test pit sample (TP2), collected adjacent to the chemical mixing shed at a depth of 4.5 ft bgs, was submitted for analysis of organochlorine pesticides and organophosphorus pesticides. The test pit location is shown on **Figure 3.** Test results are shown in **Table 3.** No organochlorine pesticides or organophosphorus compounds were detected in the test pit sample at or above the laboratory detection limits.

Three discrete near-surface soil samples (S27, S28, and S29) collected adjacent to the mixing shed were submitted for organochlorine and organophosphorus pesticides. The sample locations are shown on **Figure 4.** Test results are shown in **Table 3.** There were no detections of organochlorine or organophosphorus pesticides at or above the laboratory detection limits in S27. No organophosphorus pesticides at or above detection limits were found in any of the three discrete samples. The organochlorine pesticides 4,4'-DDE, 4,4'-DDD, and 4,4'-DDT were detected in discrete samples S28 and S29. Concentrations ranged from a low of 20 micrograms per kilogram (µg/kg) to a high of 1,300 µg/kg. In addition, the pesticides Endosulfan I, Endosulfan II, and Endosulfan sulfate were detected in S28 at concentrations ranging from 140 µg/kg to 270 µg/kg.

Three 5-point composite soil samples (S30, S31, and S32) were collected around the portable mixing tank area and submitted for analysis of organochlorine and organophosphorus pesticides. Composite sample locations are shown on **Figure 5**. Test results are summarized in **Table 4**. With the exception of gamma- and alpha-chlordane and 4,4'-DDT (pesticides found in S30), no organochlorine or organophosphorus pesticides were present at or above laboratory detection limits in the three composite soil samples collected around the mixing tanks.

3.4 Experimental Garden/Former Greenhouse Areas

Two 5-point composite soil samples were collected on the west side of the site, one in the Experimental Garden area (S34) and one south of the Experimental Garden (S10) in the former greenhouse area. Both samples were analyzed for organochlorine pesticides, organophosphorus pesticides, and arsenic, cadmium, and lead. The composite sample from the Experimental Garden (S34) was also analyzed for chlorinated acid herbicides. Analytical results are summarized in **Table 5**.

There were no organochlorine or organophosphorus pesticides present at or above laboratory detection limits in either of the composite samples. Lead was detected in both samples at concentrations of 22 and 32 mg/kg. No chlorinated acid herbicides were detected at or above laboratory detection limits in S34.

3.5 Storage (Potting) Shed with Chemical Containers

One surface soil sample (S38) was collected adjacent to the storage shed and screened for petroleum hydrocarbons and analyzed for VOCs. The sample location is shown on **Figure 4**. Test results are summarized in **Table 6**. Neither hydrocarbons nor VOCs were present at or above the laboratory detection limits in S38.

3.6 Greenhouse Assessment

A total of nine composite soil samples (S1 through S9) were collected from nine groups of greenhouses. The composite sample locations are shown on **Figure 5**. All samples were analyzed for organochlorine and organophosphorus pesticides. Four of the samples (S3, S4, S8, and S9) were also analyzed for chlorinated acid herbicides and arsenic, lead, and cadmium. Test results are summarized in **Table 7**.

The organochlorine pesticides 4,4'-DDE, 4,4'-DDD, and 4,4'-DDT were detected at concentrations ranging from 17 to 9,200 µg/kg in all nine composite samples. Other organochlorine pesticides were intermittently detected, including gamma-BHC in S1 through S5 and S9, and heptachlor epoxide and dieldrin in S1. Organophosphorus pesticides and chlorinated acid herbicides were not detected above laboratory detection limits in any of the composite samples collected from the nine greenhouse groups.

Arsenic, cadmium, and lead were all detected in samples S3, S4, and S8. Concentrations ranged from 17 to 22 mg/kg (arsenic), 0.75 to 0.85 mg/kg (cadmium), and 110 to 170 mg/kg (lead). Lead was also detected in S9 at 110 mg/kg.

3.7 Exterior Open Areas

Two 5-point composite soil samples (S39 and S40) collected on the east side and in the center of the property were analyzed for chlorinated acid herbicides and arsenic, lead, and cadmium. Sample locations are shown on **Figure 5**. Analytical results are summarized in **Table 8.**

Pentachlorophenol was detected at 13 µg/kg in S39 and 31 µg/kg in S40. Pentachlorophenol is not typically reported in the chlorinated acid herbicide analysis, however, the laboratory noted the presence of this chemical in both S39 and S40 and therefore reported the concentrations and also analyzed for pentachlorophenol in all other herbicide tests on the project. Arsenic (30 mg/kg), cadmium (1.6 mg/kg), and lead (1,100 mg/kg) were all detected in sample S39. Cadmium and lead were also detected in S40 at 0.66 and 170 mg/kg, respectively.

3.8 Former Lab Locations

One discrete surface soil was collected adjacent to each former lab building—S41 at Building 92 and S42 at Building 88 (see **Figure 4**). Both samples were analyzed for organochlorine and organophosphorus pesticides. Analytical results are summarized in **Table 9**. No organochlorine or organophosphorus pesticides were present at or above their respective laboratory detection limits in either sample with the exception of 4,4′-DDE at 63 µg/kg in S42.

3.9 Asbestos Testing in Soil

CDM collected five discrete soils samples (S21 through S25) below steam pipe areas that appeared to have degraded insulation wrapping. The samples were analyzed for percent asbestos by polarized light microscopy/dispersion staining using EPA Methods 600/M4-82-020 and 600/R-93/116. Sample locations are shown on **Figure 5.** Analytical results are summarized in **Table 10.**

Asbestos fibers were detected in discrete samples S21, S23, and S24 (chrysolite in S21 and S23 and amosite in S24).

3.10 Soil Stockpiles

A discrete soil sample (S45) was collected from the stockpile located west of the Quonset hut. In addition, a 3-point composite soil sample was collected from a stockpile located west of the Experimental Garden area (S33) and from a stockpile near the northeast corner of the site adjacent to Greenhouse 8 (S11). Discrete and composite sample locations are shown on **Figures 4** and **5**, respectively.

All of the samples were analyzed for organochlorine and organophosphorus pesticides. Arsenic, lead, and cadmium were analyzed in all stockpile samples except S11. Analytical results are summarized in **Table 11**.

Organochlorine pesticides detected in stockpile samples S11 and S45 include 4,4'-DDE, 4,4'-DDD, and 4,4'-DDT. Endosulfan sulfate was also detected in S45 (the discrete sample). No organophosphorus pesticides were detected at or above the laboratory detection limits in any of the samples.

Arsenic, cadmium, and lead were all detected in S45 at concentrations of 20 mg/kg, 1.5 mg/kg, and 780 mg/kg, respectively. Lead was also detected in S33 at 27 mg/kg.

Section 4
Regulatory Evaluation

The Model Toxics Control Act requires that soil cleanup levels be protective of human health. The analytical laboratory data were compared to tabulated Method A and Method B cleanup levels as shown in **Tables 1** through **11**. The tabulated Method A cleanup levels in Table 740-1 of MTCA may be based on direct contact, ingestion, and/or protection of groundwater, as appropriate (Ecology 2001a). MTCA Method B values were obtained from Ecology's Cleanup Levels and Risk Calculations (CLARC) tables and are based on protection of human health via ingestion (Ecology, 2001b).

In addition, potential impacts to terrestrial ecological receptors (plants and animals) need to also be considered in evaluating detected compounds unless a site can be excluded from a Terrestrial Ecological Evaluation (TEE). Specifically, the analytical results were evaluated with respect to the TEE process under WAC 173-340-7490 through 7494. MTCA establishes a tiered process for evaluating threats to terrestrial ecological receptors. Tier 1 allows for an exclusion from further evaluation those sites that do not pose a current or potential threat to terrestrial ecological receptors, Tier 2 involves a simplified evaluation, and Tier 3 requires a site-specific evaluation. The criteria that allow a contaminated site to be excluded from a TEE are described in WAC 173-340-7491. As presented in **Appendix F**, the site does not appear to qualify for TEE exclusion or a simplified TEE evaluation and therefore requires a site specific TEE.

A site-specific terrestrial ecological evaluation was beyond the scope of this investigation, however, MTCA allows compounds identified in soil to be compared to ecological indicator concentrations contained in MTCA Table 749-3 (pp. 243-244 in MTCA) as a guide in the evaluation of whether contaminant concentrations are protective of terrestrial plants and animals. Ecological indicator soil concentrations in MTCA Table 749-3 are included on **Tables 1** through **11** where they are applicable and exist. A copy of Table 749-3 is also included in **Appendix F**. In circumstances where multiple ecological indicator concentrations occur (i.e., plants, soil biota, and wildlife), the most stringent concentration is applied. MTCA cautions that ecological indicator concentrations are not cleanup levels, and concentrations that exceed the number do not necessarily require remediation.

The possibility that fallout from the former ASARCO smelter located at Ruston, near Tacoma, contributed to the metals contamination (lead and arsenic) identified at the site also needs to be considered when evaluating areas requiring remediation. Metals contamination is an area-wide issue in soil on Vashon Island (Public Health - Seattle & King County, 2000). Additional sampling may be warranted at the site to better define the distribution of metals.

The paragraphs below compare contaminant concentrations in each of the 10 areas of investigation against the human health and ecological based regulatory criteria. Conclusions and cleanup options for areas exceeding regulatory criteria are addressed in Section 5.

4.1 Former Fuel Storage Tanks

Hydrocarbons quantified as Bunker C were detected at concentrations exceeding the 2,000 mg/kg Method A cleanup level in test pit sample TP3-3'and discrete soil samples S16, S18, and S20 in the former fuel storage tank area. The highest concentration of Bunker C—180,000 mg/kg in S20—was detected in a discrete sample collected adjacent to the westernmost vertical AST (see **Figure 4** and **Table 1**).

The carcinogenic polyaromatic hydrocarbon (cPAH) soil sample results were normalized to a Toxicity Equivalency Factor (TEF). Each cPAH has a specific TEF, and the sum of the TEF-adjusted cPAHs equals the Toxic Equivalency (TEQ) as outlined in WAC 173-340-708(8). Data for cPAHs were adjusted with the TEF only when the concentration in the sample was above the method detection limit.

Of the three samples analyzed for PAHs during this investigation, the normalized cPAHs were just above the 0.1 mg/kg Method A cleanup level in sample S16 (easternmost AST area). The carcinogenic PAH Indeno(1,2,3-c,d)pyrene exceeded the Method B cleanup level in TP3-3'.

There is no ecological indicator concentration for Bunker C. The ecological indicator concentration for diesel-range TPH for protection of soil biota is 200 mg/kg, but may be as high as 6,000 mg/kg for protection of wildlife. Ecological indicator concentrations for Bunker C are expected to be similar to that of diesel.

4.2 Water Reservoir Mixing Tank

Neither organochlorine nor organophosphorus pesticides were found above their respective laboratory detection limits in discrete sample S26, collected adjacent to the water reservoir mixing tank (see **Figure 4 and Table 2**).

4.3 Chemical Mixing Shed/Portable Mixing Tanks

Several organochlorine pesticides were detected in samples collected near the chemical mixing shed, including Endosulfan I, 4,4'-DDE,4, 4'-DDD, 4,4'-DDT, and endosulfan sulfate. The concentration of 4,4'-DDT exceeded the ecological indicator concentration of 750 µg/kg at sample location S28 (see **Figure 4 and Table 3**).

Concentrations of gamma- and alpha-chlordane and 4,4'-DDT found in S30 located around the portable mixing tanks did not exceed any regulatory criteria.(see **Figure 5 and Table 4**).

4.4 Experimental Garden/Former Greenhouse Areas

Lead was detected in both composite samples from these areas; however, the highest detected concentration (32 mg/kg in S10) was still well below the Method A cleanup level (250 mg/kg) and also below the ecological indicator concentration (50 mg/kg). Also, these total lead concentrations are near what is expected for Puget Sound area background (24 mg/kg; Ecology, 1994).

4.5 Storage (Potting) Shed with Chemical Containers

Neither hydrocarbons nor VOCs were detected at or above the laboratory detection limits in the discrete surface soil sample S38 collected adjacent to the storage shed (see **Figure 4** and **Table 6**).

4.6 Greenhouse Assessment

The organochlorine pesticides 4,4'-DDE, 4,4'-DDD, and 4,4'-DDT were detected at concentrations ranging from 17 to 9,200 µg/kg in all nine composite samples collected from the greenhouse areas. The Method A cleanup level for 4,4'-DDT was exceeded at the sample S6 location (see **Figure 5** and **Table 7**). Sample S6 represents greenhouse numbers 37 and 38. The total DDT/DDD/DDE concentration in samples S4, S5, and S6 also exceeds the ecological indicator concentration of 750 µg/kg.

Other organochlorine pesticides that were intermittently detected in samples collected from the greenhouse areas included gamma-BHC in S9 and S1 through S5, and heptachlor epoxide and dieldrin in S1. These pesticides detections did not exceed any regulatory criteria.

Gamma-BHC, or benzene hexachloride, has no Method A or B cleanup level, but has an ecological indicator of 6,000 µg/kg—well above the highest detection of this pesticide (89 µg/kg in sample S4). The concentration of heptachlor epoxide in sample S1 (11 µg/kg) is well below the Method B cleanup level of 110 µg/kg and the ecological indicator of 300 µg/kg (total heptachlor/heptachlor epoxide). There is no Method A cleanup level for this pesticide.

Dieldrin, detected at 51 µg/kg in composite sample S1, has a Method B cleanup level of 62 µg/kg and an ecological indicator of 70 µg/kg. Thus, this sample, collected from the greenhouse area at the northeast corner of the site, does not exceed any regulatory criteria.

Neither organophosphorus pesticides nor chlorinated acid herbicides were detected at concentrations above their respective laboratory detection limits.

Total arsenic, cadmium, and lead were detected in samples S3, S4, and S8. Lead was also detected in S9. The highest concentrations of arsenic (22 mg/kg in S3 and 21 mg/kg in S8) are above the Method A cleanup level of 20 mg/kg, the Method B carcinogenic cleanup level (0.66 mg/kg), and the ecological indicator concentration for arsenic V (10 mg/kg). The arsenic concentration detected in S4 (17 mg/kg) also exceeds the Method B and ecological indicator concentrations.

Cadmium concentrations in samples collected from the greenhouse area were all below Method A and B cleanup levels and the ecological indicator concentration. Lead, however, exceeds the ecological indicator concentration of 50 mg/kg in all four samples in which it was analyzed (S3, S4, S8, and S9).

4.7 Exterior Open Areas

Pentachlorophenol was detected in both samples (S39 and S40) collected in the exterior open area (see **Figure 5** and **Table 8**). The Pentachlorophenol concentrations of 13 and 31 µg/kg were well below any regulatory criteria.

The metals arsenic, cadmium, and lead were detected in sample S39. Cadmium and lead were also detected at lesser concentrations in S40. The arsenic concentration in S39 (30 mg/kg) exceeds the Method A (20 mg/kg), Method B (0.66 mg/kg), and ecological indicator (10 mg/kg) limits. Concentrations of cadmium in both S39 and S40 were below all regulatory criteria. Lead, however, exceeded the Method A cleanup level of 250 mg/kg and the ecological indicator concentration of 50 mg/kg in S39 (1,100 mg/kg). In addition, the lead detection of 170 mg/kg in S40 exceeded the ecological indicator concentration.

4.8 Former Lab Locations

The organochlorine pesticide 4,4'-DDE was detected in the sample S42 collected adjacent to one of the former lab buildings (see **Figure 4** and **Table 9**). The concentration (63 µg/kg) is well below any regulatory criteria. No other organochlorine nor organophosphorus pesticides were detected at or above their respective laboratory detection limits in either sample collected adjacent to each former lab building.

4.9 Asbestos Testing in Soil

Asbestos fibers were detected in discrete samples S21, S23, and S24 collected below steam pipe areas that have degraded insulation wrapping (see **Figure 4** and **Table 10**). Asbestos fibers included chrysolite in S21 and S23 and amosite in S24.

There is no MTCA Method A or Method B cleanup levels or ecological indicator concentration for comparison of asbestos detections. Until recently it was assumed by Superfund site managers and regulatory authorities that materials containing less than 1 percent asbestos (including chrysolite and amphibole) did not pose an unacceptable risk to human health.

The U.S. EPA has more recently released guidance on developing cleanup goals and identifying new assessment tools for evaluating asbestos at cleanup sites. A copy of this memorandum is provided in **Appendix G**. The memo states that the 1 percent threshold for asbestos-containing materials may in fact not be protective of human health in all instances of site cleanups. Data from cleanup sites now indicate that soil/debris containing significantly less than 1 percent asbestos can release unacceptable air concentrations of all types of asbestos fibers. The most critical determining factors in the level of airborne concentrations are the degree of disturbance, which is associated with the level of activity occurring on the site, and the presence of complete exposure pathways. Thus, EPA recommends that an accurate asbestos exposure value can only be determined through site sampling techniques that generate fibers from soil and bulk samples, and that risk-based, site-specific action levels should be developed to determine if response actions for asbestos in soil/debris should be undertaken.

The asbestos detections in the site soil samples are likely below 1% asbestos, however, as indicated by the above-summarized EPA guidance, this does not mean the site poses no asbestos risk.

4.10 Soil Stockpiles

Various organochlorine pesticides were detected in samples S11 and S45, including 4,4'-DDE, 4,4'-DDD, and 4,4'-DDT in S11 and S45 and endosulfan sulfate in S45 (see **Figures 4** and **5** and **Table 11**). The total DDD, DDE, and DDT concentration of 1,400 µg/kg of 4,4'-DDT in S45 exceeds potential cleanup levels (ecological indicator concentration value of 750 µg/kg for). Organophosphorus pesticides were not present at or above laboratory detection limits in any of the samples.

The arsenic concentration of 20 mg/kg in S45 equaled the Method A cleanup level (also 20 mg/kg) and exceeded the Method B cleanup level (0.66 mg/kg) and ecological indicator concentration value (10 mg/kg for Arsenic V). The cadmium concentration in S45 was below the Method A, Method B, and ecological indicator values. Lead in S45 was detected at a concentration (780 mg/kg) above the Method A cleanup level of 250 mg/kg and the ecological indicator concentration (50 mg/kg). Lead was also detected in S33, but at a concentration below all regulatory criteria.

Section 5
Conclusions and Recommendations

5.1 Conclusions

The results of the Harrington-Beall Greenhouse property Phase II ESA indicate several hazardous substances are present in soil at concentrations exceeding human health-based cleanup levels. Identified compounds also exceed ecological indicator concentrations, although the applicability of these ecological levels to the site has not been explored in detail. The following sections summarize potential human health and ecological risks identified by contaminants of concern.

5.1.1 Bunker C

Bunker C is present in soil around both AST areas. Of the 14 samples analyzed, five contained Bunker C at concentrations exceeding the 2,000 mg/kg Method A cleanup level. Bunker C is not very mobile in the environment and at this site it is likely confined to near surface soil. Hydrocarbon-contaminated soils that exceed the MTCA Method A cleanup level of 2,000 mg/kg for diesel and oil is estimated to extend to an average depth of 3 feet bgs around the easternmost ASTs and to an estimated 8 feet bgs around the westernmost ASTs. PAHs are associated with the Bunker C. Carcinogenic PAHs exceeding the 0.1 mg/kg Method A cleanup level were identified in soil near the easternmost ASTs. PAHs approach the Method A cleanup level in the area of the westernmost ASTs.

The presence of Bunker C in soil may pose a risk to terrestrial receptors (plants and animals); however, no tabulated ecological indicator concentrations exist specifically for Bunker C. A site specific TEE would be needed to determine the receptors of concern and to quantify the risk, although it can be assumed that any cleanup action taken to address human health impacts from Bunker C would also reduce the threat to the plants and animals.

5.1.2 Residual Pesticides

Residual pesticides are present on the property and appear to be most prevalent within the greenhouses where 4,4'-DDT and its degradation products 4,4'-DDE, 4,4'-DDD, and were consistently detected. Of the 23 samples analyzed for pesticides, only one sample exceeded a Method A cleanup level. This composite sample, collected from Greenhouse Nos. 37 and 38 located near the center of the site, contained a 4,4'-DDT concentration of 9,200 µg/kg which exceeds the 3,000 µg/kg Method A 4,4'-DDT cleanup level. This sample, plus two additional greenhouse composite samples exceeded the combined DDT/DDD/DDE ecological indicator concentration of 750 µg/kg for wildlife exposure. These last two locations include greenhouses 21 through 30, and greenhouses 31 through 35. In addition, one of three discrete samples collected to the west of the chemical mixing shed (Building #100) exceeded the combined DDT/DDD/DDE ecological indicator concentration for wildlife exposure.

The highest concentrations of residual pesticides are present in greenhouses reportedly used to grow orchids. DDT is not mobile in the environment and is likely confined to near surface soils.

5.1.3 Metals

Of the ten samples analyzed for metals, seven samples exceeded ecological indicator concentrations, four of which also contained concentrations exceeding one or more Method A cleanup levels. Areas impacted include:

- The soil collected from the stockpile near the Quonset hut (Building #101) contained lead at 780 mg/kg, which exceeds the Method A soil cleanup level of 250 mg/kg and the ecological indicator concentration of 50 mg/kg for plant exposure. The arsenic concentration in this sample was just at the Method A cleanup level of 20 mg/kg, and exceeded the ecological indicator concentration of 10 mg/kg for plant exposure.

- Four of the greenhouse composite samples exceeded the lead ecological indicator concentration. These locations include greenhouses 18 through 20, greenhouses 21 through 35, greenhouse 47 through 53, and greenhouses 54 through 58. Three of these greenhouse groups (excluding greenhouses 47 through 53) also exceed the ecological indicator concentration for arsenic V, two of which also exceeded the Method A cleanup level.

- The composite sample collected from the open area on the east side of the site contained lead at 1,100 mg/kg and arsenic at 30 mg/kg, which exceed both their respective Method A soil cleanup levels and ecological indicator concentrations.

The source of the metals contamination is unknown. Possible sources include historical use of lead-arsenate pesticides or fallout from the historical ASARCO facility located in Ruston, near Tacoma.

5.1.4 Asbestos

Asbestos was identified in two of five soil samples analyzed. It should be assumed that the insulation around the former steam pipes and the former product piping between the easternmost ASTs and Building #83 is asbestos containing material (ACM) until a formal hazardous materials survey is performed. The insulation on all the piping is severely deteriorated and has become incorporated into the soil below the pipes in many areas. Care should be taken to minimize disturbance in areas containing the pipe wrapping until proper ACM abatement takes place.

5.2 Recommendations

Additional investigation may be necessary to fully evaluate the nature and extent of contamination requiring remedial actions in accordance with MCTA. In addition, cleanup levels need to be developed for this site that are both protective of human health and the environment. This may require completing a site-specific TEE to evaluate cleanup levels that are protective of the environment. Site-specific TEEs need to be conducted in consultation with Ecology.

We do not believe the identified contamination warrants investigation of groundwater quality below the site. Although shallow perched groundwater was identified during our investigation, the Vashon Island regional aquifer is located at an estimate 130 ft bgs in the site vicinity. All of the identified hazardous materials at the site have a low potential for vertical migration and, therefore, have a low potential to impact the regional aquifer. CDM did not define the vertical extent of the soil contamination.

Based on the types of contaminants of concern and surficial nature of impacted soils, the most viable approach for cleanup of this site is source removal. Source removal can be accomplished through soil excavation. Soil excavation would involve the physical removal and off site disposal or treatment of contaminated soil, and if necessary, replacement with clean fill. Other cleanup technologies such as bioremediation and phytoremediation may be applicable to the site; however, feasibility studies would be needed to verify this. Prior to undertaking any cleanup a site-specific TEE may be required to define risk to the environment from the site. The goal of the TEE process is to develop cleanup levels that are protective of terrestrial ecological receptors (plants and animals) from exposure to contaminants of concern.

Section 6
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For

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Senior Hydrogeologist

Tables

Tables

Tables

Table 1
Former Fuel Storage Tank Area
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

	Regulatory Criteria			Sample I.D., Lab I.D., Date Sampled, Sample Depth							
Analyte	Method A Cleanup Level [a]	Method B Cleanup Level [b]	Ecological Indicator Soil Concentrations [c]	TP3 HB-TP3-3 02/02/06 3 feet bgs	TP4 HB-TP4-4.5 02/02/06 4.5 feet bgs	TP5 HB-TP5-5 02/02/06 5 feet bgs	TP8 HB-TP8-2.5 02/02/06 5 feet bgs	TP9 HB-TP9-2.0 02/02/06 2 feet bgs	S13 HB-S13-1/06 01/27/06 1 foot bgs	S14 HB-S14-1/06 01/27/06 1 foot bgs	S15 HB-S15-1/06 01/27/06 1 foot bgs
NWTPH-Dx (mg/kg)											
Diesel	2,000	NL	200	<150	<32	<30	<30	<29	<29	<29	<33
Oil as Bunker C	2,000	NL	NL	**5,300**	**1,600**	**1,700**	<60	<58	<57	**110**	<66
PAHs [d] (EPA 8270C/Sim) (mg/kg)											
Naphthalene	5 [e]	NL/1,600	NL	<0.0081	--	<0.0080	--	--	--	--	--
2-Methylnaphthalene	NL	NL/NL	NL	<0.0081	--	<0.0080	--	--	--	--	--
1-Methylnaphthalene	NL	NL/NL	NL	<0.0081	--	<0.0080	--	--	--	--	--
Acenaphthylene	NL	NL/NL	NL	**0.33**	--	**0.016**	--	--	--	--	--
Acenaphthene	NL	NL/4800	20	<0.0081	--	<0.0080	--	--	--	--	--
Fluorene	NL	NL/3200	30	**0.024**	--	<0.0080	--	--	--	--	--
Phenanthrene	NL	NL/NL	NL	<0.0081	--	<0.0080	--	--	--	--	--
Anthracene	NL	NL/24000	NL	**0.15**	--	<0.0080	--	--	--	--	--
Fluoranthene	NL	NL/3200	NL	<0.0081	--	<0.0080	--	--	--	--	--
Pyrene	NL	NL/2,400	NL	<0.0081	--	<0.0080	--	--	--	--	--
Benzo(a)anthracene*	NL	0.137/NL	NL	**0.027**	--	<0.0080	--	--	--	--	--
Chrysene*	NL	0.137/NL	NL	<0.0081	--	**0.016**	--	--	--	--	--
Benzo(b)fluoranthene*	NL	0.137/NL	NL	<0.0081	--	<0.0080	--	--	--	--	--
Benzo(k)fluoranthene*	NL	0.137/NL	NL	<0.0081	--	<0.0080	--	--	--	--	--
Benzo(a)pyrene*	0.1	0.137/NL	12	**0.021**	--	**0.0087**	--	--	--	--	--
Indeno(1,2,3-c,d)pyrene*	NL	0.137/NL	NL	**0.36**	--	**0.013**	--	--	--	--	--
Dibenz(a,h)anthracene*	NL	0.137/NL	NL	**0.033**	--	<0.0080	--	--	--	--	--
Benzo(g,h,i)perylene	NL	NL/NL	NL	**0.66**	--	**0.076**	--	--	--	--	--
TEQ cPAHs	0.1			**0.073**		**0.0102**					

CDM

Table 1
Former Fuel Storage Tank Area
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

Analyte	Regulatory Criteria			Sample I.D., Date Sampled, Sample Depth						
	Method A Cleanup Level [a]	Method B Cleanup Level [b]	Ecological Indicator Soil Concentrations [c]	S16 HB-S16-1/06 01/27/06 1 foot bgs	S17 HB-S17-1/06 01/27/06 1 foot bgs	S18 HB-S18-1/06 01/27/06 1 foot bgs	S18 HB-S44-1/06 [f] 01/27/06 1 foot bgs	HB-S19-1/06 01/27/06 1.3 foot bgs	HB-S20-1/06 01/31/06 1 foot bgs	HB-S35-1/06 [g] 01/31/06 2 feet bgs
NWTPH-Dx (mg/kg)										
Diesel	2,000	NL	200	<36	<33	<1,500	<610	<27	<9,400	<29
Oil as Bunker C	2,000	NL	NL	**2,700**	**1,200**	**56,000**	**28,000**	**360**	**180,000**	<59
PAHs [d] (EPA 8270C/Sim) (mg/kg)										
Naphthalene	5 [e]	NL/1,600	NL	<0.0095	--	--	--	--	--	--
2-Methylnaphthalene	NL	NL/NL	NL	**0.013**	--	--	--	--	--	--
1-Methylnaphthalene	NL	NL/NL	NL	<0.0095	--	--	--	--	--	--
Acenaphthylene	NL	NL/NL	NL	**0.030**	--	--	--	--	--	--
Acenaphthene	NL	NL/4800	20	<0.0095	--	--	--	--	--	--
Fluorene	NL	NL/3200	30	<0.0095	--	--	--	--	--	--
Phenanthrene	NL	NL/NL	NL	**0.057**	--	--	--	--	--	--
Anthracene	NL	NL/24000	NL	**0.026**	--	--	--	--	--	--
Fluoranthene	NL	NL/3200	NL	**0.10**	--	--	--	--	--	--
Pyrene	NL	NL/2,400	NL	**0.097**	--	--	--	--	--	--
Benzo(a)anthracene*	NL	0.137/NL	NL	**0.05**	--	--	--	--	--	--
Chrysene*	NL	0.137/NL	NL	**0.08**	--	--	--	--	--	--
Benzo(b)fluoranthene*	NL	0.137/NL	NL	**0.092**	--	--	--	--	--	--
Benzo(k)fluoranthene*	NL	0.137/NL	NL	**0.036**	--	--	--	--	--	--
Benzo(a)pyrene*	0.1	0.137/NL	12	**0.10**	--	--	--	--	--	--
Indeno(1,2,3-c,d)pyrene*	NL	0.137/NL	NL	**0.12**	--	--	--	--	--	--
Dibenz(a,h)anthracene*	NL	0.137/NL	NL	**0.040**	--	--	--	--	--	--
Benzo(g,h,i)perylene	NL	NL/NL	NL	**0.67**	--	--	--	--	--	--
TEQ cPAHs	0.1			**0.147**						

Note:
Boxed values exceed one or more regulatory criteria.
*Carcinogenic polycyclic aromatic hydrocarbons (cPAHs).
a) Washington Administrative Code Chapter 173-340, Model Toxics Control Act Cleanup Regulation, Method A suggested soil cleanup level for unrestricted land uses; promulgated August 15, 2001.
b) Method B cleanup levels based on Washington State Department of Ecology CLARC tables (November 2001). Risk values based on direct contact. Format: X/Y where X = carcinogenic and Y = noncarcinogenic cleanup level; NL indicates not listed.
c) Washington Administrative Code Chapter 173-340, Model Toxics Control Act Cleanup Regulation, Table 749-3, Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals. Value represents lowest ecological indicator of plant, soil biota, or wildlife (see Appendix F for copy of Table 793-3).
d) Samples analyzed for PAHs were extracted from 6 to 13 days beyond method holding time. Since PAHs in Bunker C oil do not readily biodegrade, the missed holding times are not believed to have substantially altered the sample results and the PAH data are usable.
e) Total for all naphthalenes.
f) HB-S44-1/06 is a duplicate analysis of HB-S18-1/06.
g) Identified as HB-S39-1/06 in laboratory report with collection date of 1/31/06.

bgs - below ground surface.
mg/kg - milligrams per kilogram.
TEQ - toxic equivalency.
NL - not listed.
-- not analyzed.
< - analyte not detected at or greater than the listed concentration.

Table 2
Water Reservoir Mixing Tank Area
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

Analyte	Regulatory Criteria			Sample I.D., Lab I.D., Date Sampled, Sample Depth
	Method A Cleanup Level [a]	Method B Cleanup Level [b]	Ecological Indicator Soil Concentrations [c]	S28 HB-S28-1/08 01/27/08 1 foot bgs
Organochlorine Pesticides (EPA 8081A) (ug/kg)				
alpha-BHC	NL	NL	6,000	<5.4
gamma-BHC	NL	NL	6,000	<5.4
Heptachlor	NL	220/40,000	4,000	<5.4
Aldrin	NL	58/2,400	100	<5.4
beta-BHC	NL	NL	NL	<5.4
delta-BHC	NL	NL	NL	<5.4
Heptachlor epoxide	NL	110/1,040	400	<5.4
Endosulfan I	NL	NL/480,000	NL	<5.4
gamma-Chlordane	NL	NL	1,000	<11
alpha-Chlordane	NL	NL	1,000	<11
4,4'-DDE	NL	2,940/NL	[d]	<11
Dieldrin	NL	62/4,000	70	<11
Endrin	NL	NL/24,000	200	<11
Endosulfan II	NL	NL/480,000	NL	<11
4,4'-DDD	NL	4,170/NL	[d]	<11
4,4'-DDT	3,000	2,940/40,000	[d]	<11
Endrin aldehyde	NL	NL	NL	<11
Endosulfan sulfate	NL	NL	NL	<11
Methoxychlor	NL	NL/400,000	NL	<11
Endrin ketone	NL	NL	NL	<11
Toxaphene	NL	900/NL	NL	<54
DDT/DDD/DDE (total) [d]	NL	NL	750	<11
Organophosphorous Pesticides (EPA 8141A by GM-MS) (ug/kg)				
Dichlorvos	NL	3,400/40,000	NL	<31
Mevinphos	NL	NL/20,000	NL	<31
Ethoprop	NL	NL/NL	NL	<31
Naled	NL	NL/160,000	NL	<31
Sulfotepp	NL	NL/NL	NL	<31
Monocrotophos	NL	NL/NL	NL	<31
Phorate	NL	NL/16,000	NL	<31
Dimethoate	NL	NL/16,000	NL	<31
Demeton-O and -S	NL	NL/3,200	NL	<31
Diazinon	NL	NL/72,000	NL	<31
Disulfoton	NL	NL/3,200	NL	<31
Parathion,methyl	NL	NL/20,000	NL	<31
Ronnel	NL	NL/4,000,000	NL	<31
Chlorpyrifos	NL	NL/240,000	NL	<31
Malathion	NL	NL/1,600,000	NL	<31
Fenthion	NL	NL/NL	NL	<31
Parathion	NL	NL/480,000	NL	<31
Trichloronate	NL	NL/NL	NL	<31
Tetrachlorvinphos	NL	41,600/2,400,000	NL	<31
Merphos	NL	NL/2,400	NL	<31
Tokuthion	NL	NL/NL	NL	<31
Fensulfothion	NL	NL/20,000	NL	<31
Bolstar	NL	NL/NL	NL	<31
EPN	NL	NL/NL	NL	<31
Azinphos,methyl	NL	NL/NL	NL	<31
Coumaphos	NL	NL/NL	NL	<31

Notes:
a) Washington Administrative Code Chapter 173-340, Model Toxics Control Act Cleanup Regulation, Method A suggested soil cleanup level for unrestricted land uses; promulgated August 15, 2001.
b) Method B formula value (direct contact pathway as a carcinogen or noncarcinogen) from the Department of Ecology Publication #94-145, Cleanup Levels and Risk Calculations under the Model Toxics Control Act Cleanup Level Regulation (CLARC Version 3.1). Updated November 2001.
Format: X/Y where X = carcinogenic and Y = noncarcinogenic cleanup level; NL indicates not listed.
c) Washington Administrative Code Chapter 173-340, Model Toxics Control Act Cleanup Regulation, Table 749-3, Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals.
Value represents lowest ecological indicator of plant, soil biota, or wildlife (see Appendix F for copy of Table 793-3).
d) Ecological Indicator Soil Concentration for total of DDT/DDD/DDE.
bgs - below ground surface.
NL - not listed.
µg/kg - micrograms per kilogram.
< - analyte not detected at or greater than the listed concentration.

Table 3
Chemical Mixing Shed Area
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

Analyte	Regulatory Criteria: Method A Cleanup Level [a]	Regulatory Criteria: Method B Cleanup Level [b]	Regulatory Criteria: Ecological Indicator Soil Concentrations [c]	Sample I.D., Lab I.D., Date Sampled, Sample Depth: TP2 HB-TP2-4.5 02/02/06 4.5 feet bgs	S27 HB-S27-1/06 01/27/06 1 foot bgs	S28 HB-S28-1/06 01/27/06 1 foot bgs	S29 HB-S29-1/06 01/27/06 1 foot bgs
Organochlorine Pesticides (EPA 8081A) (µg/kg)							
alpha-BHC	NL	NL	6,000	<6.0	<6.0	<12	<5.9
gamma-BHC	NL	NL	6,000	<6.0	<6.0	<12	<5.9
Heptachlor	NL	220/40,000	4,000	<6.0	<6.0	<12	<5.9
Aldrin	NL	58/2,400	100	<6.0	<6.0	<12	<5.9
beta-BHC	NL	NL	NL	<6.0	<6.0	<12	<5.9
delta-BHC	NL	NL	NL	<6.0	<6.0	<12	<5.9
Heptachlor epoxide	NL	110/1,040	400	<6.0	<6.0	<12	<5.9
Endosulfan I	NL	NL/480,000	NL	<6.0	<6.0	270	<5.9
gamma-Chlordane	NL	NL	1,000	<12	<12	<23	<12
alpha-Chlordane	NL	NL	1,000	<12	<12	<23	<12
4,4'-DDE	NL	2,940/NL	d	<12	<12	51	20
Dieldrin	NL	62/4,000	70	<12	<12	<23	<12
Endrin	NL	NL/24,000	200	<12	<12	<23	<12
Endosulfan II	NL	NL/480,000	NL	<12	<12	200	<12
4,4'-DDD	NL	4,170/NL	d	<12	<12	110	81
4,4'-DDT	3,000	2,940/40,000	d	<12	<12	1,300	150
Endrin aldehyde	NL	NL	NL	<12	<12	<23	<12
Endosulfan sulfate	NL	NL	NL	<12	<12	140	<12
Methoxychlor	NL	NL/400,000	NL	<12	<12	<23	<12
Endrin ketone	NL	NL	NL	<12	<12	<23	<12
Toxaphene	NL	900/NL	NL	<60	<60	<580	<59
DDT/DDD/DDE (total) [d]	NL	NL	750	<12	<12	$\boxed{1,461}$	251
Organophosphorous Pesticides (EPA 8141A by GM-MS) (µg/kg)							
Dichlorvos	NL	3,400/40,000	NL	<33	<32	<33	<31
Mevinphos	NL	NL/20,000	NL	<33	<32	<33	<31
Ethoprop	NL	NL/NL	NL	<33	<32	<33	<31
Naled	NL	NL/160,000	NL	<33	<32	<33	<31
Sulfotepp	NL	NL/NL	NL	<33	<32	<33	<31
Monocrotophos	NL	NL/NL	NL	<33	<32	<33	<31
Phorate	NL	NL/16,000	NL	<33	<32	<33	<31
Dimethoate	NL	NL/16,000	NL	<33	<32	<33	<31
Demeton-O and -S	NL	NL/3,200	NL	<33	<32	<33	<31
Diazinon	NL	NL/72,000	NL	<33	<32	<33	<31
Disulfoton	NL	NL/3,200	NL	<33	<32	<33	<31
Parathion,methyl	NL	NL/20,000	NL	<33	<32	<33	<31
Ronnel	NL	NL/4,000,000	NL	<33	<32	<33	<31
Chlorpyrifos	NL	NL/240,000	NL	<33	<32	<33	<31
Malathion	NL	NL/1,600,000	NL	<33	<32	<33	<31
Fenthion	NL	NL/NL	NL	<33	<32	<33	<31
Parathion	NL	NL/480,000	NL	<33	<32	<33	<31
Trichloronate	NL	NL/NL	NL	<33	<32	<33	<31
Tetrachlorvinphos	NL	41,600/2,400,000	NL	<33	<32	<33	<31
Merphos	NL	NL/2,400	NL	<33	<32	<33	<31
Tokuthion	NL	NL/NL	NL	<33	<32	<33	<31
Fensulfothion	NL	NL/20,000	NL	<33	<32	<33	<31
Bolstar	NL	NL/NL	NL	<33	<32	<33	<31
EPN	NL	NL/NL	NL	<33	<32	<33	<31
Azinphos,methyl	NL	NL/NL	NL	<33	<32	<33	<31
Coumaphos	NL	NL/NL	NL	<33	<32	<33	<31

Notes:
Boxed value exceeds one or more regulatory criteria.
a) Washington Administrative Code Chapter 173-340, Model Toxics Control Act Cleanup Regulation, Method A suggested soil cleanup level for unrestricted land uses; promulgated August 15, 2001.
b) Method B formula value (direct contact pathway as a carcinogen or noncarcinogen) from the Department of Ecology Publication #94-145, Cleanup Levels and Risk Calculations under the Model Toxics Control Act Cleanup Level Regulation CLARC Version 3.1). Updated November 2001. Format: X/Y where X = carcinogenic and Y = noncarcinogenic cleanup level; NL indicates not listed.
c) Washington Administrative Code Chapter 173-340, Model Toxics Control Act Cleanup Regulation, Table 749-3, Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals. Value represents lowest ecological indicator of plant, soil biota, or wildlife (see Appendix F for copy of Table 793-3).
d) Ecological Indicator Soil Concentration for total of DDT/DDD/DDE.
bgs - below ground surface.
NL - not listed.
µg/kg - micrograms per kilogram.
< - analyte not detected at or greater than the listed concentration.

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Table 4
Portable Mixing Tank Area
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

Analyte	Regulatory Criteria: Method A Cleanup Level [a]	Method B Cleanup Level [b]	Ecological Indicator Soil Concentrations [c]	Sample I.D., Lab I.D., Date Sampled, Sample Depth: S30 HB-S30-1/08 01/27/08 0.25 foot bgs	S31 HB-S31-1/08 01/27/08 0.25 foot bgs	S32 HB-S32-1/08 01/27/08 0.25 foot bgs
Organochlorine Pesticides (EPA 8081A) (µg/kg)						
alpha-BHC	NL	NL	6,000	<6.7	<6.8	<7.1
gamma-BHC	NL	NL	6,000	<6.7	<6.8	<7.1
Heptachlor	NL	220/40,000	4,000	<6.7	<6.8	<7.1
Aldrin	NL	58/2,400	100	<6.7	<6.8	<7.1
beta-BHC	NL	NL	NL	<6.7	<6.8	<7.1
delta-BHC	NL	NL	NL	<6.7	<6.8	<7.1
Heptachlor epoxide	NL	110/1,040	400	<6.7	<6.8	<7.1
Endosulfan I	NL	NL/480,000	NL	<6.7	<6.8	<7.1
gamma-Chlordane	NL	NL	1,000	16	<14	<14
alpha-Chlordane	NL	NL	1,000	22	<14	<14
4,4'-DDE	NL	2,940/NL	[d]	<13	<14	<14
Dieldrin	NL	62/4,000	70	<13	<14	<14
Endrin	NL	NL/24,000	200	<13	<14	<14
Endosulfan II	NL	NL/480,000	NL	<13	<14	<14
4,4'-DDD	NL	4,170/NL	[d]	<13	<14	<14
4,4'-DDT	3,000	2,940/40,000	[d]	22	<14	<14
Endrin aldehyde	NL	NL	NL	<13	<14	<14
Endosulfan sulfate	NL	NL	NL	<13	<14	<14
Methoxychlor	NL	NL/400,000	NL	<13	<14	<14
Endrin ketone	NL	NL	NL	<13	<14	<14
Toxaphene	NL	900/NL	NL	<67	<68	<71
DDT/DDD/DDE (total) [d]	NL	NL	750	22	<14	<14
Organophosphorous Pesticides (EPA 8141A by GM-MS) (µg/kg)						
Dichlorvos	NL	3,400/40,000	NL	<33	<33	<32
Mevinphos	NL	NL/20,000	NL	<33	<33	<32
Ethoprop	NL	NL/NL	NL	<33	<33	<32
Naled	NL	NL/160,000	NL	<33	<33	<32
Sulfotepp	NL	NL/NL	NL	<33	<33	<32
Monocrotophos	NL	NL/NL	NL	<33	<33	<32
Phorate	NL	NL/16,000	NL	<33	<33	<32
Dimethoate	NL	NL/16,000	NL	<33	<33	<32
Demeton-O and -S	NL	NL/3,200	NL	<33	<33	<32
Diazinon	NL	NL/72,000	NL	<33	<33	<32
Disulfoton	NL	NL/3,200	NL	<33	<33	<32
Parathion,methyl	NL	NL/20,000	NL	<33	<33	<32
Ronnel	NL	NL/4,000,000	NL	<33	<33	<32
Chlorpyrifos	NL	NL/240,000	NL	<33	<33	<32
Malathion	NL	NL/1,600,000	NL	<33	<33	<32
Fenthion	NL	NL/NL	NL	<33	<33	<32
Parathion	NL	NL/480,000	NL	<33	<33	<32
Trichloronate	NL	NL/NL	NL	<33	<33	<32
Tetrachlorvinphos	NL	41,600/2,400,000	NL	<33	<33	<32
Merphos	NL	NL/2,400	NL	<33	<33	<32
Tokuthion	NL	NL/NL	NL	<33	<33	<32
Fensulfothion	NL	NL/20,000	NL	<33	<33	<32
Bolstar	NL	NL/NL	NL	<33	<33	<32
EPN	NL	NL/NL	NL	<33	<33	<32
Azinphos,methyl	NL	NL/NL	NL	<33	<33	<32
Coumaphos	NL	NL/NL	NL	<33	<33	<32

Note:
a) Washington Administrative Code Chapter 173-340, Model Toxics Control Act Cleanup Regulation,
Method A suggested soil cleanup level for unrestricted land uses; promulgated August 15, 2001.
b) Method B formula value (direct contact pathway as a carcinogen or noncarcinogen) from the
Department of Ecology Publication #94-145, Cleanup Levels and Risk Calculations under the
Model Toxics Control Act Cleanup Level Regulation CLARC Version 3.1). Updated November 2001.
Format: X/Y where X = carcinogenic and Y = noncarcinogenic cleanup level; NL indicates not listed.
c) Washington Administrative Code Chapter 173-340, Model Toxics Control Act Cleanup Regulation, Table 749-3,
Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals.
Value represents lowest ecological indicator of plant, soil biota, or wildlife (see Appendix F for copy of Table 793-3).
d) Ecological Indicator Soil Concentration for total of DDT/DDD/DDE.
bgs - below ground surface.
NL - not listed.
µg/kg - micrograms per kilogram.
< - analyte not detected at or greater than the listed concentration.

Table 5
Experimental Garden/Former Greenhouse Areas
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

Analyte	Regulatory Criteria			Sample I.D., Lab I.D., Date Sampled, Sample Depth	
	Method A Cleanup Level [a]	Method B Cleanup Level [b]	Ecological Indicator Soil Concentrations [c]	S10 HB-S10-1/06 01/31/06 0.25 foot bgs	S34 HB-S34-1/06 01/31/06 0.25 foot bgs
Organochlorine Pesticides (EPA 8081A) (µg/kg)					
alpha-BHC	NL	NL	6,000	<6.8	<6.3
gamma-BHC	NL	NL	6,000	<6.8	<6.3
Heptachlor	NL	220/40,000	4,000	<6.8	<6.3
Aldrin	NL	58/2,400	100	<6.8	<6.3
beta-BHC	NL	NL	NL	<6.8	<6.3
delta-BHC	NL	NL	NL	<6.8	<6.3
Heptachlor epoxide	NL	110/1,040	400	<6.8	<6.3
Endosulfan I	NL	NL/480,000	NL	<6.8	<6.3
gamma-Chlordane	NL	NL	1,000	<14	<13
alpha-Chlordane	NL	NL	1,000	<14	<13
4,4'-DDE	NL	2,940/NL	d	<14	<13
Dieldrin	NL	62/4,000	70	<14	<13
Endrin	NL	NL/24,000	200	<14	<13
Endosulfan II	NL	NL/480,000	NL	<14	<13
4,4'-DDD	NL	4,170/NL	d	<14	<13
4,4'-DDT	3,000	2,940/40,000	d	<14	<13
Endrin aldehyde	NL	NL	NL	<14	<13
Endosulfan sulfate	NL	NL	NL	<14	<13
Methoxychlor	NL	NL/400,000	NL	<14	<13
Endrin ketone	NL	NL	NL	<14	<13
Toxaphene	NL	900/NL	NL	<68	<63
DDT/DDD/DDE (total) [d]	NL	NL	750	<14	<13
Organophosphorous Pesticides (EPA 8141A by GM-MS) (µg/kg)					
Dichlorvos	NL	3,400/40,000	NL	<33	<33
Mevinphos	NL	NL/20,000	NL	<33	<33
Ethoprop	NL	NL/NL	NL	<33	<33
Naled	NL	NL/160,000	NL	<33	<33
Sulfotepp	NL	NL/NL	NL	<33	<33
Monocrotophos	NL	NL/NL	NL	<33	<33
Phorate	NL	NL/16,000	NL	<33	<33
Dimethoate	NL	NL/16,000	NL	<33	<33
Demeton-O and -S	NL	NL/3,200	NL	<33	<33
Diazinon	NL	NL/72,000	NL	<33	<33
Disulfoton	NL	NL/3,200	NL	<33	<33
Parathion,methyl	NL	NL/20,000	NL	<33	<33
Ronnel	NL	NL/4,000,000	NL	<33	<33
Chlorpyrifos	NL	NL/240,000	NL	<33	<33
Malathion	NL	NL/1,600,000	NL	<33	<33
Fenthion	NL	NL/NL	NL	<33	<33
Parathion	NL	NL/480,000	NL	<33	<33
Trichloronate	NL	NL/NL	NL	<33	<33
Tetrachlorvinphos	NL	41,600/2,400,000	NL	<33	<33
Merphos	NL	NL/2,400	NL	<33	<33
Tokuthion	NL	NL/NL	NL	<33	<33
Fensulfothion	NL	NL/20,000	NL	<33	<33
Bolstar	NL	NL/NL	NL	<33	<33
EPN	NL	NL/NL	NL	<33	<33
Azinphos,methyl	NL	NL/NL	NL	<33	<33
Coumaphos	NL	NL/NL	NL	<33	<33

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Table 5
Experimental Garden/Former Greenhouse Areas
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

Analyte	Regulatory Criteria			Sample I.D., Lab I.D., Date Sampled, Sample Depth	
	Method A Cleanup Level [a]	Method B Cleanup Level [b]	Ecological Indicator Soil Concentrations [c]	S10 HB-S10-1/06 01/31/06 0.25 foot bgs	S34 HB-S34-1/06 01/31/06 0.25 foot bgs
Chlorinated Acid Herbicides (EPA 8151A) (µg/kg)					
Dalapon	NL	NL/2,400,000	NL	--	<290
Dicamba	NL	NL/2,400,000	NL	--	<59
MCPP	NL	NL	NL	--	<12,000
MMPA	NL	NL	NL	--	<12,000
Dichlorprop	NL	NL	NL	--	<60
2,4-D	NL	NL	NL	--	<59
Pentachloropenol	NL	NL/8,300	3,000	--	<1.2
2,4,5-TP (Silvex)	NL	NL	NL	--	<60
2,4,5-T	NL	NL	NL	--	<60
2,4-DB	NL	NL/640,000	NL	--	<60
Dinoseb	NL	NL/80,000	NL	--	<60
Total Metals (EPA 6010B) (mg/kg)					
Arsenic	20	0.66/24	10	<14	<13
Cadmium	2	NL/80	4	<0.68	<0.63
Lead	250	NL/NL	50	**32**	**22**

Notes:
a) Washington Administrative Code Chapter 173-340, Model Toxics Control Act Cleanup Regulation, Method A suggested soil cleanup level for unrestricted land uses; promulgated August 15, 2001.
b) Method B formula value (direct contact pathway as a carcinogen or noncarcinogen) from the Department of Ecology Publication #94-145, Cleanup Levels and Risk Calculations under the Model Toxics Control Act Cleanup Level Regulation CLARC Version 3.1). Updated November 2001. Format: X/Y where X = carcinogenic and Y = noncarcinogenic cleanup level; NL indicates not listed.
c) Washington Administrative Code Chapter 173-340, Model Toxics Control Act Cleanup Regulation, Table 749-3, Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals. Value represents lowest ecological indicator of plant, soil biota, or wildlife (see Appendix F for copy of Table 793-3).
d) Ecological Indicator Soil Concentration for total of DDT/DDD/DDE.

bgs - below ground surface.
NL - not listed.
mg/kg - milligrams per kilogram.
µg/kg - micrograms per kilogram.
-- not analyzed.
< - analyte not detected at or greater than the listed concentration.

Table 6
Storage Shed with Chemical Containers
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

Analyte	Regulatory Criteria			Sample I.D., Lab I.D., Date Sampled, Sample Depth	
				S38	
	Method A Cleanup Level [a]	Method B Cleanup Level [b]	Ecological Indicator Soil Concentrations [c]	HB-S38-1/06 01/27/06 1 foot bgs	HB-S46-1/06 [d] 01/27/06 1 foot bgs
NWTPH-HCID					
Gasoline	N/A	N/A	N/A	ND	ND
Diesel	N/A	N/A	N/A	ND	ND
Lube Oil	N/A	N/A	N/A	ND	ND
Volatile Organic Compounds (EPA 8260B) (mg/kg)					
Dichlorodifluoromethane	NL	NL/N16,000	NL	<0.0011	<0.0011
Chloromethane	NL	76.9/NL	NL	<0.0011	<0.0011
Vinyl Chloride	NL	0.6/240	NL	<0.0011	<0.0011
Bromomethane	NL	NL/112	NL	<0.0011	<0.0011
Chloroethane	NL	NL/NL	NL	<0.0011	<0.0011
Trichlorofluoromethane	NL	NL/24,000	NL	<0.0011	<0.0011
1,1-Dichloroethene	NL	1.6/720	NL	<0.0011	<0.0011
Acetone	NL	NL/8,000	NL	<0.0054	<0.0053
Iodomethane	NL	NL/NL	NL	<0.0054	<0.0053
Carbon Disulfide	NL	NL/8,000	NL	<0.0011	<0.0011
Methylene Chloride	0.02	133/4,800	NL	<0.0054	<0.0053
trans-1,2-Dichloroethene	NL	NL/1,600	NL	<0.0011	<0.0011
Methyl-t-Butyl Ether	0.1	NL/NL	NL	<0.0011	<0.0011
1,1-Dichloroethane	NL	NL/8,000	NL	<0.0011	<0.0011
Vinyl Acetate	NL	NL/80,000	NL	<0.0054	<0.0053
2,2-Dichloropropane	NL	NL/NL	NL	<0.0011	<0.0011
cis-1,2-Dichloroethene	NL	NL/800	NL	<0.0011	<0.0011
2-Butanone	NL	NL/NL	NL	<0.0054	<0.0053
Bromochloromethane	NL	16.1/1600	NL	<0.0011	<0.0011
Chloroform	NL	163/800	NL	<0.0011	<0.0011
1,1,1-Trichloroethane	2	NL/72,000	NL	<0.0011	<0.0011
Carbon Tetrachloride	NL	7.69/56	NL	<0.0011	<0.0011
1,1-Dichloropropene	NL	NL/NL	NL	<0.0011	<0.0011
Benzene	0.03	18.1/240	NL	<0.0011	<0.0011
1,2-Dichloroethane	NL	10.9/NL	NL	<0.0011	<0.0011
Trichloroethene	0.03	90.9/NL	NL	<0.0011	<0.0011
1,2-Dichloropropane	NL	14.7/NL	700	<0.0011	<0.0011
Dibromomethane	NL	NL/NL	NL	<0.0011	<0.0011
Bromodichloromethane	NL	16.1/1600	NL	<0.0011	<0.0011
2-Chloroethyl Vinyl Ether	NL	NL/NL	NL	<0.0054	<0.0053
cis-1,3-Dichloropropene	NL	5.5/2400	NL	<0.0011	<0.0011
Methyl Isobutyl Ketone	NL	NL/6,400	NL	<0.0054	<0.0053
Toluene	7	NL/16,000	NL	<0.0011	<0.0011
trans-1,3-Dichloropropene	NL	5.5/2400	NL	<0.0011	<0.0011
1,1,2-Trichloroethane	NL	17.5/320	NL	<0.0011	<0.0011
Tetrachloroethene	0.05	19.6/800	200	<0.0011	<0.0011
1,3-Dichloropropane	NL	NL/NL	NL	<0.0011	<0.0011
2-Hexanone	NL	NL/NL	NL	<0.0054	<0.0053
Dibromochloromethane	NL	11.9/1600	NL	<0.0011	<0.0011
1,2-Dibromoethane	NL	NL/NL	NL	<0.0011	<0.0011

Table 6
Storage Shed with Chemical Containers
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

	Regulatory Criteria			Sample I.D., Lab I.D., Date Sampled, Sample Depth	
				S38	
Analyte	Method A Cleanup Level[a]	Method B Cleanup Level[b]	Ecological Indicator Soil Concentrations[c]	HB-S38-1/06 01/27/06 1 foot bgs	HB-S46-1/06[d] 01/27/06 1 foot bgs
Chlorobenzene	NL	NL/1,600	NL	<0.0011	<0.0011
1,1,1,2-Tetrachloroethane	NL	38.4/2,400	NL	<0.0011	<0.0011
Ethylbenzene	6	NL/8,000	NL	<0.0011	<0.0011
m,p-Xylene	9[d]	NL/160,000	NL	<0.0022	<0.0021
o-Xylene		NL/160,000	NL	<0.0011	<0.0011
Styrene	NL	33.3/16,000	300	<0.0011	<0.0011
Bromoform	NL	126.5/1,600	NL	<0.0011	<0.0011
Isopropylbenzene	NL	NL/NL	NL	<0.0011	<0.0011
Bromobenzene	NL	NL/NL	NL	<0.0011	<0.0011
1,1,2,2-Tetrachloroethane	NL	5/NL	NL	<0.0011	<0.0011
1,2,3-Trichloropropane	NL	0.14/480	NL	<0.0011	<0.0011
n-Propylbenzene	NL	NL/NL	NL	<0.0011	<0.0011
2-Chlorotoluene	NL	NL/NL	NL	<0.0011	<0.0011
4-Chlorotoluene	NL	NL/NL	NL	<0.0011	<0.0011
1,3,5-Trimethylbenzene	NL	NL/NL	NL	<0.0011	<0.0011
tert-Butylbenzene	NL	NL/NL	NL	<0.0011	<0.0011
1,2,4-Trimethylbenzene	NL	NL/NL	NL	<0.0011	<0.0011
sec-Butylbenzene	NL	NL/NL	NL	<0.0011	<0.0011
1,3-Dichlorobenzene	NL	NL/NL	NL	<0.0011	<0.0011
p-Isopropyltoluene	NL	NL/NL	NL	<0.0011	<0.0011
1,4-Dichlorobenzene	NL	41.6/NL	20	<0.0011	<0.0011
1,2-Dichlorobenzene	NL	NL/7,200	NL	<0.0011	<0.0011
n-Butylbenzene	NL	NL/NL	NL	<0.0011	<0.0011
1,2-Dibromo-3-chloropropane	NL	0.71/NL	NL	<0.0054	<0.0053
1,2,4-Trichlorobenzene	NL	NL/800	20	<0.0011	<0.0011
Hexachlorobutadiene	NL	12.8/16	NL	<0.0054	<0.0053
Naphthalene	5	NL/1,600	NL	<0.0011	<0.0011
1,2,3-Trichlorobenzene	NL	NL/NL	20	<0.0011	<0.0011

Notes:
a) Washington Administrative Code Chapter 173-340, Model Toxics Control Act Cleanup Regulation, Method A suggested soil cleanup level for unrestricted land uses; promulgated August 15, 2001.
b) Method B formula value (direct contact pathway as a carcinogen or noncarcinogen) from the Department of Ecology Publication #94-145, Cleanup Levels and Risk Calculations under the Model Toxics Control Act Cleanup Level Regulation (CLARC Version 3.1). Updated November 2001. Format: X/Y where X = carcinogenic and Y = noncarcinogenic cleanup level;
c) Washington Administrative Code Chapter 173-340, Model Toxics Control Act Cleanup Regulation, Table 749-3, Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals. Value represents lowest ecological indicator of plant, soil biota, or wildlife (see Appendix F for copy of Table 793-3).
d) HB-S46-1/06 is a duplicate analysis of HB-S38-1/06.
NWTPH-HCID - hydrocarbon identification method.
mg/kg - milligrams per kilogram.
N/A - not applicable.
NL - not listed.
< - analyte not detected at or greater than the listed concentration.

Table 7
Greenhouse Areas
King County/Site Assessment - Harrington-Beall Greenhouse Site
Vashon Island, Washington

		Regulatory Criteria			Sample I.D., Lab I.D., Date Sampled, Sample Depth									
					S1	S2	S3	S4		S5	S6	S7	S8	S9
Analyte	Date Sampled	Method A Cleanup Level[a]	Method B Cleanup Level[b]	Ecological Indicator Soil Concentrations[c]	HB-S1-1/06 01/26/06 0.25 foot bgs	HB-S2-1/06 01/26/06 0.25 foot bgs	HB-S3-1/06 01/26/06 0.25 foot bgs	HB-S4-1/06 01/26/06 0.25 foot bgs	HB-S12-1/06[d] 01/26/06 0.25 foot bgs	HB-S5-1/06 01/26/06 0.25 foot bgs	HB-S6-1/06 01/26/06 0.25 foot bgs	HB-S7-1/06 01/26/06 0.25 foot bgs	HB-S8-1/06 01/26/06 0.25 foot bgs	HB-S9-1/06 01/26/06 0.25 foot bgs
Organochlorine Pesticides (EPA 8081A) (µg/kg)														
alpha-BHC	01/26/06	NL	NL	6,000	<6.7	<6.9	<6.8	<6.1	<6.1	<6.5	<6.5	<6.8	<6.0	<6.7
gamma-BHC	01/26/06	NL	NL	6,000	**25**	**16**	**18**	**89**	**75**	**15**	<6.5	<6.8	<6.0	**17**
Heptachlor	01/26/06	NL	220/40,000	4,000	<6.7	<6.9	<6.8	<6.1	<6.1	<6.5	<6.5	<6.8	<6.0	<6.7
Aldrin	01/26/06	NL	58/2,400	100	<6.7	<6.9	<6.8	<6.1	<6.1	<6.5	<6.5	<6.8	<6.0	<6.7
beta-BHC	01/26/06	NL	NL	NL	<6.7	<6.9	<6.8	<6.1	<6.1	<6.5	<6.5	<6.8	<6.0	<6.7
delta-BHC	01/26/06	NL	NL	NL	<6.7	<6.9	<6.8	<6.1	<6.1	<6.5	<6.5	<6.8	<6.0	<6.7
Heptachlor epoxide	01/26/06	NL	110/1,040	400	**11**	<6.9	<6.8	<6.1	<6.1	<6.5	<6.5	<6.8	<6.0	<6.7
Endosulfan I	01/26/06	NL	NL/480,000	NL	<6.7	<6.9	<6.8	<6.1	<6.1	<6.5	<6.5	<6.8	<6.0	<6.7
4,4'-DDE	01/26/06	NL	2,940/NL	[e]	**320**	**240**	**310**	**380**	**340**	**630**	**1,800**	**280**	**150**	**47**
Dieldrin	01/26/06	NL	62/4,000	70	**51**	<14	<14	<12	<12	<13	<13	<14	<12	<13
Endrin	01/26/06	NL	NL/24,000	200	<13	<14	<14	<12	<12	<13	<13	<14	<12	<13
Endosulfan II	01/26/06	NL	NL/480,000	NL	<13	<14	<14	<12	<12	<13	<13	<14	<12	<13
4,4'-DDD	01/26/06	NL	4,170/NL	[e]	**75**	**58**	**90**	**86**	**290**	**110**	**260**	**110**	**130**	**17**
4,4'-DDT	01/26/06	3,000	2,940/40,000	[e]	**340**	**320**	**230**	**1,800**	**1,700**	**2,000**	**9,200**	**320**	**350**	**50**
Endrin aldehyde	01/26/06	NL	NL	NL	<13	<14	<14	<12	<12	<13	<13	<14	<12	<13
Endosulfan sulfate	01/26/06	NL	NL	NL	<13	<14	<14	<12	<12	<13	<13	<14	<12	<13
Methoxychlor	01/26/06	NL	NL/400,000	NL	<13	<14	<14	<12	<12	<13	<13	<14	<12	<13
Endrin ketone	01/26/06	NL	NL	NL	<13	<14	<14	<12	<12	<13	<13	<14	<12	<13
Toxaphene	01/26/06	NL	900/NL	NL	<130	<140	<140	<120	<120	<130	<130	<140	<120	<130
Chlordane (Technical)	01/26/06	NL	NL	NL	<67	<69	<68	<61	<61	<65	<65	<68	<60	<67
DDT/DDD/DDE (total)[e]	01/26/06	NL	NL	750	**735**	**618**	**630**	**2,266**	**2,330**	**2,740**	**11,260**	**710**	**630**	**114**
Organophosphorous Pesticide (EPA 8141A GC-MS) (µg/kg)														
Dichlorvos	01/26/06	NL	3,400/40,000	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Mevinphos	01/26/06	NL	NL/20,000	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Ethoprop	01/26/06	NL	NL/NL	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Naled	01/26/06	NL	NL/160,000	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Sulfotepp	01/26/06	NL	NL/NL	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Monocrotophos	01/26/06	NL	NL/NL	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Phorate	01/26/06	NL	NL/16,000	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Dimethoate	01/26/06	NL	NL/16,000	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Demeton-O and -S	01/26/06	NL	NL/3,200	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Diazinon	01/26/06	NL	NL/72,000	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Disulfoton	01/26/06	NL	NL/3,200	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Parathion,methyl	01/26/06	NL	NL/20,000	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Ronnel	01/26/06	NL	NL/4,000,000	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Chlorpyrifos	01/26/06	NL	NL/240,000	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Malathion	01/26/06	NL	NL/1,600,000	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Fenthion	01/26/06	NL	NL/NL	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Parathion	01/26/06	NL	NL/480,000	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Trichloronate	01/26/06	NL	NL/NL	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Tetrachlorvinphos	01/26/06	NL	41,600/2,400,000	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Merphos	01/26/06	NL	NL/2,400	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32

Table 7
Greenhouse Areas
King County/Site Assessment - Harrington-Beall Greenhouse Site
Vashon Island, Washington

Analyte	Date Sampled	Regulatory Criteria: Method A Cleanup Level[a]	Method B Cleanup Level[b]	Ecological Indicator Soil Concentrations[c]	Sample I.D., Lab I.D., Date Sampled, Sample Depth: S1 HB-S1-1/06 01/26/06 0.25 foot bgs	S2 HB-S2-1/06 01/26/06 0.25 foot bgs	S3 HB-S3-1/06 01/26/06 0.25 foot bgs	S4 HB-S4-1/06 01/26/06 0.25 foot bgs	S4 HB-S12-1/06[d] 01/26/06 0.25 foot bgs	S5 HB-S5-1/06 01/26/06 0.25 foot bgs	S6 HB-S6-1/06 01/26/06 0.25 foot bgs	S7 HB-S7-1/06 01/26/06 0.25 foot bgs	S8 HB-S8-1/06 01/26/06 0.25 foot bgs	S9 HB-S9-1/06 01/26/06 0.25 foot bgs
Tokuthion	01/26/06	NL	NL/NL	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Fensulfothion	01/26/06	NL	NL/20,000	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Bolstar	01/26/06	NL	NL/NL	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
EPN	01/26/06	NL	NL/NL	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Azinphos,methyl	01/26/06	NL	NL/NL	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Coumaphos	01/26/06	NL	NL/NL	NL	<32	<33	<32	<33	<33	<33	<33	<32	<33	<32
Chlorinated Acid Herbicides (EPA 8151A) (µg/kg)														
Dalapon	01/26/06	NL	NL/2,400,000	NL	–	–	<310	<280	<280	–	–	–	<280	<310
Dicamba	01/26/06	NL	NL/2,400,000	NL	–	–	<64	<57	<57	–	–	–	<57	<63
MCPP	01/26/06	NL	NL	NL	–	–	<6,300	<5,700	<5,700	–	–	–	<5,700	<6,300
MCPA	01/26/06	NL	NL	NL	–	–	<6,300	<5,700	<5,700	–	–	–	<5,700	<6,200
Dichlorprop	01/26/06	NL	NL	NL	–	–	<64	<58	<58	–	–	–	<57	<63
2,4-D	01/26/06	NL	NL	NL	–	–	<64	<57	<57	–	–	–	<57	<63
Pentachlorophenol	01/26/06	NL	NL/8,300	3,000	–	–	<1.3	<1.2	<1.2	–	–	–	<1.1	<1.3
2,4,5-TP (Silvex)	01/26/06	NL	NL	NL	–	–	<64	<58	<58	–	–	–	<57	<63
2,4,5-T	01/26/06	NL	NL/640,000	NL	–	–	<64	<58	<58	–	–	–	<57	<63
2,4-DB	01/26/06	NL	NL/80,000	NL	–	–	<64	<58	<58	–	–	–	<57	<63
Dinoseb	01/26/06	NL			–	–	<64	<58	<58	–	–	–	<57	<63
Total Metals (EPA 6010B) (mg/kg)														
Arsenic	01/26/06	20	0.66/24	10	–	–	22	17	17	–	–	–	21	<13
Cadmium	01/26/06	2	NL/80	4	–	–	0.85	0.80	0.75	–	–	–	0.75	<0.67
Lead	01/26/06	250	NL/NL	50	–	–	170	130	140	–	–	–	110	110

Notes:
Boxed values exceed one or more regulatory criteria.
a) Washington Administrative Code Chapter 173-340, Model Toxics Control Act Cleanup Regulation, Method A suggested soil cleanup level for unrestricted land uses; promulgated August 15, 2001.
b) Method B formula value (direct contact pathway as a carcinogen or noncarcinogen) from the Department of Ecology Publication #94-145, Cleanup Levels and Risk Calculations under the Model Toxics Control Act Cleanup Level Regulation CLARC Version 3.1). Updated November 2001. Format: X/Y where X = carcinogenic and Y = noncarcinogenic cleanup level; NL indicates not listed.
c) Washington Administrative Code Chapter 173-340, Model Toxics Control Act Cleanup Regulation, Table 749-3, Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals. Value represents lowest ecological indicator of plant, soil biota, or wildlife (see Appendix F for copy of Table 793-3).
d) HB-S12-1/06 is a duplicate analysis of HB-S4-1/06.
e) Ecological Indicator Soil Concentration for total of DDT/DDD/DDE.
bgs - below ground surface.
NL - not listed.
µg/kg - micrograms per kilogram.
mg/kg - milligrams per kilogram.
– not sampled.
< - analyte not detected at or greater than the listed concentration.

Table 8
Exterior Open Areas
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

Analyte	Method A Cleanup Level [a]	Method B Cleanup Level [b]	Ecological Indicator Soil Concentrations [c]	S39 HB-S39-1/06 01/27/06 0.25 foot bgs	S40 HB-S40-1/06 01/27/06 0.25 foot bgs
	Regulatory Criteria			Sample I.D., Lab I.D., Date Sampled, Sample Depth	
Chlorinated Acid Herbicides (EPA 8151A) (µg/kg)					
Dalapon	NL	NL/2,400,000	NL	<280	<280
Dicamba	NL	NL/2,400,000	NL	<57	<58
MCPP	NL	NL	NL	<5,700	<5,800
MCPA	NL	NL	NL	<5,700	<5,800
Dichlorprop	NL	NL	NL	<57	<58
2,4-D	NL	NL	NL	<57	<58
Pentachlorophenol	NL	NL/8,300	3,000	**13**	**31**
2,4,5-TP (Silvex)	NL	NL	NL	<57	<59
2,4,5-T	NL	NL/640,000	NL	<57	<59
2,4-DB	NL	NL/80,000	NL	<57	<59
Dinoseb				<57	<59
Total Metals (EPA 6010B) (mg/kg)					
Arsenic	20	0.66/24	10	**30**	<12
Cadmium	2	NL/80	4	**1.6**	**0.66**
Lead	250	NL/NL	50	**1,100** DISCOUNT	**170**

Notes:
a) Washington Administrative Code Chapter 173-340, Model Toxics Control Act Cleanup Regulation, Method A suggested soil cleanup level for unrestricted land uses; promulgated August 15, 2001.
b) Method B formula value (direct contact pathway as a carcinogen or noncarcinogen) from the Department of Ecology Publication #94-145, Cleanup Levels and Risk Calculations under the Model Toxics Control Act Cleanup Level Regulation CLARC Version 3.1). Updated November 2001. Format: X/Y where X = carcinogenic and Y = noncarcinogenic cleanup level; NL indicates not listed.
c) Washington Administrative Code Chapter 173-340, Model Toxics Control Act Cleanup Regulation, Table 749-3, Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals. Value represents lowest ecological indicator of plant, soil biota, or wildlife (see Appendix F for copy of Table 793-3).

mg/kg - milligrams per kilogram.
µg/kg - micrograms per kilogram.
NL - not listed.
< - analyte not detected at or greater than the listed concentration.

Table 9
Former Lab Locations
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

	Regulatory Criteria			Sample I.D., Lab I.D., Date Sampled, Sample Depth	
Analyte	Method A Cleanup Level [a]	Method B Cleanup Level [b]	Ecological Indicator Soil Concentrations [c]	S41 HB-S41-1/08 01/27/08 1 foot bgs	S42 HB-S42-1/08 01/27/08 1 foot bgs
Organochlorine Pesticides (EPA 8081A) (µg/kg)					
alpha-BHC	NL	NL	6,000	<6.3	<6.1
gamma-BHC	NL	NL	6,000	<6.3	<6.1
Heptachlor	NL	220/40,000	4,000	<6.3	<6.1
Aldrin	NL	58/2,400	100	<6.3	<6.1
beta-BHC	NL	NL	NL	<6.3	<6.1
delta-BHC	NL	NL	NL	<6.3	<6.1
Heptachlor epoxide	NL	110/1,040	400	<6.3	<6.1
Endosulfan I	NL	NL/480,000	NL	<6.3	<6.1
gamma-Chlordane	NL	NL	1,000	<13	<12
alpha-Chlordane	NL	NL	1,000	<13	<12
4,4'-DDE	NL	2,940/NL	d	<13	63
Dieldrin	NL	62/4,000	70	<13	<12
Endrin	NL	NL/24,000	200	<13	<12
Endosulfan II	NL	NL/480,000	NL	<13	<12
4,4'-DDD	NL	4,170/NL	d	<13	<12
4,4'-DDT	3,000	2,940/40,000	d	<13	<12
Endrin aldehyde	NL	NL	NL	<13	<12
Endosulfan sulfate	NL	NL	NL	<13	<12
Methoxychlor	NL	NL/400,000	NL	<13	<12
Endrin ketone	NL	NL	NL	<13	<12
Toxaphene	NL	900/NL	NL	<63	<61
DDT/DDD/DDE (total) [d]	NL	NL	750	<13	63
Organophosphorous Pesticides (EPA 8141A by GM-MS) (µg/kg)					
Dichlorvos	NL	3,400/40,000	NL	<33	<33
Mevinphos	NL	NL/20,000	NL	<33	<33
Ethoprop	NL	NL/NL	NL	<33	<33
Naled	NL	NL/160,000	NL	<33	<33
Sulfotepp	NL	NL/NL	NL	<33	<33
Monocrotophos	NL	NL/NL	NL	<33	<33
Phorate	NL	NL/16,000	NL	<33	<33
Dimethoate	NL	NL/16,000	NL	<33	<33
Demeton-O and -S	NL	NL/3,200	NL	<33	<33
Diazinon	NL	NL/72,000	NL	<33	<33
Disulfoton	NL	NL/3,200	NL	<33	<33
Parathion,methyl	NL	NL/20,000	NL	<33	<33
Ronnel	NL	NL/4,000,000	NL	<33	<33
Chlorpyrifos	NL	NL/240,000	NL	<33	<33
Malathion	NL	NL/1,600,000	NL	<33	<33
Fenthion	NL	NL/NL	NL	<33	<33
Parathion	NL	NL/480,000	NL	<33	<33
Trichloronate	NL	NL/NL	NL	<33	<33
Tetrachlorvinphos	NL	41,600/2,400,000	NL	<33	<33
Merphos	NL	NL/2,400	NL	<33	<33
Tokuthion	NL	NL/NL	NL	<33	<33
Fensulfothion	NL	NL/20,000	NL	<33	<33
Bolstar	NL	NL/NL	NL	<33	<33
EPN	NL	NL/NL	NL	<33	<33
Azinphos,methyl	NL	NL/NL	NL	<33	<33
Coumaphos	NL	NL/NL	NL	<33	<33

Note:
a) Washington Administrative Code Chapter 173-340, Model Toxics Control Act Cleanup Regulation, Method A suggested soil cleanup level for unrestricted land uses; promulgated August 15, 2001.
b) Method B formula value (direct contact pathway as a carcinogen or noncarcinogen) from the Department of Ecology Publication #94-145, Cleanup Levels and Risk Calculations under the Model Toxics Control Act Cleanup Level Regulation CLARC Version 3.1). Updated November 2001. Format: X/Y where X = carcinogenic and Y = noncarcinogenic cleanup level; NL indicates not listed.
c) Washington Administrative Code Chapter 173-340, Model Toxics Control Act Cleanup Regulation, Table 749-3, Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals. Value represents lowest ecological indicator of plant, soil biota, or wildlife (see Appendix F for copy of Table 793-3).
d) Ecological Indicator Soil Concentration for total of DDT/DDD/DDE.
bgs - below ground surface.
NL - not listed.
µg/kg - micrograms per kilogram.
< - analyte not detected at or greater than the listed concentration.

Table 10
Asbestos in Soil
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

Analyte	Sample I.D., Lab I.D., Date Sampled, Sample Depth					
	S21 HB-S21-1/06 01/27/06 0.2 foot bgs	S22 HB-S22-1/06 01/27/06 0.2 foot bgs	S23 HB-S23-1/06 01/27/06 0.2 foot bgs	S24 HB-S24-1/06 01/27/06 0.2 foot bgs	S25 HB-S25-1/06 01/27/06 0.2 foot bgs	S25 HB-S43-1/06 [a] 01/27/06 0.2 foot bgs
Asbestos Fibers Present	**Chrysotile**	None detected	**Chrysotile**	**Amosite**	None detected	None detected
Non-asbestos Fibers	Cellulose	Cellulose	Cellulose	Cellulose	Cellulose	Cellulose
Non-fibrous Components	Miscellaneous organic and inorganic debris	Miscellaneous organic and inorganic debris	Miscellaneous organic and inorganic debris	Miscellaneous organic and inorganic debris	Miscellaneous organic and inorganic debris	Miscellaneous organic and inorganic debris

Note:
Samples were analyzed for percent asbestos by polarized light microscopy/dispersion staining using EPA Methods 600/M4-82-020 and 600/R-93/116.
a) HB-S43-1/06 is a duplicate analysis of HB-S25-1/06.

Table 11
Soil Stockpiles
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

	Regulatory Criteria			Sample I.D., Lab I.D., Date Sampled, Sample Depth		
Analyte	Method A Cleanup Level [a]	Method B Cleanup Level [b]	Ecological Indicator Soil Concentrations [c]	S11 HB-S11-1/06 01/26/06 1 foot bgs	S33 HB-S33-1/06 01/27/06 1 foot bgs	S45 HB-S45-1/06 01/27/06 1 foot bgs
Organochlorine Pesticides (EPA 8081A) (µg/kg)						
alpha-BHC	NL	NL	6,000	<6.3	<6.3	<6.3
gamma-BHC	NL	NL	6,000	<6.3	<6.3	<6.3
Heptachlor	NL	220/40,000	4,000	<6.3	<6.3	<6.3
Aldrin	NL	58/2,400	100	<6.3	<6.3	<6.3
beta-BHC	NL	NL	NL	<6.3	<6.3	<6.3
delta-BHC	NL	NL	NL	<6.3	<6.3	<6.3
Heptachlor epoxide	NL	110/1,040	400	<6.3	<6.3	<6.3
Endosulfan I	NL	NL/480,000	NL	<6.3	<6.3	<6.3
gamma-Chlordane	NL	NL	1,000	<13	<13	<13
alpha-Chlordane	NL	NL	1,000	<13	<13	<13
4,4'-DDE	NL	2,940/NL	d	**130**	<13	**45**
Dieldrin	NL	0.062/4.0	70	<13	<13	<13
Endrin	NL	NL/24,000	200	<13	<13	<13
Endosulfan II	NL	NL/480,000	NL	<13	<13	<13
4,4'-DDD	NL	4,170/NL	d	**78**	<13	**170**
4,4'-DDT	3,000	2,940/40,000	d	**430**	<13	**1,400**
Endrin aldehyde	NL	NL	NL	<13	<13	<13
Endosulfan sulfate	NL	NL	NL	<13	<13	**21**
Methoxychlor	NL	NL/400,000	NL	<13	<13	<13
Endrin ketone	NL	NL	NL	<13	<13	<13
Toxaphene	NL	900/NL	NL	<63	<63	<63
DDT/DDD/DDE (total) [d]	NL	NL	750	**638**	<13	**1,615**
Organophosphorous Pesticides (EPA 8141A by GM-MS) (µg/kg)						
Dichlorvos	NL	3,400/40,000	NL	<32	<33	<31
Mevinphos	NL	NL/20,000	NL	<32	<33	<31
Ethoprop	NL	NL/NL	NL	<32	<33	<31
Naled	NL	NL/160,000	NL	<32	<33	<31
Sulfotepp	NL	NL/NL	NL	<32	<33	<31
Monocrotophos	NL	NL/NL	NL	<32	<33	<31
Phorate	NL	NL/16,000	NL	<32	<33	<31
Dimethoate	NL	NL/16,000	NL	<32	<33	<31
Demeton-O and -S	NL	NL/3,200	NL	<32	<33	<31
Diazinon	NL	NL/72,000	NL	<32	<33	<31
Disulfoton	NL	NL/3,200	NL	<32	<33	<31
Parathion,methyl	NL	NL/20,000	NL	<32	<33	<31
Ronnel	NL	NL/4,000,000	NL	<32	<33	<31
Chlorpyrifos	NL	NL/240,000	NL	<32	<33	<31
Malathion	NL	NL/1,600,000	NL	<32	<33	<31
Fenthion	NL	NL/NL	NL	<32	<33	<31
Parathion	NL	NL/480,000	NL	<32	<33	<31
Trichloronate	NL	NL/NL	NL	<32	<33	<31
Tetrachlorvinphos	NL	41,600/2,400,000	NL	<32	<33	<31
Merphos	NL	NL/2,400	NL	<32	<33	<31
Tokuthion	NL	NL/NL	NL	<32	<33	<31
Fensulfothion	NL	NL/20,000	NL	<32	<33	<31
Bolstar	NL	NL/NL	NL	<32	<33	<31
EPN	NL	NL/NL	NL	<32	<33	<31
Azinphos,methyl	NL	NL/NL	NL	<32	<33	<31
Coumaphos	NL	NL/NL	NL	<32	<33	<31

CDM

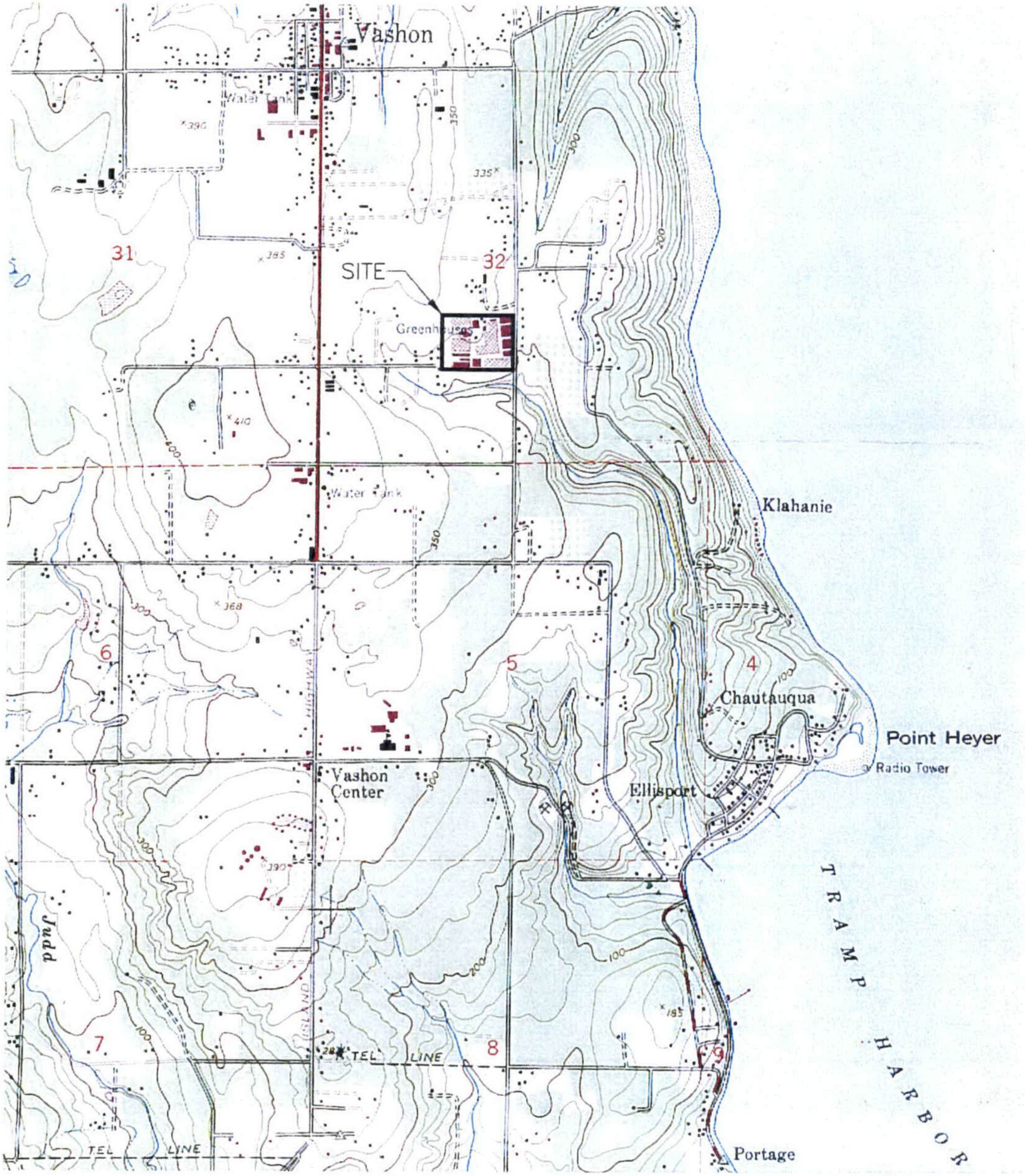
Table 11
Soil Stockpiles
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

Analyte	Regulatory Criteria			Sample I.D., Lab I.D., Date Sampled, Sample Depth		
	Method A Cleanup Level [a]	Method B Cleanup Level [b]	Ecological Indicator Soil Concentrations [c]	S11 HB-S11-1/06 01/26/06 1 foot bgs	S33 HB-S33-1/06 01/27/06 1 foot bgs	S45 HB-S45-1/06 01/27/06 1 foot bgs
Total Metals (EPA 6010B) (mg/kg)						
Arsenic	20	0.66/24	10	–	<13	20
Cadmium	2	NL/80	4	–	<0.63	1.5
Lead	250	NL/NL	50	–	27	780

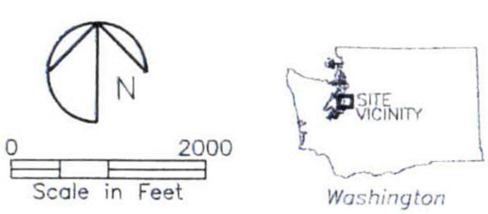
Notes:
Boxed values exceed one or more regulatory criteria.
a) Washington Administrative Code Chapter 173-340, Model Toxics Control Act Cleanup Regulation, Method A suggested soil cleanup level for unrestricted land uses; promulgated August 15, 2001.
b) Method B formula value (direct contact pathway as a carcinogen or noncarcinogen) from the Department of Ecology Publication #94-145, Cleanup Levels and Risk Calculations under the Model Toxics Control Act Cleanup Level Regulation CLARC Version 3.1). Updated November 2001. Format: X/Y where X = carcinogenic and Y = noncarcinogenic cleanup level; NL indicates not listed.
c) Washington Administrative Code Chapter 173-340, Model Toxics Control Act Cleanup Regulation, Table 749-3, Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals. Value represents lowest ecological indicator of plant, soil biota, or wildlife (see Appendix F for copy of Table 793-3).
d) Ecological Indicator Soil Concentration for total of DDT/DDD/DDE.
bgs - below ground surface.
NL - not listed.
mg/kg - milligrams per kilogram.
µg/kg - micrograms per kilogram.
– not analyzed.
< - analyte not detected at or greater than the listed concentration.

Figures

Figures



Source: USGS Vashon, Wash. 7.5' Quadrangle, 1968



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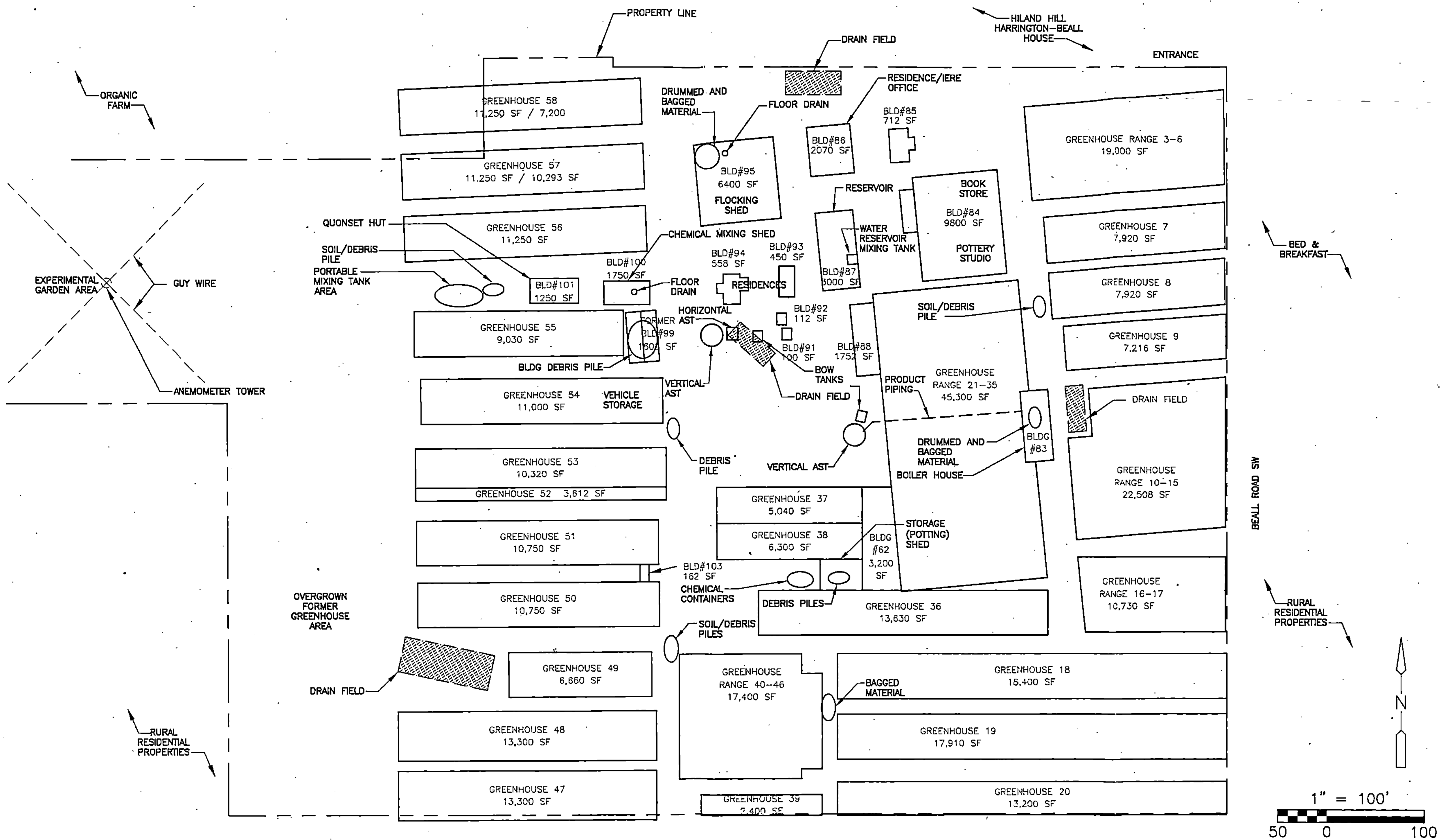
HARRINGTON–BEALL GREENHOUSE
SITE ASSESSMENT
VASHON ISLAND, WA

Figure No. 1
Vicinity Map

CDM



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HARRINGTON-BEALL GREENHOUSE SITE
PHASE II SITE ASSESSMENT
VASHON ISLAND, WA

Figure No. 2
Site Plan

CDM

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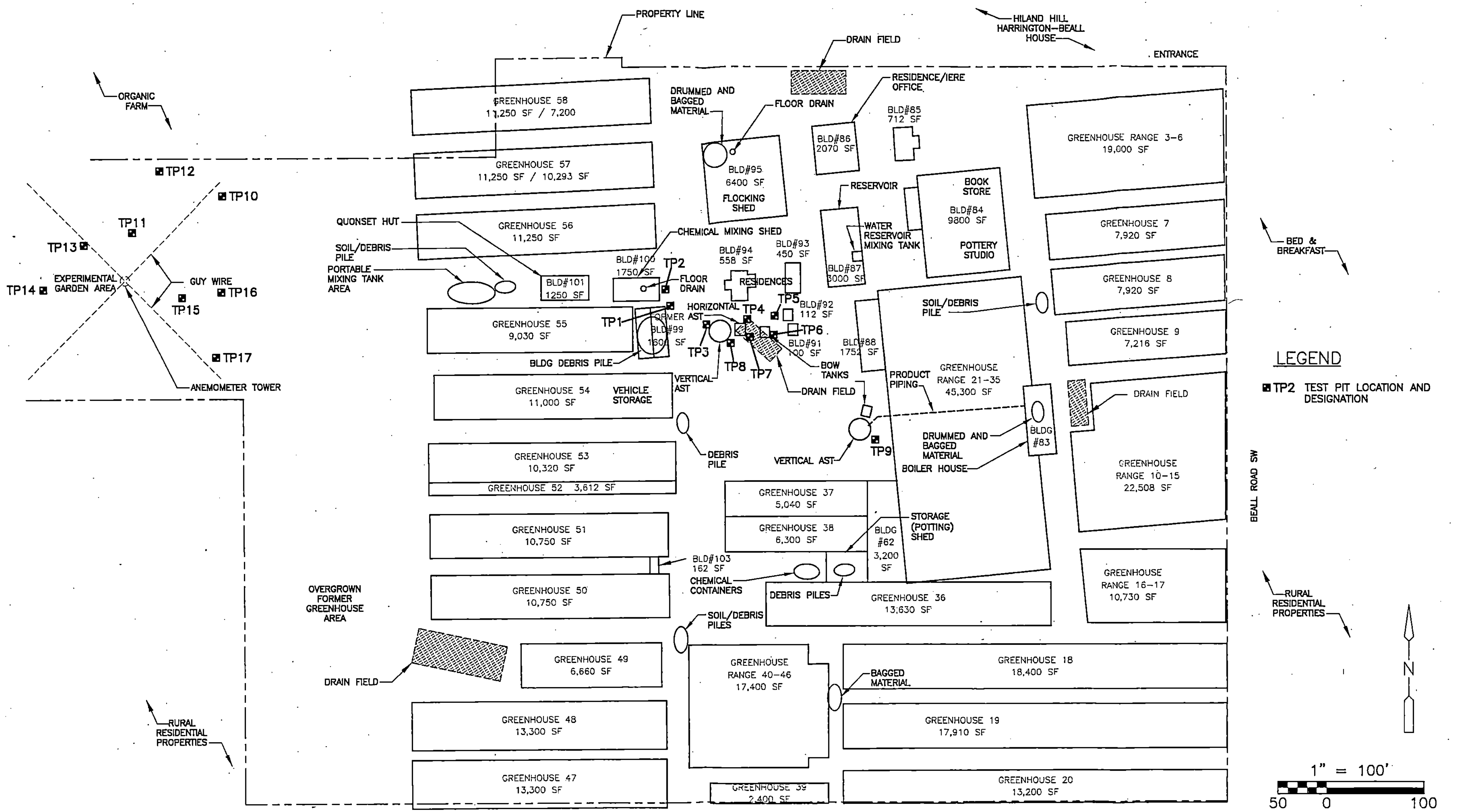

HARRINGTON–BEALL GREENHOUSE SITE
PHASE II SITE ASSESSMENT
VASHON ISLAND, WA

CDM

Figure No. 3
Test Pit Sample Locations

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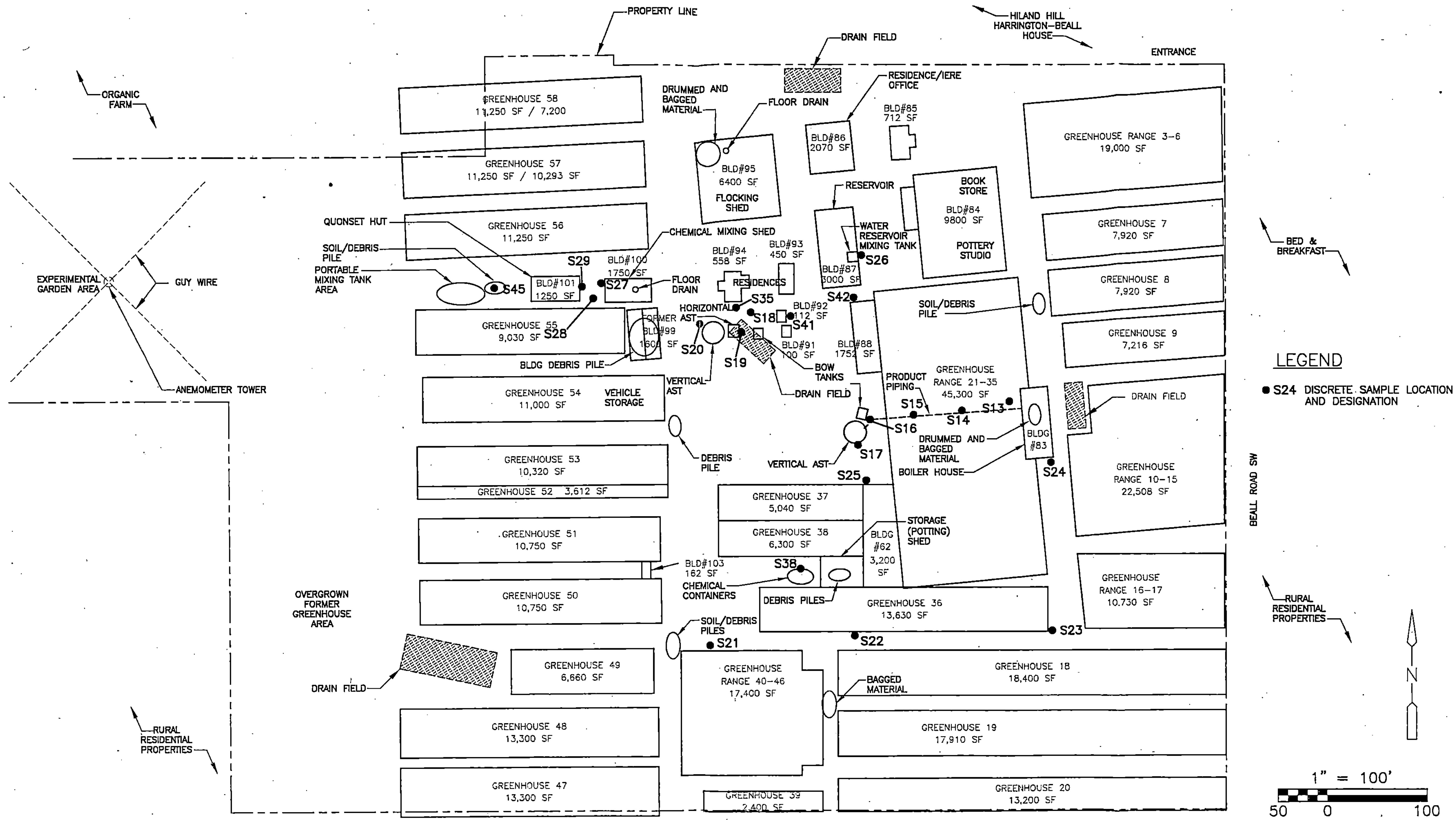
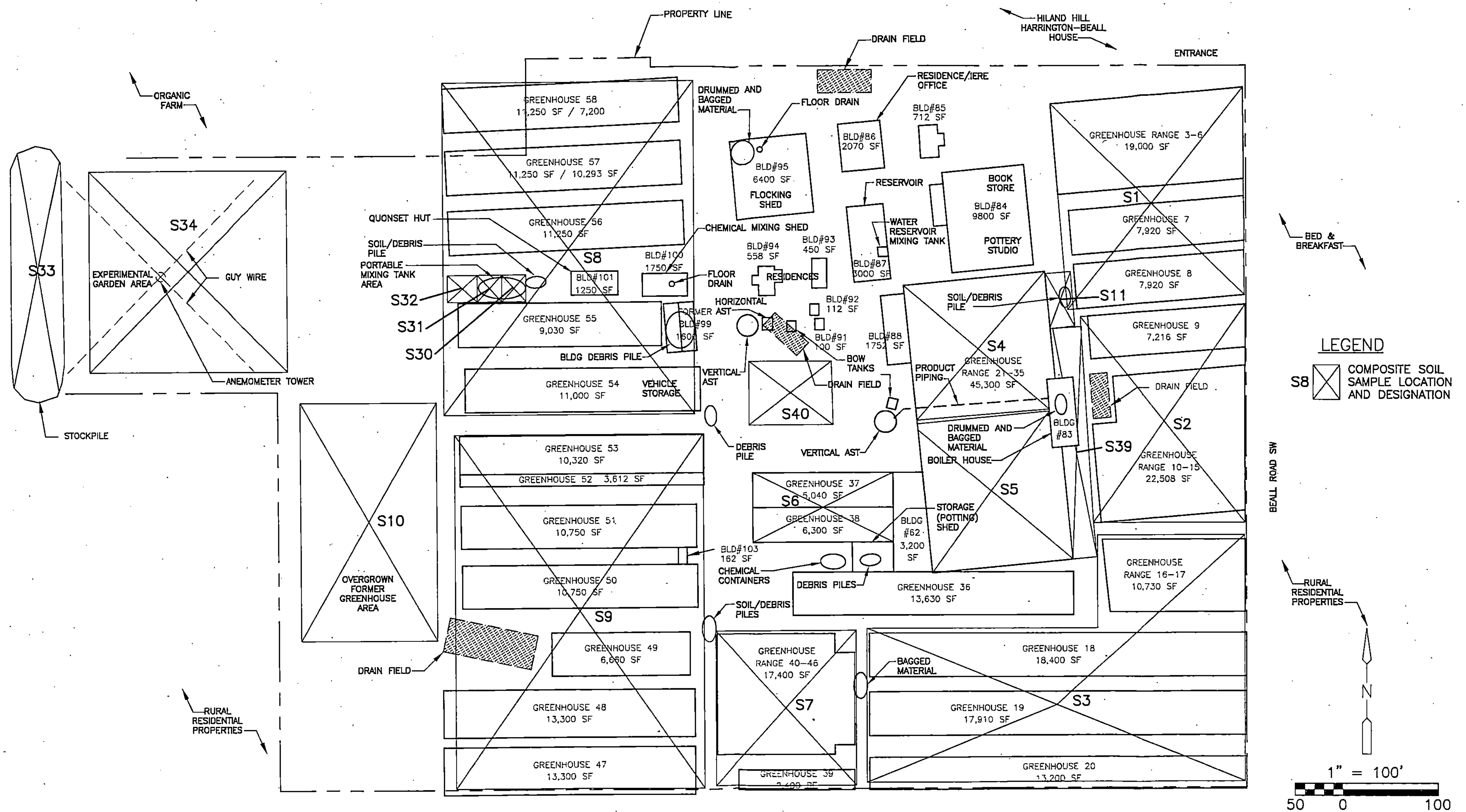


HARRINGTON–BEALL GREENHOUSE SITE
PHASE II SITE ASSESSMENT
VASHON ISLAND, WA

Figure No. 4
Discrete Sample Locations

CDM



P:\19897\47506\rept\ Figure 5 04/06/06 13:39 riehlepj XREFS: site, 11X17BDR

HARRINGTON–BEALL GREENHOUSE SITE
PHASE II SITE ASSESSMENT
VASHON ISLAND, WA

CDM

Figure No. 5
Composite Sample Locations

Appendix A

Appendix A
Site Photos

January 26, 2006

Photograph No. A-1

Photographed By:
Brian King

Description: Greenhouse Assessment - Composite Sample S1 location (Greenhouse Group 3-8).

January 26, 2006

Photograph No. A-2

Photographed By:
Brian King

Description: Greenhouse Assessment - Collection of portion of S1 composite sample (Greenhouse Group 3-8).

January 26, 2006

Photograph No. A-3

Photographed By:
Brian King

Description: Greenhouse Assessment - Collection of portion of S7 composite sample (Greenhouse Group 39-46).

January 27, 2006

Photograph No. A-4

Photographed By:
Brian King

Description: Asbestos testing in soil - Sample S21 location - Note deteriorated insulation wrapping on steam pipe.

January 27, 2006

Photograph No. A-5

Photographed By:
Brian King

Description: Asbestos testing in soil. Sample S25 location - Note deteriorated insulation wrapping on steam pipe.

January 27, 2006

Photograph No. A-6

Photographed By:
Josh Miller

Description: Former Fuel Storage Tank Assessment - Sample S15 location adjacent to Bunker C product piping leading to Building #83 (former boiler house).

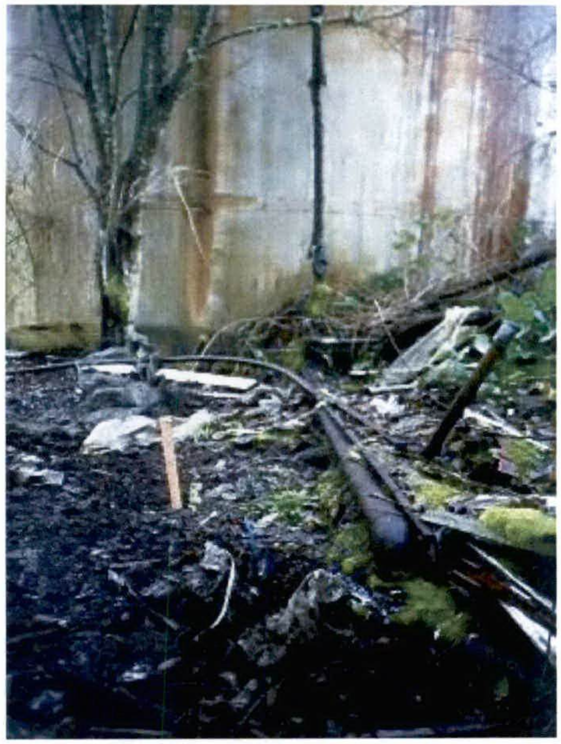
FIELD PHOTOGRAPHY LOG SHEET
King County/Phase II Environmental Site Assessment
Harrington-Beall Greenhouse Property
Vashon Island, Washington

January 27, 2006

Photograph No. A-7

Photographed By:
Josh Miller

Description: Former Fuel Storage Tank Assessment - Sample S16 location adjacent to Bunker C product piping.



January 27, 2006

Photograph No. A-8

Photographed By:
Josh Miller

Description: Former Fuel Storage Tank Assessment - Sample S18 location - Note hydrocarbon-stained soil at surface.

January 27, 2006

Photograph No. A-9

Photographed By:
Brian King

Description: Water Reservoir Mixing Tank Assessment - Sample S26 location.

January 27, 2006

Photograph No. A-10

Photographed By:
Brian King

Description: Chemical Mixing Shed Assessment - Area west of chemical mixing shed (Bldg #100) showing sample S27, S28, and S29 locations (staked locations from left to right).

January 27, 2006

Photograph No. A-11

Photographed By:
Brian King

Description: Portable Mixing Tank Assessment – Area of composite samples S30, S31, and S32.

January 27, 2006

Photograph No. A-12

Photographed By:
Brian King

Description: Soil Stockpile Assessment – Stockpile sample S45 location near portable mixing tank area.

February 2, 2006

Photograph No. A-13

Photographed By:
Josh Miller

Description: Chemical Mixing Shed Assessment Test pit TP 2 location on east side of chemical mixing shed (Bldg #100).

February 2, 2006

Photograph No. A-14

Photographed By:
Lance Peterson

Description: Former Fuel Storage Tank Assessment Test pit TP3/surface sample S20 locations. Note near surface hydrocarbon-stained soil. Former Fuel Storage Tank in background.

February 2, 2006

Photograph No. A-15

Photographed By:
Lance Peterson

Description: Former Fuel Storage Tank Assessment – Test pit TP6 location.

February 2, 2006

Photograph No. A-16

Photographed By:
Josh Miller

Description: Former Fuel Storage Tank Assessment – Test pit TP8 soil horizon - Note hydrocarbon staining in upper 1 foot of soil.

February 2, 2006

Photograph No. A-17

Photographed By:
Lance Peterson

Description: Former Fuel Storage Tank Assessment - Test pit TP8 location.

February 2, 2006

Photograph No. A-18

Photographed By:
Lance Peterson

Description: Former Fuel Storage Tank Assessment - Test pit TP9 location.

February 2, 2006

Photograph No. A-19

Photographed By:
Lance Peterson

Description: Experimental Garden Site Assessment – Test pit TP10 location, note perched groundwater at base of test pit.

February 2, 2006

Photograph No. A-20

Photographed By:
Lance Peterson

Description: Experimental Garden Assessment – Excavating Test pit TP13.

February 2, 2006

Photograph No. A-21

Photographed By:
Josh Miller

Description: Experimental Garden Assessment - Test pit TP13 location, note perched groundwater at base of test pit.

February 2, 2006

Photograph No. A-22

Photographed By:
Lance Peterson

Description: Experimental Garden Assessment - Excavating Test pit TP14.

FIELD PHOTOGRAPHY LOG SHEET
King County/Phase II Environmental Site Assessment
Harrington-Beall Greenhouse Property
Vashon Island, Washington

February 2, 2006

Photograph No. A-23

Photographed By:
Lance Peterson

Description: Experimental Garden Assessment – Excavating Test pit TP17.

Appendix B

Appendix B
Field Exploration and Sampling Procedures

Appendix B
Field Exploration and Sampling Procedures

Soil Sampling

Soil samples were obtained at the Harrington-Beall Greenhouse project site on January 26, 27, and 31, 2006, and February 2, 2006. Samples collected by hand were obtained on January 26th, 27th, and 31st. Samples from test pits were obtained on February 2, 2006. Both composite and discrete samples were collected.

Near Surface Soil Sampling

Composite samples collected from ground surfaces were obtained at a depth of 0.25 feet below ground surface (ft bgs) after clearing vegetation, rocks, and debris from the ground surface using a stainless steel spoon. Composite samples collected from stockpiles were obtained by digging as minimum 1-foot into the pile. Three-point to six-point composite soil samples were collected from predetermined areas throughout the project site. The locations of each sample point within these areas were influenced by accessibility while an attempt to maintain spatial representativeness. The composite sample points were mixed in a stainless steel bowl from which a representative composite sample was collected.

Discrete samples were collected using shovels to dig a hole 1 to 2 ft bgs and then using stainless steel spoons to collect the samples from the excavation. Discrete samples collected from stockpiles were obtained by digging as minimum 1-foot into the pile before collecting the sample.

Test Pit Sampling

Hokkaido Drilling, Inc. of Graham, Washington excavated seventeen test pits at the site on February 2, 2006. A Camp Dresser & McKee (CDM) hydrogeologist observed the test pit excavation. Test pits were excavated using a backhoe to depths of 2 to 6 ft bgs. The surface and test pit soils were described on the field log in accordance with the Unified Soil Classification System. Observation of hydrocarbon-like staining, odors, and sheen were noted.

Sample Collection Methods

The following procedures were used to collect soil samples:

1. Soil samples were collected directly from the test hole, ground surface, test pit excavation, or the backhoe bucket using a stainless steel spoon.

2. Soil samples to be submitted for analyses of non-volatile compounds were collected by transferring sampled soil to a laboratory-supplied 4-ounce glass jar.

3. Soil samples to be submitted for analyses of volatile compounds were collected using approximately 5 gram core samplers, dispensed immediately into preweighed 40 mL VOA vials, and sealed in accordance with EPA Method 5035A. Additional sample was also collected into a two or four-ounce glass jar for moisture determination.

4. The sample containers were immediately labeled, placed in a cooler, and chilled with ice.

Sample Handling and Shipping

Samples selected for analytical testing were kept stored in a chilled container, out of direct sunlight and were checked for label completeness and cap tightness. Sample containers were labeled with the following information:

- Project identification
- Date
- Time
- Sampler's initials
- Sample identification number.

The samples were stored and transported under chain-of-custody procedures. Copies of the completed chain-of-custody forms are presented with the laboratory reports in **Appendix E.**

Documentation

The CDM representative reported daily activities on a Field Investigation Daily Report form. Personnel on site, visitors, weather, and general activities planned and performed, and any problems were included on the Daily Field Report. Daily Field Reports and other documentation of field activities are contained in the project file.

CDM documented field activities associated with soil sampling on a log completed in the field. This included a comprehensive discussion of field observations, including visual observations, field parameter measurements, QA observations, and problems encountered. Soil Sampling Records were completed for all samples submitted for analytical testing.

Appendix C

Appendix C
Cultural Resources Assessment Report

CDM

Preliminary Cultural Resources Assessment of the Proposed Phase II Site Assessment at the Harrington-Beall Greenhouse Site on Vashon Island, Conducted in Support of EPA's Section 106 Compliance Responsibilities

Prepared for

Camp Dresser McKee
11811 N.E. 1st Street, Suite 201
Bellevue, Washington 98005
(425) 453-8383
fax: (425) 646-9523

Submitted to

King County Dept. of Natural Resources & Parks
Solid Waste Division
201 S. Jackson Street
Seattle, WA 98104

Prepared by

Lara Rooke, M.A., RPA and Susan Leary, M.A., RPA
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5-91M-15534-0
November 22, 2005

Abstract

King County Solid Waste Division proposes to conduct testing of contaminated soil at the Harrington-Beall Greenhouse site, 18531 Beall Road SW on Vashon Island, King County. The testing is to be funded by the U.S. Environmental Protection Agency (EPA) and is designed to conduct a Phase II assessment of contamination in support of future cleanup of the site. Because the EPA funding makes this project a federal undertaking, compliance with Section 106 of the National Historic Preservation Act and its implementing regulations is required.

AMEC Earth and Environmental, Inc., on behalf of the EPA, conducted a cultural resources overview screening for this project and has determined that there is one cultural resource in the project area: the Harrington-Beall Greenhouse Company Historic District, a designated Landmark site. This project will not adversely affect his property; therefore, I recommend that a determination of **No Historic Properties Adversely Affected** be made.

Contents

Figures

Appendices

Introduction

King County Department of Natural Resources and Parks (DNRP) proposes to conduct limited testing of soils in the Harrington-Beall Greenhouses site on Vashon Island to determine the level of soil contamination. The proposed project is located in Section 32, Township 23 North, Range 3 East, in King County. The project is mapped on the USGS Vashon, Washington (Photorevised 1958) 7.5' Topographic Quadrangle (Figure 1). The soil testing at this location is funded by the Environmental Protection Agency's (EPA) Brownfield program, which makes it a federal undertaking. The project is, therefore, subject to Section 106 of the National Historic Preservation Act and its implementing regulations.

AMEC Earth & Environmental has been contracted by Camp Dresser McKee (CDM) to conduct archival research and background studies on cultural resources in the project area. A pedestrian survey is not planned with this phase of work. AMEC, on behalf of King County Solid Waste Division and CDM, has consulted with the Washington State Department of Archaeology and Historic Preservation for concurrence on the proposed area of potential effects (APE) for archaeological resources and historic buildings and structures as part of the Section 106 process.

Project Description

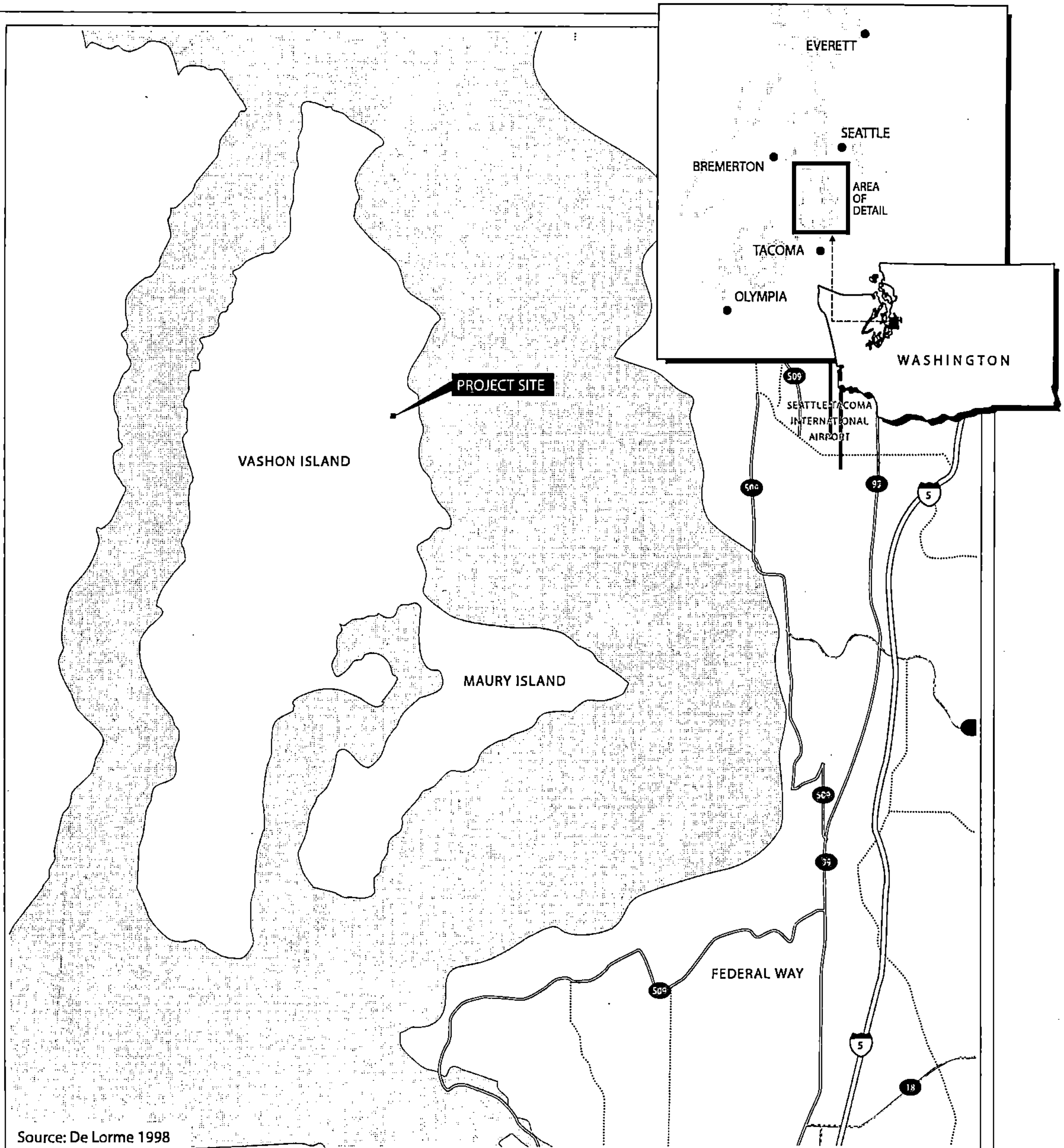
A Phase II Contamination Investigation is scheduled for the Harrington-Beall Greenhouse site. This investigation is a screening assessment to determine the type and general magnitude of contaminants present in the soil. Approximately 30 surface soil samples will be collected, using shovels and stainless-steel spoons, from several areas. The locations of the proposed soil samples are listed in the following text. Cleanup for possible contaminated soils is planned for the future.

<u>Sample Locations</u>

Former Fuel Storage Tanks
Five above-ground storage tanks (ASTs) are present; these contained or are suspected to have contained Bunker C oil. Seven surface samples will be collected in the areas of the ASTs.

Water Reservoir Mixing Tank
A mixing tank is located on the east side of the water reservoir. One surface soil will be collected adjacent to the mixing tank.

Chemical Mixing Shed and Portable Mixing Tanks
The chemical mixing shed contains equipment used to mix chemicals (likely pesticides) for application on plants. One surface sample will be collected adjacent to the mixing shed.



0 2
Approximate Scale in Miles

FIGURE 1

PROJECT VICINITY MAP

HARRINGTON-BEALL GREENHOUSES

591M155340

Two small steel tanks located approximately 75 feet away from the mixing shed were apparently used to mix and carry chemicals for spraying inside greenhouses. One soil sample will be collected in this area.

Experimental Garden Site and Former Greenhouse Area
The experimental garden site and adjacent undeveloped area (both on west side of site) were formerly covered with greenhouses. Two soil samples will be collected on the west side of the site: one in the experimental garden site and one south of the experimental garden.

Storage Shed with Chemical Containers
A storage shed located in the southcentral area of the site contains an assortment of containers that appear mostly empty. One surface soil will be collected adjacent to the storage shed.

Greenhouse Assessment
Fifty-four greenhouse buildings reportedly remain and are in generally poor condition. A composite soil sample will be collected from each of the nine groups of greenhouses.

Exterior Open Areas
Two soil samples will be collected from open areas around the greenhouses.

Former Lab Locations
One surface soil will be collected adjacent to each former lab building (buildings No. 88 and No. 92).

Asbestos Testing in Soil
The condition of asbestos wrapping on former steampipes is very poor. Five discrete soil samples will be taken below steampipe areas that appear to contain degraded asbestos wrappings.

Legal Compliance

The soil-testing program at the Harrington-Beall Greenhouses site is funded by EPA's Brownfields Program and is considered to be a federal undertaking. Under Section 106 of the National Historic Preservation Act (NHPA), all federal undertakings must be assessed for their potential to adversely affect significant cultural resources. Significant cultural resources—also known under federal law as "Historic Properties"—include archaeological resources, historic resources, and traditional cultural properties listed on or eligible for listing on the National Register of Historic Places (NRHP). The process for identifying and assessing a project's effects upon historic properties is outlined in 36 CFR, part 800. This cultural resources assessment is designed to support and partially fulfill EPA's Section 106 responsibilities.

Area of Potential Effects

King County DNRP proposes that the APE for this project be defined as those portions of the17-acre greenhouse complex in which testing is proposed (Figure 2). The soil sampling proposed will consist of taking surface samples of soil in the following areas: former fuel storage tanks, water reservoir mixing tank, chemical mixing shed, experimental garden site, storage shed, greenhouses, exterior open areas, and former lab locations. Because the testing project as described will not result in effects to above-ground historic resources, we recommend that the APE be confined to those areas where ground-disturbance has the possibility to affect archaeological resources (Figure 2).

Consultation

Because the Harrington-Beall Greenhouse complex is a King County Landmark site, AMEC consulted with the King County Historic Preservation program to determine whether the proposed work will require an application for a Certificate of Appropriateness. AMEC also notified the State Historic Preservation Office and Judy Wright, the tribal historian, for the Puyallup Tribe to review the proposed work (Appendix A). Responses have not yet been received, but consultation is ongoing.

Methods

AEMC conducted a background review of known cultural resources in the vicinity of the project area. This review was conducted through the King County Database for Cultural Resources. This database and geographic information system (GIS) include the locations of all known and suspected cultural resources, including archaeological sites, historic buildings and structures, geographic localities that have ethnographic place names, and traditional cultural properties. In addition, AMEC staff researched archaeological site forms, cultural resource reports, maps, historic inventory forms, Seattle Landmark Forms, and National Register of Historic Places (NRHP) nomination forms. The results of this background "screening" are attached as Appendix B. AMEC also reviewed the landmark documents, including designation forms for the Harrington-Beall Greenhouses, on file at the King County Historic Preservation program office and historic maps at the Seattle Public Library.

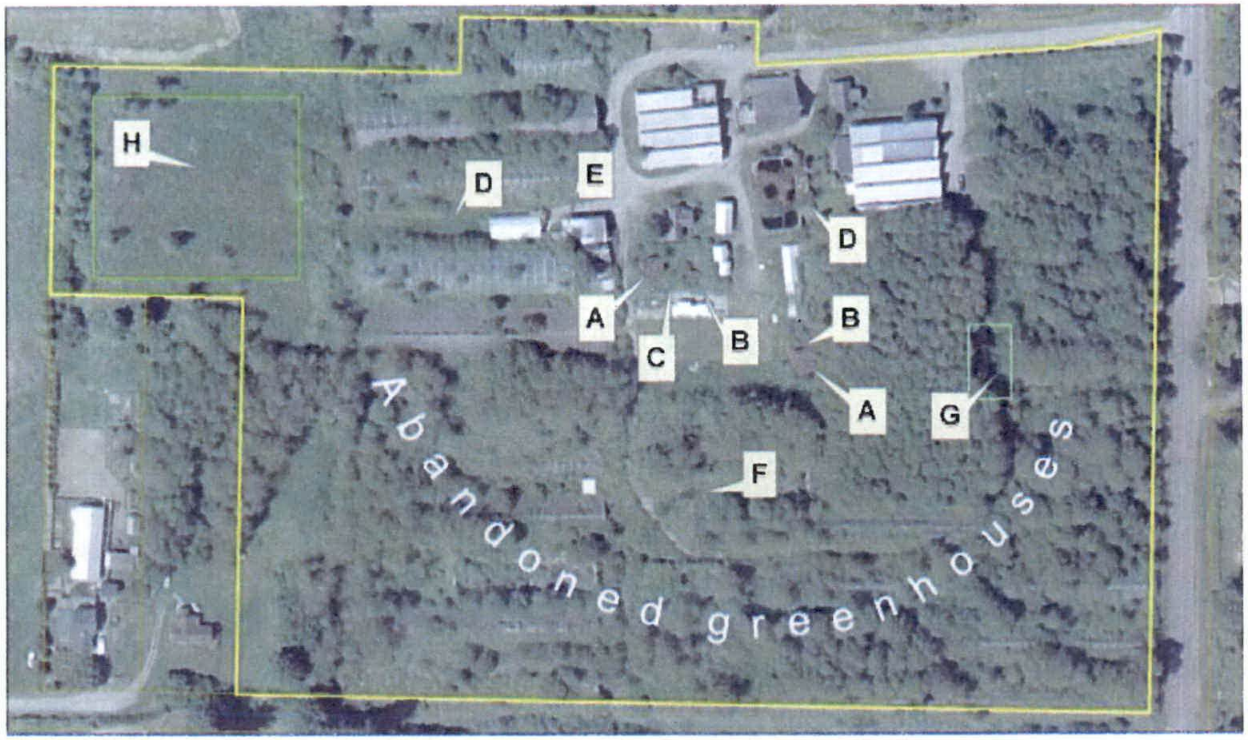
Context

The following sections include results of background research and implications of the findings on the archaeological and cultural resource record. In addition, the cultural context describes the prehistoric, ethnohistoric, and historic period settings of the project area.

Graphics Server/Graphics/Billable/Project/Fig 1 Document 9.03.02

Harrington-Beall Greenhouses, Vashon Island, Washington

Salient Features for Site Asessment



N

1:1,580

0 75 150 300 Feet

Key

A = Upright riveted steel storage tanks
B = Riveted steel bow tanks
C = Horizontal smooth steel tank
D = Small mixing tanks
E = Chemical mixing shed w/ steel tank
F = Storage shed with paint containers
G = Boiler house
H = Experimental garden site

Environmental Coalition of South Seattle

Not to Scale

FIGURE 2

Areas of Potential Effect

HARRINGTON-BEALL GREENHOUSES

591M155340

amec

Environmental Context

The proposed project lies within the Puget Lowland physiographic province of western Washington. The geomorphology of this landscape was shaped during the late Pleistocene by glacial activity and Holocene fluvial erosion. During the Vashon Stade of the Fraser glaciation, the last glacial advance of the Pleistocene epoch, the Puget Lowland was completely scoured by the Puget Lobe of the Cordilleran ice sheet. At its maximum extent approximately 15,000 years ago, the Puget Lobe advanced southward from British Columbia and extended across the Puget Lowland from the Cascade Range in the east to the Olympic Mountains in the west (Booth 1987; Thorson 1980). Ice thickness ranged from 1,265 meters (4,150 feet) above the present sea level to approximately 465 meters (1,526 feet) at the southern margin (Thorson 1980). As this large glacier retreated, drainage of glacial meltwater through the Strait of Juan de Fuca was blocked by the ice sheet, so the immense troughs formed by the glacier were occupied by southward-draining proglacial lakes. Lacustrine (lake) sediments that accumulated in these troughs have depths of almost 50 meters (164 feet) in some areas of the Puget basin (Thorson 1980). As the glacier eventually ablated and the northward-flowing drainage through the Strait of Juan de Fuca was reestablished, marine sediments flowed into the basin, forming the current Puget Sound.

Since the end of the Pleistocene and the retreat of the Cordilleran glaciers, the Pacific Northwest has endured only two major episodes of regional climatic change (Mehringer 1985). Although traditional climatic models for western North America suggest three periods of climatic change (Antevs 1955), pollen records from the Olympic Peninsula and coastal British Columbia contradict this model (Mathewes 1973). Because changes in vegetation are influenced by climate, particularly temperature and precipitation, analyses of pollen records are useful indicators for understanding the timing and nature of these events. During the early post-glacial period of 13,000 to 7,000 Before Present (BP), temperatures increased appreciably (Leopold et al. 1982). Although climatic conditions were much warmer than they were during the Pleistocene, they were cooler and wetter than they are today. Initially, vegetation was sparse, consisting of subalpine grasses and sedges; however, by the end of this period, Douglas fir (*Pseudotsuga menziesii*), western red cedar (*Thuja plicata*), and western hemlock (*Tsuga heterophylla*) dominated the landscape (Brubaker 1991). The presence of modern plant communities after 7,000 BP reflects climatic conditions similar of those of today (Leopold et al. 1982; Mathewes and Heusser 1981; Suttles 1990a). Prehistoric and present ecological landscapes have not changed significantly over the last 7,000 years.

Local topography was formed by glacial processes during the late Pleistocene. Glacial till, recessional outwash, and proglacial lacustrine and outwash sediments lie in northwest-trending ridges. Several small lakes are remnants of glacial action.

The predominant soils surrounding the project area belong to the Alderwood series (Soil Conservation Service 1952). Alderwood soils are moderately well drained with a weak to strong consolidated substratum. These soils are formed in forested areas in glacial deposits (Soil Conservation Service 1952).

The regional climate is influenced by the Puget Sound on the west and the Cascade Range on the east. The maritime air mass, originating over the Pacific Ocean, influences the climate throughout the year. Warm, dry summers and wet, mild winters are characteristic climatic conditions for the Puget Sound. The annual precipitation is 124 centimeters (49 inches) with more than half of this falling as rainfall between October and March (Franklin and Dyrness 1973). Temperatures range from 85°F in summer to 45°F during winter. This temperate climate supports a lush plant community that was valued for subsistence by both human and animal foragers.

The project area is located within the *Tsuga heterophylla* or Western Hemlock Zone of the Forest Province (Franklin and Dyrness 1973). The vegetation of the area is now primarily agricultural. Historically, however, dense stands of the following species occupied the landscape: Douglas fir, western hemlock, western red cedar, big-leaf maple, red alder, willow, and vine maple. Ferns, mosses, salal, Oregon grape, ocean spray, snowberry, wild rose, red huckleberry, blackberry, and salmonberry grew abundantly under the heavy forest canopy (Franklin and Dyrness 1973).

Historically, the area supported a diverse faunal community similar to that of today. Black-tailed deer, bear, bobcat, cougar, wolf, elk, raccoon, striped skunk, beaver, pheasants, waterfowl, herons, salmon, and trout are some of the now-common species. Game birds that use the area are ducks, quail, Gambel's quail, blue grouse, and ruffed grouse.

Implications for Cultural Resources

Knowledge of the geologic processes associated with the landforms in this area can assist in locating archaeological resources. Geographic features such as shorelines, rivers, lakes, and terraces are often correlated with the archaeological record. Throughout prehistory, these locations provided an abundance of plant resources and fish and often attracted terrestrial animals as well. As a result, sites tend to be found at locations within active floodplains or along associated terraces. Alluvial processes associated with these dynamic environments can deeply bury or erode archaeological sites. As the distance away from bodies of water increases, one expects a corresponding decrease in archaeological sites.

The project area is located on Vashon Island and is close to an abundant supply of saltwater resources. However, the project site is located inland and is not close to any lake, river, or creek. It is, therefore, likely that archaeological resources associated with the earlier prehistoric cultural occupation periods will be identified at this location. Archaeological deposits associated with early homesteading and/or the greenhouse business located on this property may be identified, however.

Cultural Context

Prehistory

Archaeological assemblages are variable across time and space but exhibit similar patterns within regional environments, which reflect differences in subsistence and settlement patterns. Archaeologists have classified these variations into three broad chronological periods: the Early Period (15,000–5,000 BP), the Middle Period (5,000–1,000 BP), and the Late Period (1,000–250 BP) (Greengo and Houston 1970).

The Early Period represents an adaptation to early postglacial environmental conditions. Regionally, sites of this period are referred to as "Olcott" (Kidd 1964). The period is characterized by chipped stone assemblages, including unifacial and bifacial choppers, scrapers, leaf-shaped projectile points, and cobble tool traditions associated with core and blade industries. Settlements were generally located in the upland plateaus or river terraces, and subsistence patterns relied on inland hunting supplemented by fishing and shellfish procurement (Blukis Onat 1987).

The Middle Period is characterized by an increased use of saltwater resources, with deep shell-midden deposits at most of the sites containing abundant fish and sea mammal bones. During this period, the toolkit expands in diversity within the regional assemblage. Ground stone, bone, and antler tools replace the earlier cobble tool tradition. Small stemmed and notched projectile points replace the leaf-shaped projectile points. The earliest evidence of large winter habitation sites is associated with this period (Greengo and Houston 1970). These village sites are found in association with waterbodies such as along the shorelines of lakes and the Puget Sound.

The Late Period is characterized by increased site sizes and evidence for plank houses. The presence of chipped stone decreases, and ground stone tools become more abundant. Adze blades, mauls, antler wedges, and composite tools similar to those seen during the ethnographic period make up the toolkit (Greengo and Houston 1970). Exotic trade goods imported from the Columbia Plateau are common. Small side-notched and triangular stone projectile points are still used, but an emphasis on bone and antler tools is predominant. Fish appears to be the primary economic resource, as represented archaeologically by fish weirs and the abundance of fish hooks, harpoons, and ground slate knives. Many of the village sites that were occupied at this time persisted into the historic period (Wesson and Stilson 1987).

Ethnohistory

The project area is located within the traditional territory of the Puyallup Tribe. The Puyallup are a Salishan-speaking group that occupied the Puyallup River drainage and nearby islands until the Puyallup reservation was established by treaty in the 1850s. The Puyallup practiced a seasonal subsistence economy that consisted of spring, summer, and fall migrations to areas for fishing, hunting, and gathering plant resources (Blukis Onat 1987). During the winter months, they returned to more permanent settlements along the shore of Puget Sound and area lakes or along the many rivers and creeks. These winter villages consisted of several large houses generally constructed of cedar planks.

There were two known village sites on Vashon and Maury islands: *STEH-khoog'wl* located at the current location of Portage between Maury and Vashon islands, and *tsoo-Gwah-lehlh* located at the entrance to Quartermaster Harbor on Maury Island. Oral history suggests that there may have been three more villages nearby (Waterman 1920).

Although salmon were caught as a staple food source, the complex environment provided many resources for a rich subsistence base. Fish (salmon, halibut, trout, herring, cod, perch, flounder) and sea mammals (otters, harbor seals, sea lions) were as important nutritionally to the prehistoric and ethnohistoric occupants as were terrestrial fauna (deer, elk, bear, rabbits, squirrels, muskrat, raccoons) and birds (cormorants, ducks, geese, gulls, herons, teal). Along the shorelines of Puget Sound and along local rivers, shellfish provided a reliable source of protein. In addition to being subsistence food sources, many of these animals were also acquired for their skins, fur, and feathers. Shells were used for ornamentation, and bones were used for fish hooks, needles, awls, and other tools.

Plants also contributed to the economy. Plant materials were collected for subsistence, medicinal, technological, and spiritual purposes. Rhizomes, roots, bulbs, leaves, stalks, nuts, and berries were eaten raw or cooked, or they were stored for consumption during the winter. Wood and bark, both important sources of fuel, were used for canoes, paddles, fish weirs, houses, and containers. Several plants were known for their healing properties and were collected for medicinal and ceremonial purposes. Plants were known to treat a variety of ailments, including cold symptoms, sores, muscle aches, stomach disorders, constipation, rheumatism, and tuberculosis.

The arrival of Euro-Americans had a devastating effect on traditional life. Following the 1855 treaty negotiations, the Puyallup were relocated to reservations within their traditional territories. Homesteaders and fur traders disrupted social organizations and displaced traditional seasonal habitat sites.

History

Captain George Vancouver's arrival in 1792 marks the earliest undisputed record of Euro-American contact in the Puget Sound region (Cole and Darling 1990; Kirk and Alexander 1990; Marino 1990). Exploration was followed by incursions of Euro-American fur traders under the aegis of the Hudson's Bay Company during the 1830s. Early contacts between Euro-American traders and native populations proved disastrous to the latter as they fell victim to waves of malaria, tuberculosis, and smallpox epidemics in the late 1700s and middle 1800s (Cole and Darling 1990; Marino 1990; Suttles 1990b).

In 1818, Oregon Country, which included Washington State, was subject to both United States and British rule. By 1846, disputes over the area drew to a close when a treaty confirmed the international boundary line between Washington Territory and British Columbia. The Territory was organized in 1853 by its first governor, Isaac Stevens, who helped pave the way for Euro-American settlement by compelling regional Indian tribes to relocate to reservations under a series of treaties in 1855. The unpopularity of Indian removal was manifested by widespread rebellion of tribal groups (Kirk and Alexander 1990; Marino 1990).

In the 1860s, the U.S. government encouraged homesteading in the region through the Donation Land Law and the Homestead Act (Ficken and LeWarne 1988). An individual could claim 320 acres (640 acres for a married couple) to settle, farm, ranch, and improve. If in the span of four years the acreage had been "improved upon," the claimants had legal ownership rights to the property (Ficken and LeWarne 1988). Homesteading efforts took place from the 1880s into the 20th century but were concentrated around the turn of the 20th century (General Land Office 1884).

Vashon Island was named by Captain George Vancouver for his friend and fellow explorer Captain James Vashon. The first land claim was made on August 1, 1864, by Andrew J. Pope and William Talbot for 80 acres (http://www.historylink.org). Vashon soon became a center for logging and fishing as well as for brick and shingles operations. Once all of the trees had been logged, farming became the main industry. Berries and flowers sustained the community economically.

The Harrington-Beall Greenhouses are significant for their association with the development and growth of the horticultural industry in King County and Vashon Island. The company was incorporated in 1888 and reached its peak of activity in the 1960s, when it was the largest greenhouse complex in the world. The facility grew primarily roses and orchids for distribution by air over all over the United States. To heat the greenhouses, bunker C oil was imported by barge via the dock at Ellisport Creek, 1.5 miles southeast of the site.

Because of its unique history and significance to the economic development of Vashon Island and the Puget Sound area, the county's Office of Cultural Resources has designated the property as a King County Landmark within the 23-acre Harrington-Beall Greenhouse Company Historic District (Appendix C). The greenhouse district includes 59 greenhouses and the power plant as well as the homes of the Harrington and Beall family members.

Findings

There are no known archaeological sites within the Harrington-Beall Greenhouse project site. This area has a moderate to low sensitivity for archaeological resources dating to the pre-Contact period. Native Americans are likely to have used this area over the last 4,000 years, but archaeological evidence in this area is sparse. Isolated projectile points are reported to have been found within a mile of the project site, but no archaeological sites have been identified (Appendix B).

There will be no impacts to the Harrington-Beall Greenhouse Company Historic District as a result of the Phase II contamination assessment. The King County Historic Preservation program reviewed the proposed project and determined that submission of a Certificate of Appropriateness application and formal review by the King County Landmarks Commission will not be required as long as the testing activity will have no direct impact to the historic buildings or structures identified in the landmark designation report and that such activity will be primarily limited to temporary ground disturbance.

Recommendations

We recommend a determination that there will be **No Historic Properties Adversely Affected** by this project. Impacts to the historic district will be minimal and temporary, and it is unlikely that significant cultural resources will be encountered during the Phase II contamination assessment project. Should remediation of the contaminated soil be proposed in the future, a professional archaeologist should be on site to monitor ground-disturbing activities.

If prehistoric or historic artifacts are encountered during sampling, ground-disturbing activities will be directed away from these materials. In addition, the project manager will contact the project archaeologist or the Washington State Archaeologist, Robert Whitlam, to determine how the materials should be treated. Common markers of cultural sites include shell fragments, dark-stained or charcoal-rich sediments, stone tools, metal fragments, bottles, or broken glass.

In the unlikely event that human remains are found during soil-sampling activities, all work within 500 feet of the discovery will cease. The area will be screened off, and the project foreman will contact the County Medical Examiners Office; the SHPO archaeologist, Robert Whitlam; and the Puyallup Tribe. If the medical examiner determines that the burial is Native American and is not a recent crime victim, SHPO and the tribal representatives will confer to determine an appropriate treatment for the remains.

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Appendix A: Consultation

amec

November 14, 2005
5-91M-15534-0

Puyallup Tribe
1850 Alexander Avenue
Tacoma, Washington 98421

Attention: Judy C. Wright, Tribal Historian, Puyallup Tribe

Subject: Harrington-Beall Greenhouses, Phase II Environmental Site Assessment and Remediation Planning Project

Dear Ms. Wright:

King County Solid Waste Division, in cooperation with Camp Dresser & McKee, Inc., (CDM), is currently planning to conduct a Phase II environmental site assessment for the Harrington-Beall Greenhouses to determine the type and general magnitude of contaminants present in the soil at the site. Sampling of soils is proposed throughout the project area in support of remediation planning that will follow. A cleanup for possible contaminated soils is planned for the future.

AMEC Earth & Environmental, Inc., has been contracted by CDM to conduct archival research and background studies on cultural resources in the project area. No cultural resource fieldwork is planned with this phase of work. However, the project is subject to the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended, and associated implementing regulations 36 CFR 800.

AMEC, on behalf of King County, would like to know if the site of the Harrington-Beall Greenhouses, located at 18531 Beall Road SW on Vashon Island, is of cultural interest to the Puyallup Tribe. AMEC would like your input on concerns the Tribe may have regarding future soils testing and cleanup at the site. Does the Tribe have any concerns or wish to provide any information about archaeological or traditional cultural properties that may be affected by the project?

Please contact me at (425) 820-4669 if you have any questions or comments regarding the Harrington-Beall Greenhouses project and/or site.

AMEC Earth & Environmental, Inc.
11335 NE 122nd Way, Suite 100
Kirkland, Washington
USA 98034
Tel (425) 820-4669
Fax (425) 821-3914
www.amec.com

Sincerely,

AMEC Earth & Environmental, Inc.

Lara Rooke
Cultural Resources Specialist

Attachments:
Figure 1. Project Vicinity Map
Figure 2. Areas of Potential Effect (APE), an aerial photo illustrating the campus boundary and proposed APE for archaeological and historic resources

amec

November 18, 2005
5-91M-15534-0

Department of Archaeology & Historic Preservation
PO Box 48343
Olympia, Washington 98504-8343

Attention: Dr. Allyson Brooks, State Historic Preservation Officer

Subject: Notification of Undertaking and Identification of Areas of Potential Effects
Harrington-Beall Greenhouses Site Phase II Environmental Site Assessment Project

Dear Dr. Brooks:

This letter is to notify you of the King County Solid Waste Division's determination that the Harrington-Beall Greenhouses Site Phase II Environmental Assessment and Remediation Planning Project on Vashon Island, in cooperation with Camp Dresser & McKee Inc., (CDM), will be a federal undertaking. CDM is currently planning to conduct a Phase II environmental site assessment and remediation planning for the site. Their tasks will include field investigation of the site and the sampling of soils. The project is subject to the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended, and associated implementing regulations 36 CFR 800.

AMEC Earth & Environmental, Inc., has been contracted by CDM to conduct archival research and background studies on cultural resources in the project area. A pedestrian survey is not planned with this phase of work. AMEC, on behalf of King County Solid Waste Division and CDM, is seeking Washington State Department of Archaeology & Historic Preservation concurrence for the proposed area of potential effect (APE), as described below, for archaeological resources and historic buildings and structures as part of the Section 106 process.

Project Description

The purpose of the project is to conduct a Phase II environmental site assessment for the Harrington-Beall Greenhouses to determine the type and general magnitude of contaminants present in the soil at the site. Sampling of soils is proposed throughout the project area. Cleanup for possible contaminated soils is planned for the future.

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Proposed Area of Potential Effect (APE)

The soil sampling proposed will consist of taking surface samples of soil in the following areas: former fuel storage tanks, water reservoir mixing tank, chemical mixing shed, experimental garden site, storage shed, greenhouses, exterior open areas, and former lab locations. The proposed APE for archaeological sites consists of the entire 17-acre complex located at 18531 Beall Road SW. However, nearly 50 percent of the complex is covered by the footprints of 56 greenhouses and 16 ancillary structures, many of which were built in the 1920s.

It is not anticipated that there will be any direct impacts (i.e., acquisition, destruction, or modification) to historic buildings or structures. The proposed APE for historic buildings and structures includes all of the buildings on the 17-acre greenhouse complex.

Because the Harrington-Beall Greenhouse complex is a King County Landmark site, AMEC will consult with the King County Historic Preservation program to determine whether the proposed work will require an application for a Certificate of Appropriateness.

Please contact Lara Rooke, Archaeologist, AMEC, (425) 820-4669, if you have any questions or comments regarding the Harrington-Beall Greenhouses Site Cultural Resource Assessment and Remediation Planning Project.

Sincerely,

AMEC Earth and Environmental, Inc.

Lara Rooke, RPA
Archaeologist, AMEC Earth and Environmental, Inc.

Attachments:
Figure 1. Project Vicinity Map
Figure 2. Area of Potential Effect (APE), an aerial photo illustrating the proposed APE for archaeological and historic resources

Distribution: Puyallup Tribe, Judy Wright, Tribal Historian (1)

Appendix B: Screening Report

Project Name: **Beall Greenhouse cleanup** Project /CIP #: ________
Contact/Screening Requested by: Lucy Auster KC SW / Lara Rooke Amec
Date of Request: 10/12/05 Date Screened: 10/12/05 Federal undertaking: Y/N/?
EPA funding

Location & Scope of Project: T 23N R 03E S32
Str. Addr: 18527-31 Beall Rd The site is located on Vashon Island
Parcels: 3223039094
Scope: Environmental assessment and cleanup of ground contamination from greenhouse operations.

Known Resources/Cultural Indicators (from CRPP GIS) in and w/in 1 mi. of project area:
Archaeological Resources (prehistoric and historic): Two unverified reports of isolated projectile points roughly one mile to N and to S of the project site
Ethnographic Places: None within one mile
GLO features: None within one mile
Above-Ground Historic Resources: Numerous inventoried historic properties exist on site and in the vicinity. The Greenhouse complex is within a King County landmark historic district (HRI# 0975, the Harrington-Beall Greenhouse Historic District) that includes three adjoining/nearby residences. Within ½ mile there are two additional inventoried properties, and within one mile another 15 inventoried properties.

Environmental Indicators/Sensitivity:
Water Resources: The headwaters of Eastport Creek run approx. 300 feet from the west and south boundaries of the site, dropping from approx. 15 feet below the site to 50 feet below it.

Landforms and Soils: The project site is on gently sloping land approx. ½ mi west of the Puget Sound and north and east of the headwaters of Eastport Creek. It is underlain by Alderwood series soils, moderately well-drained soils on uplands, underlain by consolidated glacial till (hardpan) at a depth of 24-40 inches, generally formed under conifers, in glacial till.

Comments/Recommendations: ☐ No further action recommended ■ Survey
☐ Monitoring ☐ Documentation ☐ Other

If there is any evidence that excavation and disturbance will extend to previously undisturbed soils, planned geotechnical borings should include field observation by a professional archaeologist if possible, and should include a limited number of borings for archaeological testing if recommended by the archaeologist. Field surveying by a professional archaeologist familiar with the region is recommended if undisturbed areas exist at the site and can be surveyed. Monitoring is advised if recommended by the archaeologist. There appears to be a moderate to low likelihood that prehistoric archaeological deposits may exist in the project area.

Appendix C: Landmark Designation

KING COUNTY DEPARTMENT OF PARKS, PLANNING AND RESOURCES
CULTURAL RESOURCES DIVISION, LANDMARKS COMMISSION
1115 Smith Tower, 506 Second Avenue, Seattle, Washington 98104

KING COUNTY LANDMARK REGISTRATION FORM

This form is for use in nominating individual properties or districts. See instructions in *Guidelines for Completing King County Landmark Forms.* Complete each item by marking "x" in the appropriate box or by entering the requested information. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, styles, materials, and areas of significance, enter only the categories and subcategories listed in the instructions. For additional space use continuation sheets. Type all entries.

1. Name of property

historic name: Harrington-Beall Greenhouse Company Historic District

other names/site number: HRI #0890, HRI #0974, HRI 0975, HRI #0976, Beall's Pedigreed White Leghorn Farm, H. Harrington Company Greenhouses.

2. Location

street & number: ___ not for publication

city, town: ___ vicinity

state: code: county: code: zip code:

_x_ See continuation sheet

3. Classification

Ownership of Property:
- _x_ private
- ___ public-local
- ___ public-State
- ___ public-Federal

Category of Property:
- ___ building(s)
- _x_ district
- ___ object
- ___ site
- ___ structure

Number of Resources within Property:

Contributing	Noncontributing	
48	2	building(s)
		object
		site
6		structure
54	2	Total

Name of related multiple property listing:

Number of contributing resources previously designated as King County Landmarks: 2

4. Owner of Property

name:

city, town: vicinity: state: zip:

_x_ See continuation sheet

PARCEL A: Harrington/ Beall Greenhouse Company

street & number: 18527, 18531 Beall Road S.W. ___ not for publication

city, town: Vashon ___ vicinity

state: Washington code: WA county: King code: 033 zip code: 98070

PARCEL B: Harrington, Hilan Log House

street & number: 18525 Beall Road S.W. ___ not for publication

city, town: Vashon ___ vicinity

state: Washington code: WA county: King code: 033 zip code: 98070

PARCEL C: Harrington, Hilan House

street & number: 18515 Beall Road S.W. ___ not for publication

city, town: Vashon ___ vicinity

state: Washington code: WA county: King code: 033 zip code: 98070

PARCEL D: Beall, L.C. Sr. and Jennie House (Beall Family Home)

street & number: 18606 Beall Road S.W. ___ not for publication

city, town: Vashon ___ vicinity

state: Washington code: WA county: King code: 033 zip code: 98070

name: PARCEL A: Chuck and Nancy Hooper
street & number: 18527, 18531 Beall Road S.W.
city, town: Vashon vicinity: state: WA zip: 98070

name: PARCEL B: Kurt Timmermeister
street & number: 18525 Beall Road S.W.
city, town: Vashon vicinity: state: WA zip: 98070

name: PARCEL C: David Ward
street & number: 18515 Beall Road S.W.
city, town: Vashon vicinity: state: WA zip: 98070

name: PARCEL D: Douglas Ende and Karen Chachkes
street & number: 118606 Beall Road S.W.
city, town: Vashon vicinity: state: WA zip: 98070

5. Function or Use

Historic Functions (enter categories from instructions)

Current Functions (enter from instructions)

__x_ See continuation sheet

6. Description

Architectural Classification (enter from instructions)
OTHER: Vernacular

Materials (enter categories from instructions)
SEE PROPERTY DESCRIPTION, ITEM #6
foundation:
walls:
roof:
other:

Describe present and historic physical appearance.

The Harrington-Beall Greenhouse Historic District is located on Beall Road several miles southeast of the central business district of Vashon Island. In addition to the L.C. Sr. and Jennie Beall House (a.k.a. "Beall Family Home") and the Hilan Harrington Log House which were designated as King County landmarks in 1987 and 1993 respectively, the 23-acre district contains an 1892 Queen Anne style house and two associated buildings built by the Harrington family, 27 greenhouses, 16 buildings, and 6 structures serving various industrial functions in support of the plant. Two service buildings, a garage associated with the log house and a poultry outbuilding associated with the 1892 house, no longer retain integrity and are non-contributing elements of the District (See Hilan Harrington Log House, Landmark Registration Form 11/93.) Two additional residences historically owned by the Harrington and Beall families were not included in the district boundaries; located on either side of the L.C. Sr. and Jennie Beall house, neither retain their original physical integrity. Additional acreage west of the greenhouse company's boundaries was purchased in the 1960s with temporary greenhouse construction taking place in the 1970s; these have since been demolished, and the site is now vacant. This acreage was not included in the nominated area.

The greenhouse site is presently zoned for agricultural use, and it is surrounded by small farms and single family dwellings. The contextual landscape is rural.

Upon its establishment in 1888 the plant consisted of nine greenhouses: several planned on an east-west axis with the gable ends fronting directly on Beall Road; several sited on a north-south axis, and several service buildings and structures sited west of the greenhouses. A log house built in approximately 1885 (Hilen Harrington Log House) was originally sited on a knoll just north of the greenhouses. It was moved approximately 100 yards northwest to make way for the 1892 Harrington House. The ten-acre parcel surrounding these two houses was the site of a flourishing poultry business in the 1920s. Acreage on the east side of Beall Road was also developed for family residences, three of which survive today. Orchards were planted west of the greenhouses; this open space remains in mixed agricultural use today.

As the greenhouse business grew the greenhouses constructed on a north-south axis were replaced by buildings sited in an east-west orientation. The early greenhouses are distinguished by their placement on the site on an angle to the south, which, as the land parcel became occupied with buildings, forced a re-alignment to a true north-south direction.

_x_ See continuation sheet

PARCEL A:

AGRICULTURE:	Horticultural Facility	Vacant	
INDUSTRY:	Energy Facility	Vacant	
OTHER:	Packing Shed	COMMERCE/TRADE:	Business
DOMESTIC:	Secondary Structure	Vacant	
AGRICULTURE:	Animal Facility	DOMESTIC:	Single Dwelling
INDUSTRY:	Water Works	INDUSTRY:	Water Works
EDUCATION:	Laboratory	Vacant	
INDUSTRY:	Industrial, Storage	Vacant	
DOMESTIC:	Multiple Dwelling	Vacant	
DOMESTIC:	Single Dwelling	DOMESTIC:	Single Dwelling
INDUSTRY:	Manufacturing Facility	Vacant	
DEFENSE:	Arms Storage	COMMERCE/TRADE:	Business

PARCEL B:

DOMESTIC:	Single Dwelling	Vacant	

PARCEL C:

DOMESTIC:	Single Dwelling	DOMESTIC:	Single Dwelling
DOMESTIC:	Secondary Structure	OTHER:	Storage

PARCEL D:

DOMESTIC:	Single Dwelling	DOMESTIC:	Single Dwelling

Landscape Features

The greenhouse business fronts onto Beall Road on the east. A dirt road in early photographs, Beall Road was paved in the early 1950s. A picket fence with decorative posts along the road is shown in a photograph taken c. 1900. By approximately 1915, the pickets had been replaced by plain board. The fence was removed at an unknown date. The original lane leading into the greenhouse property from Beall Road is still extant, located between Greenhouses 6 and 7. However, its original configuration, proceeding north into the complex, then branching to the barn on the north and other service buildings on the south, was altered by the construction of the Packing Shed in 1950.

The service buildings and structures, while located throughout the site, are numerically clustered in an area on the north side of the land parcel, originally serving the greenhouse area located to the east. Greenhouses were eventually constructed west and south of the service area as well. The lush green landscape of the Harrington log house and the 1892 house was originally visually integrated with the greenhouse site and separated from the business by only a wire fence. A paved service road constructed c. 1950 between the dwellings and the greenhouses destroyed this integration.

Focal points in the district include the heating plant, with its 36′ steel chimney stack, and the 1892 house which is located on a knoll and surrounded by tall coniferous trees.

Contributing Buildings

Numbers in bold refer to a greenhouse range, an individual greenhouse, a building, or a structure as they are enumerated on the attached site plan (Ill. #10). Secondary numbers in parentheses correspond to the historic numbering system established by the Beall Greenhouse Company.

Greenhouses #1 and #2 were demolished after 1973. Their foundations remain.

1. Greenhouse Range (#3-#6)
Range of even-span ridge and furrow greenhouses built on a skewed east-west axis angling south. This range replaced an earlier uneven span ridge and furrow range.[1] Constructed or rebuilt in 1922,[2] 90′ X 195′, 17,550 sq. ft., steel pipe frame, concreté foundation walls. Roof bracing is two pipe posts and a cross brace. Wood (fir) sash bar. Wood doors are 6″ butt-jointed boarding on the exterior, board and batten on the interior, with latch hardware. Off-center, they are almost certainly reused from the original range. Dirt floors. Steam heated. Housed roses from 1941 to the 1980s; #3 housed green plants and was open for retail in approx. 1976-77. Condition: deteriorated.

2., 3., 4. Individual Greenhouses (#7, #8, and #9)
Three even-span greenhouses built on a skewed east-west axis with a slight angle to the south. Originally ridge and furrow.[3] Replaced an earlier uneven span ridge and furrow range with frame foundation walls sheathed in shiplap siding.[4] Date of construction, approx. 1924-25. #7, 45′ X 190″, 8,550 sq. ft.; #8, the same; #9, 45′ X 185′, 8,325 sq. ft. Steel pipe frame, concrete foundation walls. Roof bracing: two pipe posts and two cross braces. Fir sash bar. Wood doors are 6″ butt-jointed

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[1]Photograph #1.
[2]Photograph #4.
[3]Interview with Max Steen and Richard Shride on site, 12/18/93; 1938 Property Tax Records.
[4]Photograph #1.

board on the exterior, board and batten on the interior, with latch hardware. Two per gable end, they are probably reused from the earlier range. Dirt floors. Steam heated. In addition to the roof ridge ventilators these greenhouses feature three hinged four-light ventilators on the gable ends over the doors. Open column ventilator gearing. Originally housed roses; housed tomato plants during World War II, iris after the War; an attempt at growing carnations here failed and they returned the houses to roses. Condition: deteriorated.

5. Greenhouse Range built in two phases: (a) #10-#11; (b) #12-#15

(a) Range of two even-span ridge and furrow greenhouses built on a skewed east-west axis with a slight angle south. This range replaced an earlier ridge and furrow range under construction c. 1900.[5] Constructed c. 1917[6], 47′ X 140′; #10 is slightly wider than #11. 6,580 sq. ft. Steel pipe frame, concrete foundation walls. Roof bracing is two pipe posts and a cross brace. Fir sash bar. 6″ wide butt-jointed board doors, battened on the interior, reused from the earlier range. Dirt floors. Steam heated. Condition: deteriorated. (b): Range of four even-span ridge and furrow greenhouses built on a skewed east-west axis, with a slight angle south. Site was vacant before this range was constructed, c. 1917.[7] Approx. 100′ X 160′, 15,200 sq. ft., steel pipe frame, concrete foundation walls replaced original wood frame foundation walls sheathed in bevelled siding. Roof bracing is two pipe posts and two cross braces. Fir sash bar. Wood doors are narrower than doors in previous buildings. Dirt floors. Steam heat. Housed begonias for a short time but primarily housed roses. Condition: deteriorated.

6. Greenhouse Range (#16-#17)

Range of two even-span ridge and furrow greenhouses built on a true east-west axis (the angle south was corrected with this range.) Site was vacant before this range was constructed, between 1936 and 1938;[8] 72′ X 145′, 10,440 sq. ft., steel pipe sidewalls with bracing of two posts and a cross brace. Fir sash bar, reglazed in early 1960s.[9] Entry at gable ends was in a central bay; sliding door with vertical board below, three multi-paned vertical fixed light sash above. The framing in these central bays survives. Steam heated. Housed roses. Condition: deteriorated.

7., 8. Individual Greenhouses (#18-#19)

Two even-span greenhouses built on an east-west axis. Site vacant until the construction of these greenhouses, c. 1925.[10] Each is 45′ X 400′, 18,000 sq. ft., framing same as above. Fir sash bar. Ventilators in gable ends above doors are vertical rectangular lights in a horizontal framing. Dirt floors, concrete aisle through center. Small doors, two at each end. Primarily housed roses; grew tomatoes in the upper half during World War II; stephanotis grew in the entrance. Condition: deteriorated.

9. Greenhouse (#20)

Even-span greenhouse. Site was vacant until its construction in 1946.[11] 36′ X 400′; height to top of gable, 18′. 14,400 sq. ft. Steel pipe frame, four pipe posts and one cross brace; first house to have pipes welded rather than clamped. Double doors on the north elevation are at each end and in the center. Dirt floors. Steam heat. First greenhouse to have lights. Carnations were grown here for a few years, then housed roses. Condition: deteriorated.

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[5] Ibid.

[6] Property Tax Records, 1938.

[7] Ibid.

[8] Property Tax Records, 1938; 1936 Aerial.

[9] Interview with Tom Beall Jr.on site, 16 January 1994.

[10] Property Tax Records, 1938.

[11] Interview with Richard Shride on site, 16 January 1994.

10. Greenhouse (#21)

Even-span greenhouse. A greenhouse was on the site c. 1900, but was approx. one-half the length of the present building. Sometime after 1936 the west one-half was added.[12] Property Tax records' date of construction, 1914, not verified; gears are dated 1910, and the east section could be earlier. Built on a skewed east-west axis angling to the south. 20' x 150', 3,000 sq. ft. The pipe frame is unique in this building; instead of vertical the posts are slanted at an angle. Concrete foundation walls probably replaced original frame sheathed in clapboard. Door configuration not available. Dirt floors, steam heated. Greenhouses #21 through #35 basically housed orchids; two or three houses were mixed with gardenias after World War II. Condition: deteriorated.

11. Greenhouse Range built in four phases: (a) #22-#25; (b) #26; (c) #27-#29; (d) #30-#35

Range of even-span ridge and furrow greenhouses, built on a skewed east-west axis, angling to the south. These two ranges are one continuous range today but were separated by an open space north of the Power Plant, occupied today by Greenhouse #26.[13] This range replaced two uneven-span forcing houses and part of an even-span ridge and furrow range. Original date of construction is not verified; tax records list 1914. (a) Greenhouse range #22-#25 is 80' X 150', 12,000 sq. ft. Pipe frame, brick foundation walls probably replacing the original frame sheathed in clapboard. This is the only example of brick used in greenhouse constructionon the site. Roof bracing is two pipe posts and a cross brace. Fir sash bar. Door configuration not available. Dirt floors, steam heat. (b) Greenhouse #26 joined the two ranges and was built between 1936 and 1947. (c) Greenhouses #27-#29 are 62' X 150', 9,300 sq. ft., and otherwise duplicate the information for #22-#25. Again, Property Tax Records' date of construction, 1914, has not been verified and the date may be earlier; a c. 1915 view shows the same even-span range with off-center doors.[14] (d) Greenhouses #30-#35: This site was probably vacant before the construction of this range, c. 1900.[15] These are the earliest surviving greenhouses in the district. 76' X 150', 11,400 sq. ft., roof bracing type is not available. Foundation walls were wood frame sheathed in clapboard in 1938, later altered to brick and concrete. Fir sash bar. Door configuration was originally wide vertical butt-jointed board with interior battens; configuration today not available. Steam heat. Greenhouses #21-#35, later known as the Orchid Range, were raised to a higher level for gutter installation and increased headroom in 1965-66, requiring stairs for access. A rectangular building used as a potting shed was appended to the west side of Greenhouses #30-#35 in 1959 (See Building #28.) Condition: deteriorated.

12. Greenhouse (#36)

One even-span greenhouse built c. 1926[16] on a true east-west axis. 45' X 300', 13,500, steel pipe frame, concrete foundation walls. Roof bracing is four pipe posts and a cross brace. Fir sash bar; originally two butt-jointed 48" wide doors were on the gable ends. Dirt floor. Steam heat. Housed gardenias, then orchids. Condition: deteriorated.

13. Greenhouse Range (#37-#38)

Range of two even-span ridge and furrow greenhouses identical to Greenhouses #16 and #17. Started with orchids then changed to roses. Condition: deteriorated.

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[12] 1936 Aerial.
[13] Property Tax Records.
[14] Photograph #3.
[15] Property Tax Records.
[16] Ibid.

14. Greenhouse (#39)
Even-span greenhouse built on an east-west axis for use as a propagation house in c. 1949.[17] 20′ X 120′ long, 2,400 sq. ft., wood frame construction with steel pipe framing in the side walls; concrete foundation walls. Type of roof bracing not available. Fir sash bar, originally wood doors, present status not available. Dirt floors, steam heated. After orchids housed roses. Condition: deteriorated.

15. Greenhouse Range (#40-#46)
Known as the "Baby Range." Range of even-span ridge and furrow greenhouses built on a north-south axis. The south one-half of a greenhouse was located on the site of #40 in 1936, and #41-#43 were also present. By c. 1947[18] there were hot beds on the site of #40, and #44-#46 were built. #40 was constructed in 1947-48, making the range 20′ X 120′, with 2,400 sq. ft. Steel pipe frame, concrete foundation walls. For framing see #39. Fir sash, wood doors are 6″ butt-jointed boarding and are positioned directly beneath the gable. Dirt floors. Steam heated. #40 housed roses, later baby roses; #41-#46 housed poinsettas, then roses, then baby roses. Condition, deteriorated.

16., 17. Individual Greenhouses (#47-#48)
Uneven span of greenhouses constructed in 1965; 6′0″ longer on the south than on the north. 45′ X 265′, 11,925 sq. ft. each. Steel pipe construction, truss designed by Max Steen, similar to a compression truss, two pipe posts. Fir sash bars milled on the site by Tom Beall Jr., Max Steen, and Richard Shride.[19] First experimental use of fiberglass as sheathing. Roof and sidewalls changed to glass less than 10 years later, fiberglass was too dark. Two wood doors on each end. Dirt floors, steam heated. Housed roses. Condition: deteriorated.

18. Greenhouse (#49)
Even-span greenhouse constructed c. 1965-66. 45′ X 150′, approx. 6,750 sq. ft. A temporary quonset addition sheathed in plastic was added on the west elevation before 1973; it is no longer extant. This greenhouse was built on the site after an experimental structure composed of a German-designed bubble material proved impractical.[20] Wood frame sheathed in corrugated fiberglass at the gable ends, roof and walls glass. Two wood doors on each end, dirt floors, steam heated. Housed roses. Condition: deteriorated.

19. Greenhouse (#50)
Constructed in 1965. 45′ X 250′, 11,250 sq. ft. Steel pipe construction, truss designed by Max Steen, similar to a compression truss, two pipe posts. Fir sash bar, fiberglass on the north, glass on the south. Wood frame and fiberglass doors. Dirt floors, steam heated. Housed roses. Condition: deteriorated.

20. Greenhouse (#51)
Constructed in 1965. 45′ X 250′, 11,250 sq. ft. Welded steel pipe construction, truss designed by Max Steen, similar to a compression truss. Fir sash bar, glass sash. Concrete for side walls mixed by hand. Cedar planks for side benches from Canada.

21. Greenhouse Range (#52-#53)
Two ridge and furrow greenhouses; #53 built 1954-55, #52 added later. #52 approx. 10′ in width, attached to larger building on the north, #53, approx. 40′ in width, uneven span. Original building was 153′ long, 7,650 sq. ft.; an approx. 40′ X 100′ fiberglass addition was appended on the west at an unknown date. Steel pipe frame,

[17] Property Tax Records, Steen and Shride Interview.
[18] Photograph #5.
[19] Beall, Steen, and Shride interview, 16 January 1994.
[20] Ibid.

roof bracing is pipe side walls and central pipe post on the south, four pipe posts and two cross braces on the north. Fir sash bar. Wood board and batten doors, dirt floors. Steam heated. Condition: deteriorated.

22. Greenhouse (#54)

Built to house orchids in the early 1960s, this greenhouse is 45′ X 250′, 11,250 sq. ft. Steel pipe construction, wood frame sheathed in fiberglass. Designed and built by Halvor Larsen.[21] Large square opening at gable end designed to access machinery moving pallets. One of few greenhouses in the plant with overhead sprinklers, designed to water cymbidium orchids. Condition: deteriorated.

23.-27. Individual Greenhouses (#55-#59)

Five even-span greenhouses constructed in 1968. 45′ X 248′, 33,480 sq. ft., except #55, which is approx. 218′ in length, 9,810 sq. ft. Steel pipe construction, truss designed by Max Steen, similar to a compression truss. No cement foundations, fiberglass-sheathed sides and gable ends, glass roofs. Two houses still used for housing roses. Condition: fair.

Greenhouses (#21-#35) are also listed as Ranges (#60-#61) by the company's historic numbering system.

28. Potting Shed (#62)

The Potting Shed was appended to the west elevation of Greenhouses 30-35 in 1959. 40′ X 100′, 4,000 sq. ft., steel pipe frame with concrete foundation walls. Two pipe posts, one cross brace, compression-type truss. Fir framing, sheathed in fiberglass. Cement floors. Originally heated by radiators. A gabled fiberglass-sheathed addition was appended on the west elevation of the potting shed between Greenhouses #36 and #38 in the 1970s. Condition: fair.

Greenhouses (#63-#64): A large gabled two-story frame building used as a bunkhouse for the workers was on this site until the construction of two greenhouses in the early 1950s. These were torn down at an unknown date and the site is again vacant.

Greenhouses (#65-#69) are not included in the boundaries of the historic district. These were temporary buildings constructed in the 1970s to house orchids; plastic sheathing was attached to a quonset-type steel pole frame. Only a few frames remain on the site.

The site of Greenhouses (#70-#79) is not included within the boundaries of the historic district. These were single-span temporary greenhouses, of various widths, approx. 250′ in width, built in the 1970s to house roses. A few frames remain, but most of this site has been cleared.

The site of Greenhouses (#80-#82) is not included within the boundaries of the historic district. Built in 1983-85, they housed roses. This site was cleared in 1992-3.

29. Power Plant (#83)

Originally built in 1914,[22] the power plant was constructed in a gabled "L" plan around a tall brick chimney stack that was on the site c. 1900.[23] The base of the old stack is still extant. The building was extensively remodelled in 1948 when the plant switched from coal to oil heat.[24] Present dimensions are: south elevation, 30′; west elevation, 34′, turning east 12′, then proceeding 30′; north

[21] Ibid.

[22] Property Tax Records.

[23] Photograph #1.

[24] Property Tax Records.

elevation, 18'; primary east facade, 64', a total of 1,580 sq. ft. Concrete foundation and floors. Original wood-sided walls were resheathed in corrugated steel, as was the roof, originally corrugated iron. Louvered wood ventilator is original. Large windows with multi-paned rectangular sash, wood muntins, date to 1948. A wood frame boiler room sheathed in fiberglass was added on the north end in the 1970s. A sliding door on the south end of the facade is wood, as is an entry on the north. Two steel stacks 36' high, one 30" and one approx. 48" in diameter. In 1948 the original boiler was retained and two more boilers were added, salvaged by hand from a ship that sunk in Alaska.[25] By 1943 the three boilers had been converted to oil burners. The two ship boilers are still extant (See Structures #36, #44), but the large boiler has been removed. Condition: deteriorated.

(30) Building #84, Packing Shed

Built in 1950, replaced two large gabled buildings on the site. Sawtooth industrial design, with the walls facing north finished in multi-pane rectangular fixed sash. Rectangular plan, 88' X 105', with an 8' X 38' inset dock on the primary east facade; 8,936 sq. ft. The Packing Shed is frame construction with original vinyl sheathing on the east and corrugated aluminum on the other elevations and the roof. Concrete foundation. Hot water heat. The primary east facade features a tripartite fenestration of long horizontal 3-light fixed sash on each side of the inset dock. Original board and batten 3-panel door with one upper rectangular light. A rectangular addition was appended to the west elevation at some time before 1973. Interior space was divided into areas used for grading and packing, office space, a vault, and a 20' X 88' cold room. Condition: fair.

31. Cookhouse/Office (#85)

The Cookhouse/Office is one of the oldest buildings on the site, dating at least to 1900[26] and possibly to the plant's establishment in 1888. The building originally was one-story frame, 18' X 31', sheathed in wood siding with a gabled wood shingle roof, central chimney, and a post and beam foundation. Entry was on the south elevation. Windows were one-over-one light double-hung sash. This building originally served as the cookhouse for the greenhouse company's workers. By 1938 the building was used as an office and had two small gabled porches appended; in later years it was used as a tool shed. The building today has had a concrete foundation and shake roof added, and plywood has been applied to the exterior. A four-over-four light double-hung window has been added in the second story gable. Condition: fair.

32. Barn (#86)

The barn is one of the oldest buildings on the site, dating to at least 1900 and probably to the plant's establishment in 1888. The barn was originally two story frame, approx. 45' square, sheathed in wood siding with a gabled wood shingle roof and a post and beam foundation. A large square wagon entry was on the east; a large rectangular opening served the hay loft. Small square windows were visible on the south elevation, with a door at the west end; the east facade gable featured two-over-two light double-hung sash flanking the hay loft opening. At an early date a lean-to was added on the north elevation. Between the early 1950s and 1959 the barn was sheathed in corrugated aluminum; the hay loft opening was covered over; a central sliding door was placed on the east elevation; a new concrete foundation was added, framing was replaced by steel posts, and a row of one-over-one light windows was inserted in the gable end of the east elevation. The building today has been altered to serve as a residence. Vertical wood siding, a shake roof, two-over-two light double-hung sash in various configurations, and a two-story deck providing entry to the second floor has been added. Condition: good.

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[25] Property Tax Records, Beall, Steen, and Shride Interview.
[26] Photograph #1.

33. Reservoir (#87)
Two metal water tanks on timber framed stands were originally located on this site. This reservoir was constructed of concrete in 1946. 40′ X 75′, the tank is 12′ deep and the walls are 3′ in width. A shed-roofed entry, wood frame and sheathed in fiberglass, is appended on the northeast corner. Condition: good.

34. Lab Complex (#88)
The lab complex is a group of buildings associated with orchid production. There was a long rectangular building on the site in 1936; this was enlarged after 1947 with the addition of a lab and research room and storage. In the late 1970s this complex was connected to the Potting Shed and the south end of the Orchid Range by a corridor, called "the Orchid Corridor," where orchids were displayed for buyers. The lab complex is in good condition.

35. Circular Steel Tank (#89)
This 80,000 gallon tank was used for oil storage. 20′ in diameter, it was installed in 1950. Condition: fair.

36. Rivetted Fabricated Steel Tank (#90)
This tank, along with #44, was hand salvaged from a ship that sank in Alaska. It was on the site by 1938. Condition: fair.

37. Worker's Toilet (#91)
Believed to have been built for use by the occupants of the bunkhouse c. 1915. Small gabled building sided in shiplap with corner boards. Concrete foundation, corrugated aluminum roof, two six-panel doors, six-light fixed sash. Probably in its original location. Facade faces east. Condition: fair.

38. Soil Testing Laboratory (#92)
Small one-story frame building with shiplap siding and corner boards, corrugated metal roof, five-panel door flanked by one-over-one light double-hung sash. Probably dates to c. 1915. Moved from its original location on the east elevation of a workshop/storage building that was replaced by the Packing Shed in 1950. Condition: fair.

39. Workers' Housing or "Sigfried's House" (#93)
This building is one of the earliest on the site and appears c. 1900. Photo #1 shows the building newly constructed; the two entries do not yet have stairs and the central chimney has not yet been installed. One-story frame construction, 14′ X 30′, 420 sq. ft., sheathed in bevelled siding with corner boards. A gabled roof is sheathed in corrugated aluminum (originally wood shingle); the original central chimney has been removed. Post and beam foundation. Originally built as a duplex, two doors with a single panel below and a single square light above are located in the center of the primary east facade. The original configuration of these doors was two lower panels with a two-over-two light fixed sash above. On the interior, tongue and groove used as a wainscoting is still extant.

40. Worker's Housing (#94)
This building appears on this site at some time between 1936 and c. 1947. It is constructed in a "T" plan and appears to be two early buildings connected together; in c. 1900, two other rectangular gabled buildings are on the site; one is documented as a single family dwelling in 1938. Measuring 14′ X 32′, it is almost certainly a part of this house. Newspapers dating to 1905 seem to confirm this date. An enclosed hip roof porch on the west elevation has recently been altered into an open gabled porch. The earlier house had a wood shingle roof with a central chimney, wood siding, cornerboards, and a post and beam foundation; it was similar to Sigfried's House. The house today has had several alterations; the shiplap siding remains. A shake roof, new windows in various locations and configurations with applied muntins, new doors, and turned porch posts are all recent additions.

41. Christmas Tree Flocking Shed (#95)
Building #95 replaced a long rectangular building on the site in 1936. Built in 1954, the building has a sawtooth industrial design with four bays. Square in plan, 80′ X 80′, a 10′ overhang was originally connected to the west elevation. Frame construction sheathed in corrugated aluminum (including roof), concrete foundation. Sliding doors. Condition: poor; guttering was poorly designed and has failed.

42. Circular Steel Tank (#96)
Used for oil storage, moved from Ellisport in the late 1960s.

43. Propane Tank (#97)
Moved to the site in 1968.

44. Rivetted Fabricated Steel Tank (second of two) (#98)
Originally in the Power Plant, moved to this site at an unknown date. See #36.

45. Shop (#99)
Built c. 1923, frame construction, gabled plan built on a north-south axis. Started out as a manure shed; organic fertilizers were used in the form of manure obtained from the local dairies. Sheathed in corrugated aluminum at an unknown date. Wood frame roof, also sheathed in aluminum. Cement floor. 24′ X 50′, originally had a 14′ X 35′ lean-to garage on the west which was removed in 1965 for the construction of Greenhouse #55. Six-light fixed sash in various locations on the elevations. Condition: deteriorated.

46. New Boiler Room (#100)
Constructed in 1968 when natural gas came to the island. 35′ X 50′ rectangular plan with gable end facing east. Sheathed in corrugated aluminum and fiberglass. Large opening in the facade was originally smaller, with two tall panelled sliding doors.[27] Concrete foundation. Condition: fair.

47. Quonset Hut (#101)
Built in 1947 of corrugated iron, this building was originally used by the U.S. Navy for torpedo storage before it was purchased and brought to this site.[28] Corrugated iron, concrete foundation, 25′ X 50′, 1,250 sq. ft. Max Steen installed glass end walls, making this building probably the only quonset hut/greenhouse ever designed.[29] Now covered in plywood. Two square windows with single fixed sash flank two tall presswood doors. Condition: fair.

48. Stand-by Generator (#102)
Built between 1946 and 1947; small frame structure with a low-pitched gable roof located between Greenhouses #9 and #10. Butt-jointed exterior boarding, four-light fixed sash; gable end faces west. 35 KW rating. Condition: deteriorated.

49. Toilet (#103)
Small frame building located between Greenhouses #50 and #51, used as toilet facilities for the south section of the plant. Built in the 1970s, sheathed in corrugated aluminum, with a shed roof. Condition: fair.

50. Hilan Harrington Log House
(See Harrington Log House Landmark Registration Form 11/93.)

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[27] Property Tax Records.
[28] Ibid.
[29] Max Steen Interview and Property Tax Records photo.

51. Garage
(Noncontributing; see Harrington Log House Landmark Registration Form 11/93.)

52. Poultry Outbuilding
(Noncontributing; see Harrington Log House Landmark Registration Form 11/93.)

53. 1892 Harrington House
The 1892 Harrington House is located north of the greenhouse plant on the west end of parcel #142. Originally the site encompassed a larger area, extending north and east for a total of approximately 10 acres. The house is situated on a hill, facing east, and is southeast of the Harrington Log House (see #50).

The 1892 Harrington House is an example of second-generation Vashon Island architecture that was constructed after the homesteading/log house phase of pioneer settlement. The 1892 House was built on the original site of the log house, which was moved approximately 100 yards to the northeast. There is no documentation on the house's builder/designer.

The house is an excellent example of Queen Anne architecture as it was probably interpreted by a local builder. The house is in good condition, retaining integrity of design, materials, location, and setting.

Access to the house is gained by a lane from Beall Road which originally proceeded around the south corner of the house. A wood post and board fence borders the south side of the lane. When Beall's Pedigreed White Leghorn Farm was established on the property in approximatly 1918, this lane became the main access to the farm complex which was located west and north of the house.

The landscape associated with the house was marked historically by several mature coniferous trees. These trees together with the house created a strong visual landmark in early historic photographs of the greenhouse company. Two of these trees still survive. Historic landscape features no longer extant include: (1) fruit trees planted along the lane soon after construction (by 1936 these fruit trees provided a pronounced east-west border to the lane); (2) the land south of the house next to the greenhouse site which was partially planted in row crops; and, (3) large pond located on the south side of the lane near Beall Road (c.1936-1990).

A precise description of landscape materials is not included herein; however historic photographs of various periods document climbing roses, hollyhocks, yucca, wisteria, and pampas grass. The wisteria is still extant.

The house is built on a cross gable plan with the main volume of the building lying on an east-west axis facing Beall Road. The east gable is 37' wide, the north and south gables approx. 15' wide, and the west gable is 17' wide. The house is approx. 48' in length, comprising overall approx. 1,322 sq. ft.

Additions include a two-story addition approximately 7' X 10', on the east section of the north elevation, and a two-story addition, approx. 5' X 7', on the west section of the north elevation. Dates of construction are unknown.

The three-story house is of balloon frame construction incorporating old-growth Douglas fir. At the present time the three stories are differentiated by three styles of wood sheathing, a common characteristic of the Queen Anne style. The first floor is sheathed in clapboard with corner boards; originally a fascia (which is still intact) and a beltcourse (which has been removed in some locations) delineated the first, second, and third stories. The beltcourse served as a boxed guttering on the porch and is still intact. The second story is sheathed in a staggered, coursed wood shingle. The third floor is sheathed in fish scale shingles with several decorative rows of coursed shingles. The present sheathing, added since 1990, was applied over asbestos shingles added in the 1950s, which was in turn applied over the original wood sheathing. The present siding duplicates the original except at the third floor where the original shingles were variegated, not fish scale.

Historic photographs show the house was originally painted cream on the first floor and brown on the second and third floors, with white trim and black window sash.

The foundation is red brick, probably from Herriot and Livesly's brick kiln at Ellisport.[30] There is a partial basement with a 5' X 30' brick-lined well. Due to a fallen watertable, the well is no longer functional. The roof of the house was originally sheathed in wood shingle, now composition shingle. A brick chimney has had the original flared cap removed. Windows are predominantly one-over-one light double-hung sash.

Significant features of the house include:

Facade:

1. On the north side, a one-story porch with a hipped roof with composition shingles, turned porch posts, open wood stairs (replaced original boxed). An original fretwork balustrade has been removed. A decorative scrolled bracket has been attached to the posts; this element is not original.

2. A large rectangular window on the south section of the facade featured a transom with a square-paned art glass border, as did a vertical rectangular window to the right of the entry. These window lights have been replaced by bevelled art glass.

3. A rectangular fixed pane sash with an elliptical gable was removed from its original location in the south gable and inserted in the east gable, before the 1920s.[31]

4. The entry door, originally panelled, has either been altered or replaced.

South elevation:

1. A two-story projecting bay featured an original decorative panel of diagonal boarding which has been removed or covered.

2. A side porch with one post and the original fretwork balustrade is intact.

3. Single-light fixed pane sash on the east end, second floor, is original to the location but in the 1920s was divided by a vertical muntin.

4. Rectangular fixed multi-pane sash in upper gable replaced an elliptical window.

5. Deck has been added on the west section.

North elevation:

1. Spiral stair has been added up to the second story porch.

On the interior the first floor oak floors and supposedly some of the framing members were brought from the East around Cape Horn.[32] Interior doors are four-panel; window and door enframements are cedar in an Eastlake style with the

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[30] David Ward, "Being a Brief but Concisely Detailed History of Hiland Hill," 1993.
[31] Historic photographs in collection of David Swain.
[32] Tom Beall Jr. Interview, per Tom Beall Sr.

carpenter's intended location written on them in script.[33] Heating was accomplished by ten hot water radiators located throughout the house, powered by a coal burning boiler, no longer extant.

54. Garage
One and one-half story frame building, sheathed in wood siding, with a large sliding battened door on the primary north elevation. Date of construction is unknown, probably 1920s. Wood shingle roof, four-light fixed sash in gable of north facade. Shed dormer on the south elevation. The east and south elevations have undergone some fenestration alterations. Condition: fair.

55. Playhouse
Date of construction unknown, probably early 1920s. Small one-story gabled building with a lean-to porch on the facade; originally had two square posts and a wood porch floor, no longer extant.[34] Sheathed in coursed wood shingles, wood shingle roof. Three-light horizontal sash, one on the north and south elevations. Four-panel double doors. Foundation has deteriorated. Condition: poor.

56. L.C. Sr. and Jennie Beall House (a.k.a. "Beall Family Home")
(See Beall Family Home Landmark Registration Form 10/20/87.)

Non-contributing Resources

51. Garage
(See Harrington Log House Landmark Registration Form 11/93.)

52. Poultry Outbuilding
The only surviving structure from Beall's Pedigreed White Leghorn Farm, now a residence (See Harrington Log House Landmark Registration Form, 11/93.)

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[33] David Ward.
[34] Historic photographs in collection of David Swain.

7. Statement of Significance

Significance of this property in relation to other properties: _x_ national _x_ state wide _x_ local

Applicable Designation Criteria	_x_ A1	_x_ A2	_x_ A3	___ A4	___ A5
Criteria Considerations (Exceptions)	___ C1	___ C2	___ C3	___ C4	___ C5

Areas of Significance (enter categories from instructions)

ARCHITECTURE
AGRICULTURE/INDUSTRY

Period of Significance

Significant Dates

1888-1986

Cultural Affiliation

Significant Person:
Beall, Ferguson, Tom Sr., Wallace

Architect/Builder:
Harrington, Hilan; Wallace Beall; Tom Beall Sr.

State significance of property, and justify criteria, criteria considerations, and areas and periods of significance noted above.

The Harrington-Beall Greenhouse Historic District is significant under criteria A1, A2, and A3 of King County Code 20.62: 1) for its association with the growth and development of the horticultural industry in King County, particularly for its contribution to the cultivation of orchids and roses nationwide, in the period from 1888 to 1989; 2) for its association with the Harrington and Beall families who played important roles in the horticultural industry in the Pacific Northwest and; 3) as a rare intact example of a complex which illustrates the evolution of greenhouse design and construction in King County.

The greenhouse complex has been a prominent Vashon Island landmark since the plant's establishment in 1888 by Hilan Harrington. In 1899 the Harrington's daughter Jessie married L. C. Beall Jr. and in 1902 Hilan Harrington went into partnership with L.C. Beall Sr. and his sons L.C. Jr. and Wallace. In the plant's 101 years of operation the business grew to become one of the largest grower of roses west of the Mississippi and an orchid establishment of international renown, employing up to 112 people in the summer and over 60 people year around in a plant with over 54 buildings and structures. During the 1970s labor and heating costs at the Vashon plant forced the family to search for other more viable locations for the business and a plant was established in Bogota, Colombia, which is still operating today. In 1989 the Vashon plant was sold.

Today the site contains 59 greenhouses dating from approximately 1905 to 1968; 22 support buildings and structures associated with the business, including a cookhouse, barn, and worker's housing built on the site c. 1900; and three residences including the original log homestead and two Victorian-era houses built by the Harrington and Beall families. Two of these houses, the Hilan Harrington Log House (c. 1885) and the L.C. Sr. and Jennie Beall House (c. 1902) were designated as King County Landmarks in 1993 and 1987 respectively; however they are incorporated herein as contributing elements of the district.

Historic Significance

The history of the Harrington/Beall Greenhouse Historic District begins c. 1888 with the immigration of Hilen Harrington and his brother Clinton to Vashon Island from

_x_ See continuation sheet

Norwich New York where Hilan had established a greenhouse business in 1878. This plant, the Harrington Greenhouse Company, is still in operation and is owned by Harrington's great-nephews George and Gilbert Harrington.[1] Upon arriving on Vashon Hilan purchased property that was originally part of a 160-acre tract homesteaded by August Doerr in 1879. He moved into the log house on the site, believed to have been built by the claim's second owner Robert Gould in approximately 1885,[2] and then returned to New York for his wife Ella and ten year old daughter Jessie.

Harrington came to the Puget Sound Region during a period of tremendous growth following the completion of the transcontinental railroads. Before that time the area had been isolated from the national marketplace; the development of the railroad tied Washington into eastern urban markets, resulting in an explosion of agricultural production from 1880 to 1900.

In a 1915 "Special Greenhouse Edition" of the Vashon Island News Harrington was credited as the founder of the greenhouse industry in the Puget Sound Region:

> The introduction of the glass-covered garden on the Island dates back to the year 1888, when Mr. Harrington erected nine houses near Vashon, and it is largely due to his wisdom and foresight that we are able to claim at this time our present high rating in the industry. At the date above mentioned both Seattle and Tacoma were in their swaddling clothes, yet each afforded a market for flowers, and the early settlers, as well as our people today, were lovers of the flora which flourishes so luxuriantly in this climate . In looking about for a suitable location and with an eye to the future, Mr. Harrington wisely decided that Vashon Island, lying at the front door of two cities with a prospect of rapid growth, was the ideal spot for this industry, and time has demonstrated the wisdom of his choice. The business has kept pace with the growth of the cities, and will continue to increase. With the enormous local demand for greenhouse products, and the demands in the East, in British Columbia and in Alaska; and with advantages in climate over the mainland--several degrees warmer in winter and a little cooler in summer; and with superior shipping facilities, it would be hard to find a more desirable location. . As a place to live and make a home, there are none better. A delightful climate, beautiful scenery,the best soil in the state, the best water on the continent, the advantages of churches and schools, the absence of saloons, a refined class of people, all tend to justify the claim of superiority over any other locality on the Pacific Coast.[3]

Harrington started out in the business growing tomatoes and cucumbers: a major market for vegetables was created during the Alaskan gold rush.[4] An early photograph of the plant taken around 1900[5] shows 15 greenhouses, two buildings that were probably forcing houses, a barn, worker's housing, a cookhouse, a water tank, three brick chimney stacks for the wood-burning furnaces, and several open shelters, one housing wagons.

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[1]Telephone interview with Gilbert and George Harrington, Harrington Greenhouse Company, Norwich, New York, 17 January 1994.

[2]Telephone interview with Marshall Sohl by Author, 16 October 1993.

[3]Vashon Island News, 11 February 1915.

[4]Reed Fitzpatrick, "Subject: H. Harrington Co. Greenhouses with C.M. Harrington--L.C. Beall Sr.," 1983; and John H. Reid, ed., Vashon Island, "Home of the Big Red Strawberry," 1909.

[5]Photograph #1.

During this early period Harrington's father George Lewis and brother Lewis came from Norwich and stayed a year, ostensibly to learn the business. They returned to New York and launched a successful winter vegetable business, using what they had learned on Vashon Island. Harrington's brother Clinton left the business soon after his arrival, but his family remained in the Puget Sound area.[6]

By 1892 the H. Harrington Company Greenhouses were doing well enough for the Harringtons to build a Queen Anne-style house on the site of the old log house which was moved about 100 yards to the northeast. The new house was situated among coniferous trees and was reached by a long drive bordered by fruit trees. The imposing two and one-half story house featured decorative shingles, Victorian detailing, art glass windows, and oak floors brought from the East around Cape Horn. The house is believed to have been designed and constructed by local island labor at a cost of $2,000. It was a fitting symbol of the financial success Harrington had achieved in his new venture in the Northwest.

In 1898 Harrington's future partner Lewis Cass Beall Sr. and his wife Sarah Jane Corner Beall (Jennie) moved to Vashon Island from Beltsville, Maryland where he had owned and operated a thriving mercantile business. Beall had been advised by his doctor to move west for his health. He was 47 years old. The Bealls and their children Lewis Cass Jr., Connie, Wallace, Magruder, and Allen first settled in a house near Center for about three years. In 1899 L.C. Beall Jr. married Harrington's daughter Jessie, and in 1922 he published a brief history of his move west in a catalogue advertising his poultry farm:

> On coming to Washington at the age of 23, (1899) I entered business with Mr. H. Harrington, my father-in-law, who was conducting a large greenhouse plant on Vashon Island. Later my father and brothers also became interested in the same business. This plant was the largest in the Northwest, operating several retail stores in Seattle.[7]

Soon after the marriage of L.C. Jr. and Jessie, L.C. Sr. went into business with the Harringtons. In approximately 1902, L.C. Sr. and Jennie built a large two and one-half story house across Beall Road east of the greenhouse complex (the "Beall Family Home" was designated a King County Landmark in 1987.) The house was supposedly built by a local carpenter, Mr. Nye, and is typical of island architecture of the period in its decorative shinglework, two-over-two light windows, exposed rafters, and hipped roof dormers. The house had a personal touch, however, unique to the island: Jennie Beall, nicknamed "Madame," came from a family of Virginia planters, and she insisted upon the columns supporting the hipped roof porch because they reminded her of a family home in Georgia that had been destroyed during Sherman's March.

L.C. Beall Sr. had attended the Maryland Agricultural College and during his stay in Maryland had established himself as an authority on horticulture. In addition to this experience, he probably brought some capital investment as well; on March 3, 1902 the H. Harrington Company was incorporated with a capital stock of $18,000 with H. Harrington, L. C. Beall Sr., L. C. Beall Jr., and Wallace Beall as Trustees.

As early as 1896 Harrington had branched out from vegetable growing to floriculture, and the years following the turn of the century saw the business expand with the H. Harrington Company operating retail stores at 916 Second Avenue and 1318 Fourth Avenue in Seattle. By the 1909 Alaska-Yukon Pacific Exposition Vashon Island had become the center of King County's horticultural industry. A booklet published for the Exposition promoted the industry:

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[6]Telephone interview, George and Gilbert Harrington.

[7]L.C. Beall Jr., <u>Catalogue and Mating List of Beall's Pedigreed White Leghorn Farm</u> (Vashon, Wa., 1922.)

> The greenhouse industry is a profitable business in King County. It may be established in the valleys, cities or on the logged-off lands of the forest. Wherever proper attention is given the work greenhouses pay handsome profits. Vashon Island presents an object lesson in building and operating greenhouses. A few years ago that fertile spot was a part of the great Puget Sound forest. The logs were cut away and sent to the mills of commerce and the stumps taken from the ground. Then began an era of development that reads like a book of romance. For Vashon now has 67 commercial greenhouses and room for many more of the same nature.[8]

In 1912 at the age of 61 Harrington retired from the greenhouse company, sold his interest in the plant to L.C. Sr., Wallace, and Allen Beall, and the business was renamed The Beall Greenhouse Company. From that time on Harrington focused on the operation of the Seattle retail stores and on his realty interests. Soon after his retirement he and Ella moved back into the log house, leaving the 1892 house to be occupied by L.C. Jr. and Jessie. Their daughter Eleanor Emily was born in the house on July 9, 1914.

The 1915 Special Greenhouse Edition of the Vashon Island News carried the headline "Quarter of a Million Square Feet of Ground Covered by Glass: Vashon Island--The Home of the Greenhouse" and went on to state:

> With more than one hundred large greenhouses on the Island, producing annually nearly one hundred thousand dozen cucumbers, ten thousand boxes of lettuce, and nearly as many boxes of tomatoes, and with the largest flora plant in the Northwest (Beall Greenhouse Company), we claim the right in the great industry of forcing the season.[9]

The article went on to state that the company now had 36 greenhouses covering an area of more than 110,000 square feet:

> The Beall plant is located about one mile from the Vashon P.O. and is, so far as we have been able to learn, the largest flora producing plant in the Northwest. While the firm makes a specialty of roses and carnations, they produce great quantities of about every kind of flower found in the country together with all sorts of bedding and potting plants.Some idea may be formed of the size of this plant when it is known they furnish regular employment for twenty men and consume annually more than 1400 tons of coal. Mr. Beall tells usduring the coldest of our days they burn about ten tons of coal per day. While this firm does not pretend to raise vegetables they produce as a sort of filler for some of their beds, during the summer months many thousands of boxes of tomatoes. To the lover of flowers we can think of nothing more beautiful or pleasing than a visit to this the greatest flower garden in the Northwest.[10]

The article goes on to name other greenhouse establishments on the island:

1. C.A. Renouf, Cove; 6,000 sq. ft., grapes, tomatoes, lettuce, cucumbers.
2. Bibbens and Sons, Quartermaster; est. 1912, cucumbers.

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[8]King County, State of Washington: Its History, Resources, Development, Present Conditions, and Opportunities (Published at the Alaskan-Yukon Pacific Exposition, 1909.)
[9]Vashon Island News, 11 February 1915.
[10]Ibid.

3. Vashon Garden Company (Hoshe), 10,000 sq. ft., est. 1911, flowers and vegetables.
4. Claude Peterson, Dockton; 5,000 sq. ft., lettuce, tomatoes, cucumbers.
5. Charles Newcom, Ellisport; 38,600 sq. ft., est. 1906, lettuce, tomatoes, cucumbers.
6. W.V. Coney, 1/2 mile north of Vashon P.O.; est. 1906, 16,000 sq. ft.; lettuce, cucumbers, tomatoes, cabbage, pears, lemons.
7. Taylor and Bibbens, Vashon; 15,000 sq. ft., lettuce, cucumbers, tomatoes.
8. Phillip French, Vashon; 7,000 sq. ft., lettuce and cucumbers sold at the Public Market.
9. Fir Tree Farm Plant, Quartermaster; est. 1912, 16,000 sq. ft.; cucumbers, tomatoes.
10. E.R. Stewart, Burton; 2,000 sq. ft., cucumbers, tomatoes.
11. H.G. Stanley, Burton; est. 1911, 2,400 sq. ft., lettuce, tomatoes.
12. A.J. Van House, Burton; est. 1912, 2,000 sq. ft., lettuce, cucumbers.

Of the 13 establishments listed in 1915 only one is still extant, Bibbens and Sons, which is today the site of several deteriorated greenhouses.

Upon Harrington's retirement L.C. Jr. also left the greenhouse company and "having other interests on the Island, also a beautiful home, I selected poultry as the best means of keeping up the home place and to have something to occupy my time. My father-in-law strongly advised me to adopt South Carolina White Leghorns, as he believed that most of the successful farms, especially on the Pacific Coast, kept only the egg-type breeds."[11] He went on to state that his training in the greenhouse business was what made him a successful poultry breeder: "It was here my training was acquired as a florist and plant-breeder through the production of the beautiful, the recognition of type, the classification of different species and the detail work in all branches of the business which gave me a foundation as a specialist poultry breeder."

L.C. Jr. and Jessie established Beall's Pedigreed White Leghorn Farm on ten acres surrounding the 1892 house, and poultry outbuildings were soon built throughout the site. The farm raised single comb white leghorns bred by Mr. D. Tancred, "the founder of the wonderful Tancred strain, THE FLOCK WITH A KNOWN TRAPNEST RECORD."[12] The Beall Farm became famous for its fine poultry, selling throughout the 1920s to customers from as far away as Japan. In 1921 the Beall Farm white leghorns took first prize in a national egg-laying contest.

In 1926 L.C. Sr. died and L.C. Jr. took over as President of the Beall Greenhouse Company with Wallace as its Director. The date L.C. Jr. left the poultry business is not known, but in 1935 Jessie died after a long illness and L.C. lost interest in the house and grounds, closing it up for over 18 years until its sale in the 1950s to another Beall relative. Today only one poultry outbuilding survives on the site, Building #52, which was probably either a trapnesting house or the Special Single Mating Breeding House. It has been altered for use as a residence.

During the decades following World War I the company focused on building maintenance and solidifying the business. Under the direction of Wallace Beall the company produced many prize-winning orchids, roses, carnations, camellias, and gardenias. During World War II the company became well known for its role in saving rare English orchid stock. Wallace Beall was one of several growers who helped to preserve the orchids by purchasing entire plants; in 1942 he purchased over 8,000 orchids. They arrived in six different boats to insure that at least one would make it safely, but even with these precautions only 5,000 plants made it alive. These years also saw the demise of the original founders of the company: Hilen Harrington

[11] L.C. Beall Jr., Catalogue and Mating List.
[12] Ibid.

had a stroke while sitting in a barber chair on the Seattle waterfront in 1916; his obituary called him "one of the pioneer florists of Seattle."[13] Ella died in 1922, L.C. Sr. in 1926, and "Madame" Jennie in 1942.

After World War II the company focused on the production of orchids and roses and continued to expand under the leadership of Wallace and his sons. Ferguson, or "Fergie," returned from serving as a fighter pilot during the African campaigns to become the Beall Company's orchid expert. In a 1959 interview Fergie noted that "the business had its glamorous side, like hunting orchids in the jungles of South America, or seeing Europe through the roofs of greenhouses."[14] Fergie experimented extensively in orchid propagation and hybridization and was President of the American Orchid Society in 1959, and the decades of the 40s and 50s saw additions made to the plant complex to accommodate the orchid market.

In 1946 an eight-acre plant was established in Palo Alto, California devoted exclusively to roses and managed by Wallace's son John. Tom Beall Sr., another son, became General Manager of the Vashon plant, was president of the National Rose Growers Association, and for ten years served on a national committee of rose growers which funded research projects to universities. Yet another son, Allen, ran a retail florist shop in Seattle. By 1959 when the Beall Greenhouse Company was featured on local television in "Success Story," there were over 60 employees on Vashon and six in Seattle in the wholesale house. The plant had over 150,000 orchid plants producing over 500,000 orchids a year, with thousands of different varieties. Roses however were the company's "bread and butter" and the Beall Company during the sixties was one of the largest producers of roses west of the Mississippi. During the late sixties and the mid-seventies one million roses wer cut and distributed each year from Vashon Island.[15] Flowers were shipped to Tacoma and Seattle by truck, to nearby towns by bus and rail express and to the Middle West and East by air express and air freight--an improvement from the horse and wagon days of the company when vegetables were hauled to the Vashon Dock to be placed on the Mosquito Fleet and taken to Seattle to the wholesale houses.

The late 40s and 50s saw several new buildings constructed within the plant including #26, the Packing Shed; #37, the Flocking Shed; Greenhouse #39 for rose propagation; #30, the orchid laboratory; and #29, the Reservoir.

Wallace's death in 1964 was the end of an era for the Vashon plant of the Beall Greenhouse Company. With increasing production costs, especially heating and labor, the company began to consolidate and to search for new locations to grow roses. In 1973 Tom Beall Jr. went to Bogota, Colombia to experiment in rose production, and the same year the company closed the Palo Alto plant, which had become surrounded by housing developments. Tom Jr. returned to Vashon to assist his father and the company split into two different corporations, with John managing the Colombia plant and Tom Sr. managing Vashon. John Beall's branch of the company, Beall Roses, is still in active operation and has several retail outlets in the Puget Sound area.

Despite intensive efforts to make the Vashon plant economically viable, the 1980s saw Tom Jr. slowly dismantle the business as production costs continued to rise. The Tacoma warehouse was sold in 1980; the orchid department was sold to a local interest in 1983; an experimental facility was established in New Mexico in 1985; and in 1989, 101 years after its founding, the Vashon plant was sold. The present owners, Charles and Nancy Hooper, like Tom Beall Jr. are searching for ways to restore the property and make its operation economically feasible.

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[13] Seattle Times, 5 December 1916.

[14] Vashon Island Beachcomber, 30 April 1959.

[15] Interview with Tom Beall Jr., 16 January 1994.

Architectural Significance

The greenhouse as a building type has always been closely linked to the expansion of international trade in plants and commercial exploration. The vast botanical resources available in the American wilderness were of great interest to early English, Dutch, and French explorers, and after 1800 it was common for gentleman scholars to build small classically-designed greenhouses and conservatories, usually as part of a residential estate, and trade horticultural knowledge and specimens. Many early libraries in America possessed a copy of Bernard M'Mahon's "American Gardener's Calendar," printed in Philadelphia in 1806, which provided month by month instruction for growing plants in the hot house and cold frame and explained greenhouse construction techniques. Thomas Jefferson, one of M'Mahon's most enthusiastic patrons, was only one owner of a type of classical greenhouse that was common in America in the early 19th century.

Before the Civil War horticulture as an industry was not widespread, and the greenhouse as a building type was predominantly constructed in the form of a residential conservatory, a showhouse where plants were kept on display. Both private and public conservatories became especially popular in both America and Britain after the construction of the Crystal Palace in Prince Albert's Exhibition of the Industry of All Nations in 1851. After the Civil War the great expansion in industrial manufacturing and railroads opened up new markets for florists, seedsmen, and nurserymen, creating a "horticultural awakening"; while only 178 greenhouses were listed in existence in America in 1860, by 1890 there were 4,659.[16]

Hilan Harrington probably owned a copy of "A Practical Treatise on the Construction, Heating, and Ventilation of Hothouses, including Conservatories, Greenhouses, Graperies, and other kinds of Horticultural Structures with Practical Direction for their Management, in Regard to Light, Heat, and Air" by Robert B. Leuchars, a "garden architect." It was the earliest technical book on greenhouses published in America, in 1850 in New York and 1860 in San Francisco:

> The object or end of hot houses is to form habitations for vegetables, and either for such exotic plants as will not grow in the open air of the country where the structure is to be erected, or for such indigenous or acclimated plants as it is desired to force or excite into a state of vegetation, or accelerate in their progress to maturity, at extraordinary seasons. The former class of structures are generally denominated greenhouses, or botanic stores, in which the object is to imitate the native clime and soil of the plants cultivated; the latter, comprehending forcing-houses and culinary stoves, in which the object is to form an exciting climate and soil in general principles, and to imitate particular climate.[17]

Light was the first point of importance, and formulas were given for the slope of hothouse roofs depending on the location's latitude, the position of the greenhouse, and its purpose.

An early photograph of the H. Harrington Greenhouse Company taken c. 1900 provides a fascinating record of early greenhouse design and construction in the Pacific Northwest.[18] An element important to an understanding of the site's architectural

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[16]U.P. Hedrick, A History of Horticulture in America to 1860 (Portland: Timber Press, 1988), p. 491.
[17]Robert B. Leuchars, A Practical Treatise on the Construction, Heating, and Ventilation of Hot-Houses (New York: C.M. Saxton, Barker and Co., 1850), p. 25.
[18]Photograph #1.

history is the pioneer experimental and self-sustaining approach with which Harrington, and later the Bealls, managed the business. No documentation has surfaced that indicates the design or construction services of a professional greenhouse company were ever used. In the early years of the business's establishment the plant was designed according to Harrington's experience in New York state, no doubt with a copy of Leuchars or a similar reference in hand. Harrington must have applied his previous knowledge to the climate and geographic conditions of Vashon Island, modifying them when necessary. Iron, not readily available in this area in 1888 and much more expensive than wood, was never used in sash construction. Up until the time of the last greenhouse construction in the 1970s the sash bars were made by hand on the site, from old growth Douglas fir dipped in hot linseed oil. Framing and trusses were also designed using a personal knowledge of greenhouse operation and local climatic conditions; in the plant's later years the greenhouses were all designed by Construction Foreman Max Steen. In numerous accounts the Bealls were known for "doing things their own way," and they were constantly experimenting to improve methods of production which included the design and construction of the plant buildings, especially the greenhouses.

In the overall plan of the site, the layout of the boiler plant and the first greenhouse established an orientation and plan that were thereafter difficult to change. Photograph #1 shows four early greenhouses, located north of the existing Greenhouses #3-#6, laid out on a north-south axis. These were probably the earliest on the site; in the next phase of construction orientation was changed to an east-west axis, skewed slightly to the south, probably to take advantage of the light. Early construction on the site can be identified by this skewed axis, which was changed by the 1920s with new construction taking place on a true north-south axis, with one exception, the Baby Range.

The architectural terminology of greenhouse construction classifies buildings according to their shape and roof structure. Points to be considered in this decision are: (1) the amount of light received, (2) economy in heating, and (3) reduced cost of construction. Several greenhouses together constitute a "range". Ranges may be composed of (1) detached houses or (2) attached houses, the roof of one building being attached to that of the next, utilizing a common gutter, termed ridge and furrow. Different types of detached houses include: (1) lean-to; (2) uneven span; (3) even-span; (4) curvilinear; and (5) curved eave.

Harrington's earliest greenhouses were uneven span ridge and furrow houses. An uneven span house "has one long span of the roof facing south, covering 2/3 or 3/4 of the width of the house. In some cases it is like an even span house with half cut off the north side (On the Harrington greenhouses, the 1/2 was cut off the south side.) Such houses must also run east and west for maximum light conditions. Because of this form the two side walls will vary in height on level ground, the north wall being two to three feet higher."[19] The uneven span secured a more even distribution of direct sunlight to all plants, with a north span permitting indirect sunlight; also supposedly the heat was more evenly distributed. The advantages of the ridge and furrow house were threefold: it was cheaper, saving the construction of two side walls per building; less heat was required; and, it produced an economy of space. "Garden Architect" Robert B. Leuchars stated in 1850 that "the advantage of this mode of roofing is, that the rays of the sun are presented more perpendicularly to the glass in the morning and afternoon, when they are weakest, and more obliquely to the glass at noon, when they are strongest."[20]

Early uneven span greenhouses on the site were built entirely of wood frame construction, which limited their widths from 20 to 25 feet. The early wood frame

[19]Richard T. Muller, American Greenhouse Construction: Heating and Equipment (New York: A.T. De La Mare Co. Inc., 1927) p. 22.
[20]Leuchars, p. 64.

side and end walls on the Harrington greenhouses were sheathed in different types of wood siding, and early greenhouse construction on the site can be comparatively dated according to the type of siding used. A major disadvantage of frame side and end walls was that the tall, opaque walls required plants to be grown in raised benches; the plants, especially cucumbers, had to be trained on a trellis up to the glass roof to secure satisfactory growth. Cucumbers can be seen hanging from the greenhouse ceilings in an early Harrington and Company photograph.[21]

On the Harrington site the uneven span was superceded by the even-span almost immediately and the c. 1900 photograph shows even-span greenhouses going up on the south next to the old uneven span houses. The even-span house has both sides of the roof the same size and at the same angle. While the advantages of the even-span over the uneven span were debatable in the early days of the industry, within a few decades several other innovations combined to make even-span individual greenhouses the industry norm.

The advent of the semi-iron frame, using in the early years iron and later steel pipe, and the development of concrete revolutionized greenhouse design. Pipe post framing set into short concrete side and end walls replaced the frame walls, bringing the glass sash closer to the ground and providing much more light. The advantages of iron pipe were that 2" pipe posts set 8'4" apart allowed much more light into the building than 4" wood posts set 4'6" apart. This type of framing was used on the site from at least the 1920s, and possibly earlier, through the 1970s. Pipe framing permitted the construction of wide houses, and while the ridge and furrow continued on the site in some instances through the 1930s, this may have been a response to site limitations rather than choice. Wide individual houses with pipe post framing were considered the most desirable building method because (1) they were more economical to heat; (2) cast less shade; (3) were easier to ventilate and work; (4) once heated, the air stayed heated longer than a small house, using less coal; and, (5) the air had further to go and was therefore more tempered by the time it reached the plants.

The range of Greenhouses #22-#35 are interesting for their brick gable walls, the only instance of brick being used in greenhouse construction on the site; however the brick was a later addition, replacing the frame gable walls at a relatively recent date. The sidewalls are concrete.

The doors of the early houses were distinctive in their widths, board and batten interior construction, 6" butt-jointed board exterior construction, and latch hardware. The doors and hardware of the earliest greenhouses were reused in their replacement buildings, and many are extant on the site today, for example in Greenhouses #3-#6 and in other locations. The entries on both the uneven span and the even-span houses in c. 1900 were off-center, a design soon modified with the doors being placed directly beneath the gable peak.

Providing heat to a greenhouse plant was always of paramount importance, as a mistake in heating could cost the grower an entire crop. While a hot water system was standard for most early greenhouses it is believed that the Harrington/Beall greenhouses always used steam. In the earliest days wood-burning furnaces with brick chimney stacks burned cordwood in 4' lengths. Tom Beall Sr. remembers a "short" pile of cordwood running the entire length of the greenhouses along Beall Road. After the turn of the century a tramway with steam engines was laid to the east by the Vashon Transportation Company to bring in coal from the beach north of Klahanie. In approximately 1939 the plant underwent a major change when oil fuel was introduced.

---

[21]Photograph #2.

Water was provided by a natural watershed of approximately 15 acres located 1/2 mile north. This parcel had been purchased by the business by 1907.[22] This natural spring produced 90 gallons of water per minute. The watershed was sold to the Water District upon the closing of the plant in 1988.

Historically, other buildings on the site in addition to the greenhouses include worker's housing and associated service buildings; water structures; a power plant; a barn; buildings to house equipment and maintenance; and later, buildings associated with the orchid industry, including packing and production and specialty buildings.

---

[22]Anderson Map Co., 1907 Plat Map.

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_x_ See continuation sheet

Previous documentation on file:
- _x_ included in King County HRI #0890, #0974, #0975, #0976
- _x_ previously designated a King County Landmark
- ___ previously designated a Community Landmarkk
- _x_ previously listed in Washington State Register of Historic Places
- ___ preliminary determination of individual listing (26 CFR 67) has been requested
- ___ previously listed in the National Register
- ___ previously determined eligible by the National Register
- ___ designated a National Historic Landmark
- ___ recorded by Historic American Buildings, Survey #___
- ___ recorded by Historic American Engineering, Record #___

Primary location of additional data:
- _x_ State historic preservation office
- ____ Other State agency
- ____ Federal agency
- _x_ Local government
- ____ University
- ____ Other

Specify repository:

9. Geographical Data

Acreage of Property: Approximately: 23.11 acres

(A) Harrington/Beall Greenhouse Co.: approx. 15.56 acres; (B) Hilan Harrington Log House: 4.15 acres; (C) 1892 Harrington House: 1.35 acres; (D) L.C. Sr. and Jennie Beall Residence: 2.05 acres

Quadrangle Name: Vashon Quadrangle Scale: 7.5 minute

Verbal Boundary Description

_x_ See continuation sheet

Boundary Justification

Historically the Harrington greenhouse company, the log house, and the 1892 house were located on one large parcel comprising approx. 25 acres. Between 1930 and 1940

_x_ See continuation sheet

10. Form Prepared By

name/title: Mary J. Matthews and Miriam Sternberg

organization: King County Historic Preservation Program date: January 18, 1994 (revised March 23, 1994)

street & number: 506 Second Avenue, Room 1115 telephone: 206-296-7580

city or town: Seattle state: WA zip code: 98104

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Aerial Photographs

1. Aerial of Beall Greenhouse Company by Aerolite, copyright 1973. Courtesy Chuck and Nancy Hooper.

2. Walker and Associates, 1936. Sec. 32 T23 R3 (Copy at the King County Public Works Department.)

Verbal Boundary Description (cont.):

The recommended boundary conforms with the current legal description of parcels 153, 142, 59, 154 and a portion of parcel 94, located in the West 1/2 of Section 32, Township 23, Range 3. The western 1/3 of Parcel 94 is excluded from the nominated area and included an "L"-shaped area with the following dimensions: starting at the northeast corner of Parcel 94, the boundary extends west 400'; thence south 250'; thence east 175'; thence south 400'; thence east 250'; thence north 250' to the starting point. (The Harrington Log House and the Beall Family Home were designated as King County Landmarks in 1987 and 1993 respectively; they are incorporated into the District by reference.) See Attachment B.

Boundary Justification (cont.):

the greenhouse company site and the site of the residences (known as the Jessie Beall parcel) were subdivided into two separate parcels. Except for a 30' X 720' wide strip running east-west on the north side of the greenhouse site which was a road, made into a separate parcel, #154, in the late 1950s, the greenhouse site boundaries are the same today as they were in 1907.

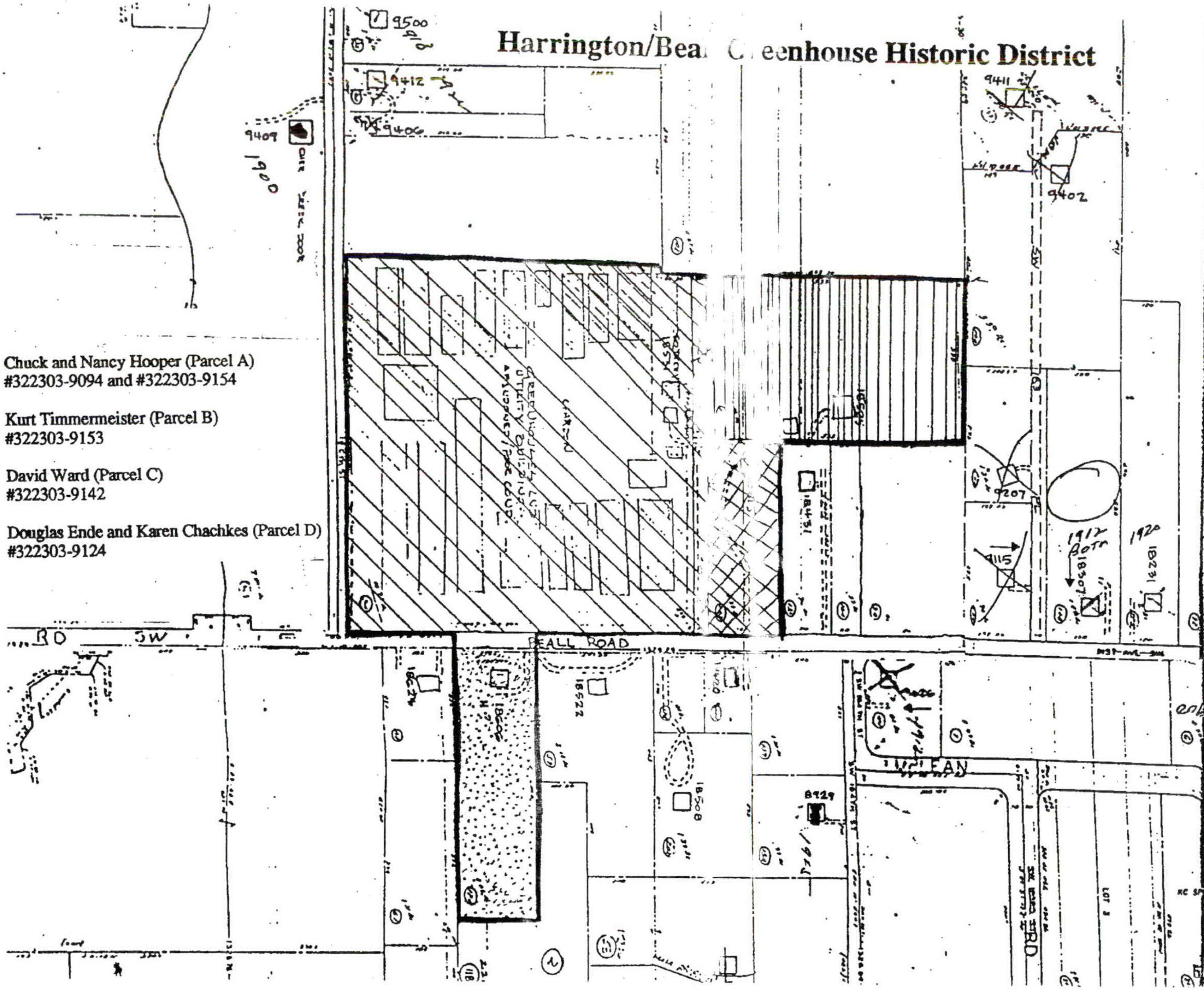
The present 15.56-acre greenhouse parcel is terminated on the west by a road forming a visual barrier; the area west of the road was used for temporary greenhouse construction in the 1970s, but none of these buildings survive today. On the east the parcel is bordered by Beall Road; on the north by the service road and adjacent property lines; and on the south by a service road. South of the service road is another land parcel in open space.

The present 1.34-acre parcel containing the 1892 house is only a small portion of the original Jessie Beall parcel's ten acres. This ten acres was subdivided at a later date into five parcels and sold to different owners. The 1892 house is presently located on a 1.34-acre parcel on the south side of what was originally the Jessie Beall parcel.

The log house, originally built on the present site of the 1892 house, was moved northwest approx. 100 yards when the 1892 house was constructed. Originally a part of Jessie Beall's 10-acre parcel, the present log house site was subdivided into a 4.16-acre parcel and sold out of the family in the 1980s. The present log house site boundaries correspond to this later subdivision.

The L.C. Sr. and Jennie Beall House is sited on its original parcel.

Harrington/Beal Greenhouse Historic District



Key

Chuck and Nancy Hooper (Parcel A)
#322303-9094 and #322303-9154

Kurt Timmermeister (Parcel B)
#322303-9153

David Ward (Parcel C)
#322303-9142

Douglas Ende and Karen Chachkes (Parcel D)
#322303-9124

Attachments

STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501
Mailing address: PO Box 48343 • Olympia, Washington 98504-8343
(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

November 23, 2005

Ms. Lara Rooke
AMEC Earth & Environmental, Inc.
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034

Re: Proposed Harrington-Beall Greenhouses Site Phase II
Log No.: 112205-13-EPA

Dear Ms. Rooke:

Thank you for contacting our department. We have reviewed the materials you provided for the above referenced project. Thank you for inviting us to consult pursuant to 36CFR800 for the proposed Harrington-Beall Greenhouses Site Phase II Environmental Assessment and Remediation Planning on Vashon Island, King County, Washington.

We look forward to receiving the results of your cultural resources assessment efforts, your consultation with the concerned tribes, and your findings. We would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4).

These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer in conformance with Section 106 of the National Historic Preservation Act and its implementing regulations 36CFR800. Should additional information become available, our assessment may be revised.

Sincerely,

Robert G. Whitlam, Ph.D.
State Archaeologist
(360)586-3080
email: rob.whitlam@dahp.wa.gov

cc: C. Sundberg

Appendix D

Appendix D
Test Pit Boring Logs

SOIL CLASSIFICATION LEGEND

MAJOR DIVISIONS				TYPICAL NAMES
COARSE GRAINED SOILS More than half is larger than No. 200 sieve	GRAVELS More than half coarse fraction is larger than No. 4 sieve size	Clean gravels with little or no fines	GW	Well graded gravels, gravel-sand mixtures
			GP	Poorly graded gravels, gravel-sand mixtures
		Gravel with over 12% fines	GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS More than half coarse fraction is smaller than No. 4 sieve size	Clean sands with little or no fines	SW	Well graded sands, gravelly sands
			SP	Poorly graded sands, gravelly sands
		Sands with over 12% fines	SM	Silty sand, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS More than half is smaller than No. 200 sieve	SILTS AND CLAYS Liquid limit less than 50		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic clays and organic silty clays of low plasticity
	SILTS AND CLAYS Liquid limit greater than 50		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils

SAMPLE TYPE SYMBOLS

- Disturbed bag or jar sample
- Std. Penetration Test (2.0" OD)
- Type U Ring Sampler (3.25" OD)
- California Sampler (3.0" OD)
- Undisturbed Tube Sample
- Grab Sample
- Core Run
- Non-standard Penetration Test (with split spoon sampler)

CONTACT BETWEEN UNITS

- Change in geologic unit
- Soil type change within geologic unit
- Obscure or gradational change

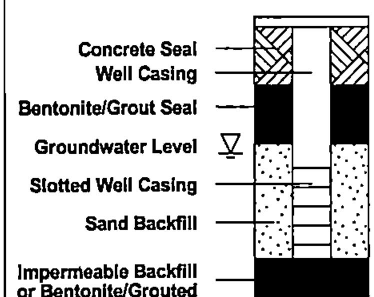
MOISTURE DESCRIPTION

Dry - Free of moisture, dusty

Moist - Damp but no visible free water

Wet - Visible free water, saturated

WELL COMPLETIONS



DESCRIPTORS FOR SOIL STRATA AND STRUCTURE (ENGLISH/METRIC)

General Thickness or Spacing

Parting:	less than 1/16 in. (1/6 cm)
Seam:	1/16 to 1/2 in. (1/6 to 1 1/4 cm)
Layer:	1/2 to 12 in. (1 1/4 to 30 1/2 cm)
Stratum:	> 12 in. (30 1/2 cm)
Scattered:	< 1 per ft. (30 1/2 cm)
Numerous:	> 1 per ft. (30 1/2 cm)

Structure

Pocket:	Erratic, discontinuous deposit of limited extent
Lens:	Lenticular deposit
Varved:	Alternating seams of silt and clay
Laminated:	Alternating seams
Interbedded:	Alternating layers

General Attitude

Near horizontal:	0 to 10 deg.
Low angle:	10 to 45 deg.
High angle:	45 to 80 deg.
Near Vertical:	80 to 90 deg.

STRUCTURE DESCRIPTION (cont.)

Fractured	Breaks easily along definite fractured planes
Slickensided	Polished, glossy, fractured planes
Blocky, Diced	Breaks easily into small angular lumps
Sheared	Disturbed texture, mix of strengths
Homogeneous	Same color and appearance throughout

RELATIVE DENSITY OR CONSISTENCY VS. SPT N-VALUE

COARSE GRAINED			FINE GRAINED		
Density	N (blows/ft)	Approx. Relative Density (%)	Consistency	N (blows/ft)	Approx. Undrained Shear Str. (psf)
Very Loose	0 to 4	0 - 15	Very Soft	0 to 2	<250
Loose	4 to 10	15 - 35	Soft	2 to 4	250 - 500
Medium Dense	10 to 30	35 - 65	Medium Stiff	4 to 8	500 - 1000
Dense	30 to 50	65 - 85	Stiff	8 to 15	1000 - 2000
Very Dense	Over 50	85 - 100	Very Stiff	15 to 30	2000 - 4000
			Hard	over 30	>4000

PHYSICAL PROPERTY TEST

- AL - Atterberg Limits
- FC - Fines Content
- GSD - Grain Size Distribution
- MC - Moisture Content
- MD - Moisture Content/Dry Density
- Comp - Compaction Test (Proctor)
- SG - Specific Gravity
- CBR - California Bearing Ratio
- RM - Resilient Modulus
- Perm - Permeability
- TXP - Triaxial Permeability
- Cons - Consolidation
- Chem - Analytical Chemical Analysis
- Corr - Corrosion
- VS - Vane Shear
- DS - Direct Shear
- UC - Unconfined Compression
- TX - Triaxial Compression
- UU - Unconsolidated, Undrained
- CU - Consolidated, Undrained
- CD - Consolidated, Drained

Notes:

1. Sample descriptions in this report are based on visual field and laboratory observations, which include density/consistency, moisture condition, grain size, and plasticity estimates, and should not be construed to imply field or laboratory testing unless presented herein. Visual-manual classification methods in accordance with ASTM D 2488 were used as an identification guide. Where laboratory data are available, soil classifications are in general accordance with ASTM D 2487.

2. Dual symbols are used to indicate gravel and sand units with 5 to 12 percent fines.

3. WOR = weight of rod.

CDM

King County
Harrington-Beall Greenhouse Site
Vashon Island, Washington

Project No: 19897.47506 Figure: D1

SOIL CLASSIFICATION/LEGEND 47506 HARRINGTON TP.GPJ CDM BLLV.GDT 4/7/06 REV.

Test Pit TP1

Other Tests	OVM (ppm)	TMP	Depth (feet)	Sample	Symbol	DESCRIPTION	Elev. (feet)
				G		Gravel.	
			1	G		Silty SAND (SM), brown, with trace fine gravel, dense, moist (Fill).	
			2	G		Timber present at 2.5 ft bgs on west site of test pit.	
			3	G		Gravelly SAND (SW), brown, dense, saturated (Fill).	
			4	G		Sandy SILT (ML), gray-brown, with trace fine gravel, stiff, moist, with iron oxidation mottling.	
			5	G			
						Test pit terminated at 5 ft bgs. Groundwater seepage noted at ~3 ft bgs during excavation.	
			6				

Location: __________
Surface Elevation: __________

Date Completed: 2-2-06
Logged By: JDM

King County
Harrington-Beall Greenhouse Site
Vashon Island, Washington

Test Pit TP1 — Figure: D2
Project No: 19897.47506 — 1 of 1

CDM

Test Pit TP2

Other Tests	OVM (ppm)	TMP	Depth (feet)	Sample	Symbol	DESCRIPTION	Elev. (feet)
			0			Grass.	
				G		SAND (SP), brown, with some silt, medium grained, trace fine grained gravel, with some silt, dense, moist (Fill).	
			1				
				G			
			2				
				G			
			▽3			Gravelly SAND (SW), brown, dense, saturated (Fill).	
				G			
			4			Silty SAND (SM), gray-brown, with trace fine gravel, very dense, moist, with iron oxidation mottling.	
				G			
			5			Test pit terminated at 5 ft bgs. Groundwater seepage noted at ~3 ft bgs during excavation.	
			6				

Location: ______________________
Surface Elevation: ______________________

Date Completed: 2-2-06
Logged By: JDM

King County
Harrington-Beall Greenhouse Site
Vashon Island, Washington

Test Pit TP2 — Figure: D3
Project No: 19897.47506 — 1 of 1

CDM

Test Pit TP3

Other Tests	OVM (ppm)	TMP	Depth (feet)	Sample	Symbol	DESCRIPTION	Elev. (feet)
				G		Silty SAND (SM), black, with some fine gravel and organics, dense, moist, hydrocarbon-like staining and odor.	
			1	G			
						Becomes brown, no hydrocarbon-like odor or staining.	
			2	G			
			3	G			
						Test pit terminated at ~3.5 ft bgs. No groundwater encountered during excavation.	
			4				
			5				
			6				

Location:
Surface Elevation:

Date Completed: 2-2-06
Logged By: JDM

CDM

King County
Harrington-Beall Greenhouse Site
Vashon Island, Washington

Test Pit TP3 Figure: D4
Project No: 19897.47506 1 of 1

TEST_PIT_TEMP 47506 HARRINGTON TP.GPJ CDM_BLLV.GDT 4/7/06 REV.

Test Pit TP4

Other Tests	OVM (ppm)	TMP	Depth (feet)	Sample	Symbol	DESCRIPTION	Elev. (feet)
				G		Grass.	
						Silty SAND (SM), dark brown, with trace fine gravel, with organics, dense, moist.	
			1	G			
			2	G		Black hydrocarbon-like staining at 2 ft bgs.	
			3			Becomes gray, with hydrocarbon-like odor.	
				G			
			4				
				G		No hydrocarbon-like odor.	
			5			Test pit terminated at ~5 ft bgs. No groundwater encountered during excavation.	
			6				

Location:__________
Surface Elevation:__________

Date Completed: 2-2-06
Logged By: JDM

King County
Harrington-Beall Greenhouse Site
Vashon Island, Washington

Test Pit TP4 | Figure: D5
Project No: 19897.47506 | 1 of 1

CDM

Test Pit TP5

Other Tests	OVM (ppm)	TMP	Depth (feet)	Sample	Symbol	DESCRIPTION	Elev. (feet)
				G		Grass.	
				G		Silty SAND (SM), brown, with organics, dense, moist.	
			1	G			
			2	G			
			3	G			
			4	G			
			5	G			
						Test pit terminated at ~5.5 ft bgs. No groundwater encountered during excavation.	
			6				

Location: __________
Surface Elevation: __________

Date Completed: 2-2-06
Logged By: JDM

King County
Harrington-Beall Greenhouse Site
Vashon Island, Washington

CDM

Test Pit TP5 Figure: D6
Project No: 19897.47506 1 of 1

TEST_PIT_TEMP 47506 HARRINGTON TP.GPJ CDM_BLLV.GDT 4/7/06 REV.

Test Pit TP6

Other Tests	OVM (ppm)	TMP	Depth (feet)	Sample	Symbol	DESCRIPTION	Elev. (feet)
						Grass.	
						Silty SAND (SM), brown, with trace organics and trace fine-grained gravel, dense, moist.	
			1				
			2				
				G			
			3				
			4				
			5	G		With iron oxidation mottling.	
						Test pit terminated at ~5.5 ft bgs. No groundwater encountered during excavation.	
			6				

Location:

Surface Elevation:

Date Completed: 2-2-06

Logged By: JDM

King County
Harrington-Beall Greenhouse Site
Vashon Island, Washington

Test Pit TP6 Figure: D7

Project No: 19897.47506 1 of 1

CDM

TEST_PIT_TEMP 47506 HARRINGTON TP.GPJ CDM_BLLV.GDT 4/7/06 REV.

Test Pit TP7

Other Tests	OVM (ppm)	TMP	Depth (feet)	Sample	Symbol	DESCRIPTION	Elev. (feet)
						Grass.	
				G		Silty SAND (SM), with trace fine to medium gravel, dense, moist, broken clay pottery pieces, hydrocarbon-like staining and odor.	
			1				
				G			
			2			No pottery pieces.	
				G			
			3				
			4				
				G		No hydrocarbon-like odor.	
			5			Becomes wet.	
				G			
						Test pit terminated at ~5.5 ft bgs. No groundwater encountered during excavation.	
			6				

Location:
Surface Elevation:

Date Completed: 2-2-06
Logged By: JDM

King County
Harrington-Beall Greenhouse Site
Vashon Island, Washington

CDM

Test Pit TP7
Project No: 19897.47506

Figure: D8
1 of 1

TEST_PIT_TEMP 47506 HARRINGTON TP.GPJ CDM_BLLV.GDT 4/7/06 REV.

Test Pit TP8

Other Tests	OVM (ppm)	TMP	Depth (feet)	Sample	Symbol	DESCRIPTION	Elev. (feet)
				G		Silty SAND (SM), dark brown, medium dense, moist, hydrocarbon-like staining in upper 1 foot.	
			1	G			
			2	G		Becomes brown, dense.	
			3	G			
						Test pit terminated at 3.5 ft bgs. Groundwater seepage noted on top of dense till at ~2 ft bgs during excavation.	
			4				
			5				
			6				

Location:

Surface Elevation:

Date Completed: 2-2-06

Logged By: JDM

King County
Harrington-Beall Greenhouse Site
Vashon Island, Washington

Test Pit TP8 Figure: D9

Project No: 19897.47506 1 of 1

CDM

Test Pit TP9

Other Tests	OVM (ppm)	TMP	Depth (feet)	Sample	Symbol	DESCRIPTION	Elev. (feet)
				G		Silty SAND (SM), dark brown, trace fine gravel, medium dense, wet.	
			1	G			
			2	G		Becomes gray, dense, moist.	
			3			Test pit terminated at ~3 ft bgs. Groundwater seepage noted at ~1.5 ft bgs during excavation.	
			4				
			5				
			6				

Location:
Surface Elevation:

Date Completed: 2-2-06
Logged By: JDM

King County
Harrington-Beall Greenhouse Site
Vashon Island, Washington

Test Pit TP9
Figure: D10
Project No: 19897.47506
1 of 1

CDM

TEST_PIT_TEMP 47506 HARRINGTON TP.GPJ CDM_BLLV.GDT 4/7/06 REV.

Test Pit TP10

Other Tests	OVM (ppm)	TMP	Depth (feet)	Sample	Symbol	DESCRIPTION	Elev. (feet)
			0	G		Sandy SILT (ML), brown, trace organics, medium stiff, moist.	
			1	G			
			2	G			
				G		Silty SAND (SM), gray, trace organics, dense, moist, with iron oxidation mottling.	
			3				
				G			
			4			Test pit terminated at 4 ft bgs. Groundwater seepage noted at 3 ft bgs during excavation.	
			5				
			6				

Location:

Surface Elevation:

Date Completed: 2-2-06

Logged By: JDM

King County
Harrington-Beall Greenhouse Site
Vashon Island, Washington

Test Pit TP10 Figure: D11

Project No: 19897.47506 1 of 1

CDM

TEST_PIT_TEMP 47506 HARRINGTON TP.GPJ CDM_BLLV.GDT 4/7/06 REV.

Test Pit TP11

Other Tests	OVM (ppm)	TMP	Depth (feet)	Sample	Symbol	DESCRIPTION	Elev. (feet)
						Grass.	
				G		Sandy SILT (ML), brown, with trace organics and fine-grained gravel, medium stiff, moist.	
			1				
				G			
			2			SAND (SP), brown, with some silt and fine to coarse gravel, dense, moist.	
				G			
			3				
				G			
			4			Test pit terminated at 4 ft bgs. Groundwater seepage noted at 2.2 ft bgs during excavation.	
			5				
			6				

Location: __________

Surface Elevation: __________

Date Completed: 2-2-06

Logged By: JDM

King County
Harrington-Beall Greenhouse Site
Vashon Island, Washington

CDM

Test Pit TP11

Figure: D12

Project No: 19897.47506

Test Pit TP12

Other Tests	OVM (ppm)	TMP	Depth (feet)	Sample	Symbol	DESCRIPTION	Elev. (feet)
						Grass.	
				G		Sandy SILT (ML), brown, with trace fine to coarse gravel, medium stiff, wet.	
			1	G			
			2	G		Silty SAND (SM), brown, dense, moist.	
			3	G			
			4			Test pit terminated at 4 ft bgs. Groundwater seepage noted at 2.5 ft bgs during excavation.	
			5				
			6				

Location:
Surface Elevation:

Date Completed: 2-2-06
Logged By: JDM

King County
Harrington-Beall Greenhouse Site
Vashon Island, Washington

Test Pit TP12 Figure: D13
Project No: 19897.47506 1 of 1

CDM

TEST_PIT_TEMP 47506 HARRINGTON TP.GPJ CDM_BLLV.GDT 4/7/06 REV.

Test Pit TP13

Other Tests	OVM (ppm)	TMP	Depth (feet)	Sample	Symbol	DESCRIPTION	Elev. (feet)
						Grass.	
				G		Silty SAND (SM), brown, with trace organics and fine gravel, medium dense, wet.	
			1				
				G			
			2				
				G		Becomes gray-brown.	
			3			Test pit terminated at 3 ft bgs. Groundwater seepage noted at 2.5 ft bgs during excavation.	
			4				
			5				
			6				

Location:____________________
Surface Elevation:____________________

Date Completed: 2-2-06
Logged By: JDM

King County
Harrington-Beall Greenhouse Site
Vashon Island, Washington

CDM

Test Pit TP13 Figure: D14
Project No: 19897.47506 1 of 1

Test Pit TP14

Other Tests	OVM (ppm)	TMP	Depth (feet)	Sample	Symbol	DESCRIPTION	Elev. (feet)
						Grass.	
				G		Silty SAND (SM), dark brown, medium dense, moist, with miscellaneous buried debris (plastic, paint can, pipe piece).	
			1	G			
			2	G		Becomes gray-brown, with iron oxidation mottling and trace fine-grained gravel.	
			3			Test pit terminated at 3 ft bgs. No groundwater encountered during excavation.	
			4				
			5				
			6				

Location:
Surface Elevation:

Date Completed: 2-2-06
Logged By: JDM

King County
Harrington-Beall Greenhouse Site
Vashon Island, Washington

Test Pit TP14 Figure: D15
Project No: 19897.47506 1 of 1

CDM

TEST_PIT_TEMP 47506 HARRINGTON TP.GPJ CDM_BLLV.GDT 4/7/06 REV.

Test Pit TP15

Other Tests	OVM (ppm)	TMP	Depth (feet)	Sample	Symbol	DESCRIPTION	Elev. (feet)
				G		Grass.	
				G		Sandy SILT (ML), with trace fine gravel and organics, medium stiff, moist.	
			1	G			
			2	G			
			3	G			
						Test pit terminated at 3.5 ft bgs. No groundwater encountered during excavation.	
			4				
			5				
			6				

Location:

Surface Elevation:

Date Completed: 2-2-06

Logged By: JDM

King County
Harrington-Beall Greenhouse Site
Vashon Island, Washington

CDM

Test Pit TP15 Figure: D16

Project No: 19897.47506

Test Pit TP16

Other Tests	OVM (ppm)	TMP	Depth (feet)	Sample	Symbol	DESCRIPTION	Elev. (feet)
						Grass.	
						Silty SAND (SM), brown, with trace fine gravel, dense, moist.	
			1				
			2				
			3				
			4			Test pit terminated at 4 ft bgs. Groundwater seepage noted at 3 ft bgs during excavation.	
			5				
			6				

Location:

Surface Elevation:

Date Completed: 2-2-06

Logged By: JDM

King County
Harrington-Beall Greenhouse Site
Vashon Island, Washington

Test Pit TP16 Figure: D17

Project No: 19897.47506 1 of 1

CDM

TEST_PIT_TEMP 47506 HARRINGTON TP.GPJ CDM_BLLV.GDT 4/7/06 REV.

Other Tests	OVM (ppm)	TMP	Depth (feet)	Sample	Symbol	Test Pit TP17 DESCRIPTION	Elev. (feet)
						Grass.	
						Silty SAND (SM), brown, with trace organics, medium dense, moist.	
				G			
			1				
				G			
			2				
						Interlayered, dark brown-black zone, possible burned organics at 2.5 ft bgs.	
				G			
			3				
				G			
			4				
				G			
			5				
						Becomes gray-brown, with iron oxidation mottling and trace fine gravel.	
				G			
			6			Test pit terminated at 6 ft bgs. Groundwater seepage noted at 4.5 ft bgs during excavation.	

Location:

Surface Elevation:

Date Completed: 2-2-06

Logged By: JDM

CDM

King County
Harrington-Beall Greenhouse Site
Vashon Island, Washington

Test Pit TP17 Figure: D18

Project No: 19897.47506 1 of 1

Appendix E

Appendix E
Analytical Laboratory Reports

Quality Assurance Report

Project and Sample Information

Project Name:	Harrington-Beall Greenhouse Project Site
Project No.:	19897-47506
Lab Name:	OnSite Environmental Inc. (OnSite), Redmond, Washington (Selected analyses were subcontracted to Severn Trent Laboratories, Inc. (STL), Tacoma, Washington and Med-Tox Northwest, Auburn, Washington)
Lab Numbers:	OnSite 0601-186, 0601-188, 0601-190, 0602-019, and 0602-043
Sample No.:	HB-S1-1/06, HB-S2-1/06, HB-S3-1/06, HB-S4-1/06, HB-S5-1/06, HB-S6-1/06, HB-S7-1/06, HB-S8-1/06, HB-S9-1/06, HB-S10-1/06, HB-S11-1/06, HB-S12-1/06, HB-S13-1/06, HB-S14-1/06, HB-S15-1/06, HB-S16-1/06, HB-S17-1/06, HB-S18-1/06, HB-S19-1/06, HB-S20-1/06, HB-S21-1/06, HB-S22-1/06, HB-S23-1/06, HB-S24-1/06, HB-S25-1/06, HB-S26-1/06, HB-S27-1/06, HB-S28-1/06, HB-S29-1/06, HB-S30-1/06, HB-S31-1/06, HB-S32-1/06, HB-S33-1/06, HB-S34-1/06, HB-S38-1/06, HB-S39-1/06 (1/27/06), HB-S39-1/06 (1/31/06) – modified to HB-S35-1/6 for clarification, HB-S40-1/06, HB-S41-1/06, HB-S42-1/06, HB-S43-1/06, HB-S44-1/06, HB-S45-1/06, HB-S46-1/06, HB-TP1-2.5, HB-TP2-4.5, HB-TP3-3, HB-TP4-4.5, HB-TP5-5, HB-TP6-5, HB-TP7-5, HB-TP8-2.5, HB-TP9-2.0
Matrix:	Soil

1.0 Quality Assurance Summary

This Quality Assurance Report (QAR) provides a summary of quality assurance (QA) findings. This review of the project data was performed using the Harrington-Beall Greenhouse Project Site Sampling and Quality Assurance Plan (SQAP; CDM, 2005); OnSite Environmental Inc. (OnSite) control limit criteria; and National Functional Guidelines for Organic Data Review (U.S. EPA, 1999). OnSite contracted with Severn Trent Laboratories Inc. (STL) to complete analysis for organophosphorus compounds and with Med-Tox Northwest for asbestos analysis of selected samples.

This report includes a review of holding times, method blanks, surrogate and matrix spike recoveries, laboratory blank and matrix spike duplicate data, and chain-of-custody records. Selected samples were analyzed for asbestos, chlorinated acid herbicides, diesel- and oil-range total petroleum hydrocarbons (TPH) quantitated as Bunker C oil, hydrocarbon identification, metals, organochlorine pesticides, organophosphorus pesticides, polycyclic aromatic hydrocarbons (PAHs), and volatile organic compounds (VOCs). All samples extracted for NWTPH-Dx and NWTPH-HCID analyses were treated with an acid/silica gel cleanup procedure. Once received by the laboratory, samples for VOC analysis were stored in a freezer between -7 and -20 degrees Celsius until extraction or analysis per EPA Method 5035A.

All data are of known quality and are acceptable for use, with the following qualifiers:

Samples analyzed for PAHs were extracted from 6 t 13 days beyond the method holding time. Since PAHs in Bunker C oil do not readily biodegrade, the missed holding time is not believed to have substantively altered the sample results and the PAH data are useable.

2.0 Analytical Methods

The following methods were used to analyze the samples:

Parameter	Method
Asbestos	EPA 600
Chlorinated Acid Herbicides	EPA 8151A
Diesel- and Oil-Range TPH	NWTPH-Dx (quantitated as Bunker C)
Hydrocarbon Identification	NWTPH-HCID
Metals- Arsenic, Lead, and Cadmium	EPA 6010B
Organochlorine Pesticides	EPA 8081A
Organophosphorus Pesticides	EPA 8141A
PAHs	EPA 8270C/SIM
VOCs	EPA 8260B

3.0 Timeliness

Asbestos

A recommended holding time for EPA Method 600/R-93/116 is not applicable. All samples were prepared and analyzed thirteen days after collection. See **Table E-1** for holding times for analyses.

Chlorinated Acid Herbicides

The recommended holding time for EPA Method 8151A is 14 days. All samples were extracted and analyzed within the recommended holding time. See **Table E-2** for holding times for analyses.

Diesel- and Oil-range TPH

The recommended holding time for NWTPH-Dx is 14 days. All samples were extracted and analyzed within the recommended holding time. See **Table E-3** for holding times for analyses.

Hydrocarbon Identification

The recommended holding time for NWTPH-HCID is 14 days. All samples were extracted and analyzed within the recommended holding time. See **Table E-4** for holding times for analyses.

Metals-Arsenic, Lead, and Cadmium

The recommended holding time for EPA Method 6010B is 6 months. All samples were digested and analyzed within the recommended holding time. See **Table E-5** for holding times for analyses.

Organochlorine Pesticides

The recommended holding time for EPA Method 8081A is 14 days. All samples were extracted and analyzed within the recommended holding time. See **Table E-6** for holding times for analyses.

Organophosphorus Pesticides

The recommended holding time for EPA Method 8141A is 14 days. All samples were extracted and analyzed within the recommended holding time. See **Table E-7** for holding times for analyses.

PAHs

The recommended holding time for EPA Method 8270C/SIM is 14 days. All samples were extracted and analyzed outside of the recommended holding time. See **Table E-8** for holding times for analyses.

VOCs

The recommended holding time for EPA Method 8260B is 14 days. All samples were frozen, extracted and analyzed within the recommended holding time. See **Table E-9** for holding times for analyses.

4.0 Chain-of-Custody

Field chain-of-custody forms were complete. All chain-of-custody forms were signed and dated. No issues with sample receipt conditions were indicated on the chain-of-custody forms or in the Case Narrative sections of the laboratory reports. All samples listed on the chain-of-custody forms were analyzed as indicated. One sample, a discrete sample collected from the AST area, collected on the January 31, 2006, was mislabeled as HB-S39-1/06, resulting in two samples with the same sample identification. The initial sample HB-S39-1/06, a composite collected from the roadway area in area of the boiler house (Bldg. #83), was collected on January 27,

2006. When the duplication was discovered, the identification of the HB-S39-1/06 sample collected on January 31, 2006 was changed to HB-S35-1/06. Both samples were analyzed by the proper methods as indicated and the analytical data is acceptable.

5.0 Field Quality Control Samples

Following is a list of the field quality controls samples that were collected during the January 2006 sampling event:

Field Duplicates

Sample ID	Duplicate ID
HB-S4-1/06	HB-S12-1/06
HB-S18-1/06	HB-S44-1/06
HB-S25-1/06	HB-S43-1/06
HB-S38-1/06	HB-S46-1/06

Field Duplicates: Duplicate relative percent differences (RPD) could only be calculated for total metals and four of the organochlorine pesticides for the first set of field duplicates as the other analytes were not detected in the samples. All duplicate RPD values calculated for the first set are within acceptable limits except for one organochlorine pesticide analyte, 4,4'-DDD, which had a duplicate RPD of 108.51%. Duplicate RPD for the second set of field duplicates could only be calculated for oil as bunker C TPH and was 66.67%, which exceeds the project-specific control limits. The duplicate RPD could not be calculated for the third set of field duplicates as it was not applicable for asbestos. However, no asbestos fibers were detected in either sample. The duplicate RPD for the last set of field duplicates could not be calculated for any of the analytes as they were not detected in the samples. See **Table E-10** for calculation of RPDs for each duplicate set.

An RPD duplicate precision limit for diesel and oil-range TPH was established by the SQAP for the Harrington-Beall Greenhouse Project Site to be 58%. The duplicate RPD for the second set of field duplicates was 8.67% above the established limit. The precision and representativeness of duplicate soil samples is largely based on how homogenous the soil is in the area where the samples were collected and if composited, how well the soil was homogenized. Samples analyzed for diesel- and oil-range TPH were collected as discrete units and were not composited, increasing the likelihood of variability between duplicates.

6.0 Laboratory Quality Control Samples

Method Blank:

Asbestos: A method blank is not applicable for asbestos analyses.

Chlorinated Acid Herbicides: No target compounds were detected at or above the Practical Quantitation Limits (PQLs).

Diesel- and Oil-range TPH: No target compounds were detected at or above the PQLs.

Hydrocarbon Identification: No target compounds were detected at or above the PQLs.

Metals: No target compounds were detected at or above the PQLs.

Organochlorine Pesticides: No target compounds were detected at or above the PQLs.

Organophosphorus Pesticides: No target compounds were detected at or above STL's Reporting Limits (RLs) which are equivalent to PQLs.

PAHs: No target compounds were detected at or above the PQLs.

VOCs: No target compounds were detected at or above the PQLs.

Matrix Spikes:

Asbestos: Matrix spike (MS) analyses are not applicable for asbestos analyses.

Chlorinated Acid Herbicides: A matrix spike and matrix spike duplicate (MS/MSD) set was performed for a sample batched with the samples submitted for this project. Percent recoveries and RPD values were within the laboratory's control limit criteria.

Diesel- and Oil-range TPH: MS analyses were not performed on samples submitted for diesel- and oil-range TPH analyses. Refer to duplicate data for precision data.

Hydrocarbon Identification: MS analyses are not applicable for hydrocarbon identification analyses as quantitative amounts are not measured.

Metals: An MS/MSD set was performed for a sample batched with the samples submitted for this project. Percent recoveries and RPD values were within the laboratory control limit criteria.

Organochlorine Pesticides: MS/MSD sets were performed for samples HB-S1-1/06, HB-S26-1/06, and a sample batched with analyses of some of the samples submitted for this project. All percent recoveries were within the laboratory's control limit criteria except for 4,4'-DDT in the HB-S1-1/06 MS, which was below the control limit. Since all other quality control analyses were within control limits, no further action was taken and the results were attributed to matrix effects.

The percent difference values for several of the analytes were greater than the quality control limit of +15% (low bias) or lower than the quality control limit of -15% (high bias) in the continuing calibration verification standards (CCVs) following the sample analyses. The degradation of the CCV standards was reproducible upon reanalysis, indicating that the CCV degradation problem was also attributable to matrix effects.

Organophosphorus Pesticides: MS/MSD were performed for samples HB-S29-1/06, HB-TP2-4.5, HB-S1-1/06, and HB-S10-1/06. Percent recoveries and RPD values were within the laboratory control limit criteria.

PAHs: An MS/MSD set was performed for a sample batched with the samples submitted for this project. Percent recoveries and RPD values were within the laboratory control limit criteria.

VOCs: MS analyses were not performed for the VOC analyses. A spike blank and spike blank duplicate (SB/SBD) were performed and percent recoveries and RPD values were within the laboratory control limit criteria.

Duplicate:

Asbestos: Duplicate analyses were not performed on samples submitted for asbestos analyses.

Chlorinated Acid Herbicides: Duplicate analyses were not performed on samples submitted for chlorinated acid herbicides analyses. Refer to MS/MSD data for precision information.

Diesel- and Oil-range TPH: Duplicate analyses were performed for NWTPH-Dx analyses on samples batched with samples submitted for this project. Results were within laboratory duplicate criteria when detections were above the PQL. If analytes are not detected above the PQL, an RPD value cannot be calculated.

Hydrocarbon Identification: Duplicate analyses were not performed on samples submitted for hydrocarbon identification analyses.

Metals: A duplicate analysis was performed for the total metals analysis on a sample batched with samples submitted for this project. RPDs were within the laboratory control limit criteria.

Organochlorine Pesticides: Duplicate analyses were not performed on samples submitted for organochlorine pesticide analyses. Refer to MS/MSD data for precision information.

Organophosphorus Pesticides: Duplicate analyses were not performed on samples submitted for organophosphorus pesticide analyses Refer to MS/MSD data for precision information.

PAHs: Duplicate analyses were not performed on samples submitted for PAH analyses. Refer to MS/MSD data for precision information.

VOCs: Duplicate analyses were not performed on samples submitted for VOC analyses. Refer to SB/SBD data for precision information.

Surrogates:

Asbestos: Surrogates are not applicable for asbestos analyses .

Chlorinated Acid Herbicides: The laboratory used one surrogate compound for chlorinated acid herbicide analyses. All surrogate recoveries were within the laboratory control limit criteria.

Diesel- and Oil-range TPH: The laboratory used one surrogate compound for diesel- and oil-range TPH analyses. Surrogate recoveries were not available for samples for which dilution was necessary. All available surrogate recoveries were within the laboratory control limit criteria.

Hydrocarbon Identification: The laboratory used one surrogate spike compound for hydrocarbon identification analyses. Surrogate recoveries were not available for samples for which Metals: Surrogates are not applicable for metals analyses.

Organochlorine Pesticides: The laboratory used two surrogate compounds for organochlorine pesticide analyses. All surrogate recoveries were within the laboratory control limit criteria.

Organophosphorus Pesticides: The laboratory used two surrogate compounds for organophosphorus pesticide analysis. Surrogate recoveries were within the laboratory control limits for all except one of the surrogates in two of the samples. Recovery of the tributyl phosphate surrogate exceeded the control limits (38%-129%) in the HB-S1-1/06 and HB-S28-1/06 samples with recoveries of 138% and 156% respectively. Because recoveries of the second surrogate in these two analyses were within the control limits and no analytes were detected in either sample, no corrective action was necessary.

PAHs: The laboratory used three surrogate compounds for PAH analyses. All surrogate recoveries were within the laboratory control limit criteria.

VOCs: The laboratory used three surrogate compounds for VOC analyses. All surrogate recoveries were within the laboratory control limit criteria.

Signatures

Janice E. Peterson

Prepared by: for Brian King Date: 5/9/06

Checked by: Janice E. Peterson Date: 5/9/06

Table E-1
Sample Holding Times - Asbestos
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Time Until Extraction (days)	Time Until Analysis (days)
HB-S21-1/06	1/27/2006	N/A	2/9/2006	N/A	13
HB-S22-1/06	1/27/2006	N/A	2/9/2006	N/A	13
HB-S23-1/06	1/27/2006	N/A	2/9/2006	N/A	13
HB-S24-1/06	1/27/2006	N/A	2/9/2006	N/A	13
HB-S25-1/06	1/27/2006	N/A	2/9/2006	N/A	13
HB-S43-1/06	1/27/2006	N/A	2/9/2006	N/A	13

Note:
Recommended holding time for EPA 600/R-93/116 is N/A.

Table E-2
Sample Holding Times - Chlorinated Acid Herbicides
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Time Until Extraction (days)	Time Until Analysis (days)
HB-S3-1/06	1/26/2006	2/8/2006	2/9/2006	13	14
HB-S4-1/06	1/26/2006	2/8/2006	2/9/2006	13	14
HB-S8-1/06	1/26/2006	2/8/2006	2/9/2006	13	14
HB-S9-1/06	1/26/2006	2/8/2006	2/9/2006	13	14
HB-S12-1/06	1/26/2006	2/8/2006	2/9/2006	13	14
HB-S34-1/06	1/31/2006	2/6/2006	2/9/2006	6	9
HB-S39-1/06	1/27/2006	2/8/2006	2/9/2006	13	14
HB-S40-/06	1/27/2006	2/8/2006	2/9/2006	13	14

Note:
Recommended holding time for EPA 8151A is 14 days.

Table E-3
Sample Holding Times - Diesel and Oil-Range TPH
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Time Until Extraction (days)	Time Until Analysis (days)
HB-S13-1/06	1/27/2006	2/3/2006	2/14/2006	7	18
HB-S14-1/06	1/27/2006	2/3/2006	2/14/2006	7	18
HB-S15-1/06	1/27/2006	2/3/2006	2/14/2006	7	18
HB-S16-1/06	1/27/2006	2/3/2006	2/14/2006	7	18
HB-S17-1/06	1/27/2006	2/3/2006	2/14/2006	7	18
HB-S18-1/06	1/27/2006	2/3/2006	2/14/2006	7	18
HB-S19-1/06	1/27/2006	2/3/2006	2/14/2006	7	18
HB-S20-1/06	1/31/2006	2/10/2006	2/14/2006	10	14
HB-S39-1/06	1/31/2006	2/10/2006	2/14/2006	10	14
HB-S44-1/06	1/27/2006	2/3/2006	2/14/2006	7	18
HB-TP3-3	2/2/2006	2/16/2006	2/19-20/2006	14	17-18
HB-TP4-4.5	2/2/2006	2/16/2006	2/19-20/2006	14	17-18
HB-TP5-5	2/2/2006	2/16/2006	2/19-20/2006	14	17-18
HB-TP8-2.5	2/2/2006	2/16/2006	2/19/2006	14	17
HB-TP9-2.0	2/2/2006	2/16/2006	2/19/2006	14	17

Note:
Recommended holding time for NWTPH-Dx is 14 days.

Table E-4
Sample Holding Times - Hydrocarbon Identification
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Time Until Extraction (days)	Time Until Analysis (days)
HB-S20-1/06	1/31/2006	2/3/2006	2/3/2006	3	3
HB-S38-1/06	1/27/2006	1/30/2006	1/30/2006	3	3
HB-S39/1/06	1/31/2006	2/3/2006	2/3/2006	3	3
HB-S46-1/06	1/27/2006	1/30/2006	1/30/2006	3	3

Note:
Recommended holding time for NWTPH-HCID is 14 days.

Table E-5
Sample Holding Times - Total Metals
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Time Until Extraction (days)	Time Until Analysis (days)
HB-S3-1/06	1/26/2006	2/2/2006	2/3&6/2006	7	8&11
HB-S4-1/06	1/26/2006	2/2/2006	2/3&6/2006	7	8&11
HB-S9-1/06	1/26/2006	2/2/2006	2/3&6/2006	7	8&11
HB-S8-1/06	1/26/2006	2/2/2006	2/3&6/2006	7	8&11
HB-S10-1/06	1/31/2006	2/2/2006	2/6/2006	2	6
HB-S12-1/06	1/26/2006	2/2/2006	2/3&6/2006	7	8&11
HB-S33-1/06	1/27/2006	2/2/2006	2/6/2006	6	10
HB-S34-1/06	1/31/2006	2/2/2006	2/6/2006	2	6
HB-S39-1/06	1/27/2006	2/2/2006	2/6/2006	6	10
HB-S40-1/06	1/27/2006	2/2/2006	2/6/2006	6	10
HB-S45-1/06	1/27/2006	2/2/2006	2/6/2006	6	10

Note:
Recommended holding time for EPA 6010B is 6 months.

Table E-6
Sample Holding Times - Organchlorine Pesticides
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Time Until Extraction (days)	Time Until Analysis (days)
HB-S1-1/06	1/26/2006	2/1/2006	2/3/2006	6	8
HB-S2-1/06	1/26/2006	2/1/2006	2/6/2006	6	11
HB-S3-1/06	1/26/2006	2/1/2006	2/6/2006	6	11
HB-S4-1/06	1/26/2006	2/1/2006	2/6&7/2006	6	11&12
HB-S5-1/06	1/26/2006	2/1/2006	2/8/2006	6	13
HB-S6-1/06	1/26/2006	2/1/2006	2/6&7/2006	6	11&12
HB-S7-1/06	1/26/2006	2/1/2006	2/7/2006	6	12
HB-S8-1/06	1/26/2006	2/1/2006	2/7/2006	6	12
HB-S9-1/06	1/26/2006	2/1/2006	2/7/2006	6	12
HB-S10-1/06	1/31/2006	2/2/2006	2/8/2006	2	8
HB-S11-1/06	1/26/2006	2/1/2006	2/8/2006	6	13
HB-S12-1/06	1/26/2006	2/1/2006	2/7/2006	6	12
HB-S26-1/06	1/27/2006	2/2/2006	2/7/2006	6	11
HB-S27-1/06	1/27/2006	2/2/2006	2/7/2006	6	11
HB-S28-1/06	1/27/2006	2/2/2006	2/7/2006	6	11
HB-S29-1/06	1/27/2006	2/2/2006	2/7/2006	6	11
HB-S30-1/06	1/27/2006	2/2/2006	2/8/2006	6	12
HB-S31-1/06	1/27/2006	2/2/2006	2/7/2006	6	11
HB-S32-1/06	1/27/2006	2/2/2006	2/7/2006	6	11
HB-S33-1/06	1/27/2006	2/2/2006	2/7/2006	6	11
HB-S34-1/06	1/31/2006	2/2/2006	2/8/2006	2	8
HB-S41-1/06	1/27/2006	2/2/2006	2/7/2006	6	11
HB-S42-1/06	1/27/2006	2/2/2006	2/7/2006	6	11
HB-S45-1/06	1/27/2006	2/2/2006	2/8/2006	6	12
HB-TP2-4.5	2/2/2006	2/9/2006	2/11/2006	7	9

Note:
Recommended holding time for EPA 8081A is 14 days.

Table E-7
Sample Holding Times - Organphosphorus Pesticides
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Time Until Extraction (days)	Time Until Analysis (days)
HB-S1-1/06	1/26/2006	2/1/2006	2/3/2006	6	8
HB-S2-1/06	1/26/2006	2/1/2006	2/3/2006	6	8
HB-S3-1/06	1/26/2006	2/1/2006	2/3/2006	6	8
HB-S4-1/06	1/26/2006	2/1/2006	2/3/2006	6	8
HB-S5-1/06	1/26/2006	2/1/2006	2/3/2006	6	8
HB-S6-1/06	1/26/2006	2/1/2006	2/3/2006	6	8
HB-S7-1/06	1/26/2006	2/1/2006	2/3/2006	6	8
HB-S8-1/06	1/26/2006	2/1/2006	2/3/2006	6	8
HB-S9-1/06	1/26/2006	2/1/2006	2/3/2006	6	8
HB-S10-1/06	1/31/2006	2/4/2006	2/4/2006	4	4
HB-S11-1/06	1/26/2006	2/1/2006	2/3/2006	6	8
HB-S12-1/06	1/26/2006	2/1/2006	2/3/2006	6	8
HB-S26-1/06	1/27/2006	2/1/2006	2/2/2006	5	6
HB-S27-1/06	1/27/2006	2/1/2006	2/3/2006	5	7
HB-S28-1/06	1/27/2006	2/1/2006	2/3/2006	5	7
HB-S29-1/06	1/27/2006	2/1/2006	2/2/2006	5	6
HB-S30-1/06	1/27/2006	2/1/2006	2/2/2006	5	6
HB-S31-1/06	1/27/2006	2/1/2006	2/2/2006	5	6
HB-S32-1/06	1/27/2006	2/1/2006	2/2/2006	5	6
HB-S33-1/06	1/27/2006	2/1/2006	2/2/2006	5	6
HB-S34-1/06	1/31/2006	2/4/2006	2/4/2006	4	4
HB-S41-1/06	1/27/2006	2/1/2006	2/2/2006	5	6
HB-S42-1/06	1/27/2006	2/1/2006	2/2/2006	5	6
HB-S45-1/06	1/27/2006	2/1/2006	2/2/2006	5	6
HB-TP2-4.5	2/2/2006	2/13/2006	2/13/2006	11	11

Note:
Recommended holding time for EPA 8141A is 14 days.

Table E-8
Sample Holding Times - PAHs
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Time Until Extraction (days)	Time Until Analysis (days)
HB-S16-1/06	1/27/2006	2/23/2006	2/24/2006	27	28
HB-TP3-3	2/2/2006	2/23/2006	2/24/2006	21	22
HB-TP5-5	2/2/2006	2/23/2006	2/24/2006	21	22

Note:
Recommended holding time for EPA Method 8270C/SIM is 14 days.

Table E-9
Sample Holding Times - Volatile Organic Compounds
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Time Until Extraction (days)	Time Until Analysis (days)
HB-S38-1/06	1/27/2006	1/31/2006	1/31/2006	4	4
HB-S46-1/06	1/27/2006	1/31/2006	1/31/2006	4	4

Note:
Recommended holding time for EPA 8260B is 14 days.

Table E-10
Calculation of Relative Percent Difference for Field Duplicates
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

Analyte (µg/L)	Sample ID HB-S4-1/06	Duplicate ID HB-S12-1/06	RPD %
Chlorinated Acid Herbicides			
Dalapon	<280	<280	0.00
Dicamba	<57	<57	0.00
MCPP	<5,700	<5,700	0.00
MCPA	<5,700	<5,700	0.00
Dichlorprop	<58	<58	0.00
2,4-D	<57	<57	0.00
Pentachlorophenol	<1.2	<1.2	0.00
2,4,5-TP (Silvex)	<58	<58	0.00
2,4,5-T	<58	<58	0.00
2,4-DB	<58	<58	0.00
Dinoseb	<58	<58	0.00
Total Metals			
Arsenic	17	17	0.00
Cadmium	0.80	0.75	6.45
Lead	130	140	7.41
Organochlorine Pesticides			
alpha-BHC	<6.1	<6.1	0.00
gamma-BHC	89	75	17.07
Heptachlor	<6.1	<6.1	0.00
Aldrin	<6.1	<6.1	0.00
beta-BHC	<6.1	<6.1	0.00
delta-BHC	<6.1	<6.1	0.00
Heptachlor epoxide	<6.1	<6.1	0.00
Endosulfan I	<6.1	<6.1	0.00
4,4'-DDE	380	340	11.11
Dieldrin	<12	<12	0.00
Endrin	<12	<12	0.00
Endosulfan II	<12	<12	0.00
4,4'-DDD	86	290	108.51
4,4'-DDT	1,800	1,700	5.71
Endrin aldehyde	<12	<12	0.00
Endosulfan sulfate	<12	<12	0.00
Methoxychlor	<12	<12	0.00
Endrin ketone	<12	<12	0.00
Toxaphene	<120	<120	0.00
Chlordane (Technical)	<61	<61	0.00
Organophosphorus Pesticides			
Dichlorvos	<33	<33	0.00
Mevinphos	<33	<33	0.00
Ethoprop	<33	<33	0.00
Naled	<33	<33	0.00
Sulfotepp	<33	<33	0.00
Monocrotophos	<33	<33	0.00
Phorate	<33	<33	0.00

Table E-10
Calculation of Relative Percent Difference for Field Duplicates
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

Analyte (µg/L)	Sample ID HB-S4-1/06	Duplicate ID HB-S12-1/06	RPD %
Organophosphorus Pesticides (cont.)			
Dimethoate	<33	<33	0.00
Demeton-O and -S	<33	<33	0.00
Diazinon	<33	<33	0.00
Disulfoton	<33	<33	0.00
Parathion,methyl	<33	<33	0.00
Ronnel	<33	<33	0.00
Chlorpyrifos	<33	<33	0.00
Malathion	<33	<33	0.00
Fenthion	<33	<33	0.00
Parathion	<33	<33	0.00
Trichloronate	<33	<33	0.00
Tetrachlorvinphos	<33	<33	0.00
Merphos	<33	<33	0.00
Tokuthion	<33	<33	0.00
Fensulfothion	<33	<33	0.00
Bolstar	<33	<33	0.00
EPN	<33	<33	0.00
Azinphos,methyl	<33	<33	0.00
Coumaphos	<33	<33	0.00

Analyte (µg/L)	Sample ID HB-S18-1/06	Duplicate ID HB-S44-1/06	RPD %
NWTPH-Dx			
Diesel Range	<1,500	<610	0.00
Lube Oil Range	56000	28000	66.67

Analyte (µg/L)	Sample ID HB-S25-1/06	Duplicate ID HB-S43-1/06	RPD %
Asbestos			
Asbestos Fibers Present	None detected	None detected	N/A
Non-asbestos Fibers	Cellulose	Cellulose	N/A
Non-fibrous Components	organic and inorganic debris	organic and inorganic debris	N/A

Table E-10
Calculation of Relative Percent Difference for Field Duplicates
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

Analyte (µg/L)	Sample ID HB-S38-1/06	Duplicate ID HB-S46-1/06	RPD %
NWTPH-HCID			
Gasoline Range	<24	<24	0.00
Diesel Range	<61	<60	0.00
Lube Oil Range	<120	<120	0.00
Volatile Organic Compounds			
Dichlorodifluoromethane	<0.0011	<0.0011	0.00
Chloromethane	<0.0011	<0.0011	0.00
Vinyl Chloride	<0.0011	<0.0011	0.00
Bromomethane	<0.0011	<0.0011	0.00
Chloroethane	<0.0011	<0.0011	0.00
Trichlorofluoromethane	<0.0011	<0.0011	0.00
1,1-Dichloroethene	<0.0011	<0.0011	0.00
Acetone	<0.0054	<0.0053	0.00
Iodomethane	<0.0054	<0.0053	0.00
Carbon Disulfide	<0.0011	<0.0011	0.00
Methylene Chloride	<0.0054	<0.0053	0.00
trans-1,2-Dichloroethene	<0.0011	<0.0011	0.00
Methyl-t-Butyl Ether	<0.0011	<0.0011	0.00
1,1-Dichloroethane	<0.0011	<0.0011	0.00
Vinyl Acetate	<0.0054	<0.0053	0.00
2,2-Dichloropropane	<0.0011	<0.0011	0.00
cis-1,2-Dichloroethene	<0.0011	<0.0011	0.00
2-Butanone	<0.0054	<0.0053	0.00
Bromochloromethane	<0.0011	<0.0011	0.00
Chloroform	<0.0011	<0.0011	0.00
1,1,1-Trichloroethane	<0.0011	<0.0011	0.00
Carbon Tetrachloride	<0.0011	<0.0011	0.00
1,1-Dichloropropene	<0.0011	<0.0011	0.00
Benzene	<0.0011	<0.0011	0.00
1,2-Dichloroethane	<0.0011	<0.0011	0.00
Trichloroethene	<0.0011	<0.0011	0.00
1,2-Dichloropropane	<0.0011	<0.0011	0.00
Dibromomethane	<0.0011	<0.0011	0.00
Bromodichloromethane	<0.0011	<0.0011	0.00
2-Chloroethyl Vinyl Ether	<0.0054	<0.0053	0.00
cis-1,3-Dichloropropene	<0.0011	<0.0011	0.00
Methyl Isobutyl Ketone	<0.0054	<0.0053	0.00
Toluene	<0.0011	<0.0011	0.00
trans-1,3-Dichloropropene	<0.0011	<0.0011	0.00
1,1,2-Trichloroethane	<0.0011	<0.0011	0.00
Tetrachloroethene	<0.0011	<0.0011	0.00
1,3-Dichloropropane	<0.0011	<0.0011	0.00
2-Hexanone	<0.0054	<0.0053	0.00
Dibromochloromethane	<0.0011	<0.0011	0.00
1,2-Dibromoethane	<0.0011	<0.0011	0.00
Chlorobenzene	<0.0011	<0.0011	0.00
1,1,1,2-Tetrachloroethane	<0.0011	<0.0011	0.00

Table E-10
Calculation of Relative Percent Difference for Field Duplicates
King County/Harrington-Beall Greenhouse Site
Vashon Island, Washington

Analyte (µg/L)	Sample ID HB-S38-1/06	Duplicate ID HB-S46-1/06	RPD %
Volatile Organic Compounds (cont.)			
Ethylbenzene	<0.0011	<0.0011	0.00
m,p-Xylene	<0.0022	<0.0021	0.00
o-Xylene	<0.0011	<0.0011	0.00
Styrene	<0.0011	<0.0011	0.00
Bromoform	<0.0011	<0.0011	0.00
Isopropylbenzene	<0.0011	<0.0011	0.00
Bromobenzene	<0.0011	<0.0011	0.00
1,1,2,2-Tetrachloroethane	<0.0011	<0.0011	0.00
1,2,3-Trichloropropane	<0.0011	<0.0011	0.00
n-Propylbenzene	<0.0011	<0.0011	0.00
2-Chlorotoluen	<0.0011	<0.0011	0.00
4-Chlorotoluen	<0.0011	<0.0011	0.00
1,3,5-Trimethylbenzene	<0.0011	<0.0011	0.00
tert-Butylbenzene	<0.0011	<0.0011	0.00
1,2,4-Trimethylbenzene	<0.0011	<0.0011	0.00
sec-Butylbenzene	<0.0011	<0.0011	0.00
1,3-Dichlorobenzen	<0.0011	<0.0011	0.00
p-Isopropyltoluene	<0.0011	<0.0011	0.00
1,4-Dichlorobenzene	<0.0011	<0.0011	0.00
1,2-Dichlorobenzene	<0.0011	<0.0011	0.00
n-Butylbenzene	<0.0011	<0.0011	0.00
1,2-Dibromo-3-chloropropane	<0.0054	<0.0053	0.00
1,2,4-Trichlorobenzene	<0.0011	<0.0011	0.00
Hexachlorobutadiene	<0.0054	<0.0053	0.00
Naphthalene	<0.0011	<0.0011	0.00
1,2,3-Trichlorobenzene	<0.0011	<0.0011	0.00

Notes:
µg/L - micrograms per liter.
< - analyte not detected at or greater than the listed concentration.

OnSite Environmental Inc.
Analytical Testing and Mobile Laboratory Services

February 13, 2006

Received
FEB 16 2006
CDM

Lance Peterson
CDM
P.O. Box 3885
Bellevue, WA 98009

Re: Analytical Data for Project 19897-45706-T2
Laboratory Reference No. 0601-190

Dear Lance:

Enclosed are the analytical results and associated quality control data for samples submitted on January 30, 2006.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

Case Narrative

Samples were collected on January 26, 2006 and received by the laboratory on January 30, 2006. They were maintained at the laboratory at a temperature of 2°C to 6°C except as noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

<u>Organochlorine Pesticides by EPA 8081A Analysis</u>

Sample HB-S1-1/06 (01-190-01) was used as the MS/MSD. Due to matrix effects, the percent recovery value (%R) for 4,4'-DDT (36%) was less than the control limits of 41-161% in the MS. The MS/MSD pair was rerun with similar results. Since all other QC was within quality control limits, no further action is necessary.

Due to sample matrix effects, the percent difference values for the following analytes were greater than the quality control limit of +15% (low bias) on both columns in the following continuing calibration verification standard (CCV):

PEST MID LEVEL 0203-2: 4,4'-DDT and Methoxychlor
PEST LOW LEVEL 0206-1: 4,4'-DDT
PEST LOW LEVEL 0206-2: 4,4'-DDT and Methoxychlor
PEST MID LEVEL 0206-2: 4,4'-DDT and Methoxychlor
PEST HIGH LEVEL 0206-2 Endosulfan I, 4,4'-DDT and Methoxychlor.
PEST LOW LEVEL 0206-3: Heptachlor, 4,4'-DDT, Methoxychlor and Endrin Ketone.
PEST LOW LEVEL 0207-1: delta-BHC
PEST MID LEVEL 0207-2: 4,4'-DDT
PEST HIGH LEVEL 0207-2: DCB, Heptachlor, Endosulfan I, 4,4'-DDT, Methoxychlor and Endrin Ketone.
PEST HIGH LEVEL 0208-1: Endosulfan I
PEST LOW LEVEL 0208-2: 4,4'-DDT and Methoxychlor

The percent difference values for the following analytes were greater than the quality control limit of -15% (high bias) on both columns in the following continuing calibration verification standards (CCV's):

PEST LOW LEVEL 0203-1: Endrin
PEST MID LEVEL 0203-1: Endrin
PEST LOW LEVEL 0203-2: Endrin
PEST MID LEVEL 0203-2: beta-BHC, Endrin, and 4,4'-DDD.

Since the degradation of the CCV standards was reproducible after re-injecting the sample extracts, the CCV degradation problem was attributed to the matrix of this sample.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

ORGANOCHLORINE PESTICIDES by EPA 8081A

Date Extracted:	2-1-06
Date Analyzed:	2-3-06
Matrix:	Soil
Units:	ug/kg (ppb)
Lab ID:	01-190-01
Client ID:	**HB-S1-1/06**

Analyte	Result	PQL	Flags
alpha-BHC	**ND**	6.7	
gamma-BHC	**25**	6.7	
Heptachlor	**ND**	6.7	
Aldrin	**ND**	6.7	
beta-BHC	**ND**	6.7	
delta-BHC	**ND**	6.7	
Heptachlor epoxide	**11**	6.7	
Endosulfan I	**ND**	6.7	
4,4'-DDE	**320**	13	
Dieldrin	**51**	13	
Endrin	**ND**	13	
Endosulfan II	**ND**	13	
4,4'-DDD	**75**	13	
4,4'-DDT	**340**	13	
Endrin Aldehyde	**ND**	13	
Endosulfan Sulfate	**ND**	13	
Methoxychlor	**ND**	13	
Endrin ketone	**ND**	13	
Toxaphene	**ND**	130	
Chlordane (Technical)	**ND**	67	

Surrogate	Percent Recovery	Control Limits
TCMX	72	34 - 109
DCB	70	30 - 115

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

ORGANOCHLORINE
PESTICIDES by EPA 8081A

Date Extracted:	2-1-06
Date Analyzed:	2-6-06
Matrix:	Soil
Units:	ug/kg (ppb)
Lab ID:	01-190-02
Client ID:	**HB-S2-1/06**

Analyte	Result	PQL	Flags
alpha-BHC	ND	6.9	
gamma-BHC	16	6.9	
Heptachlor	ND	6.9	
Aldrin	ND	6.9	
beta-BHC	ND	6.9	
delta-BHC	ND	6.9	
Heptachlor epoxide	ND	6.9	
Endosulfan I	ND	6.9	
4,4'-DDE	240	14	
Dieldrin	ND	14	
Endrin	ND	14	
Endosulfan II	ND	14	
4,4'-DDD	58	14	
4,4'-DDT	320	14	
Endrin Aldehyde	ND	14	
Endosulfan Sulfate	ND	14	
Methoxychlor	ND	14	
Endrin ketone	ND	14	
Toxaphene	ND	140	
Chlordane (Technical)	ND	69	

Surrogate	Percent Recovery	Control Limits
TCMX	65	34 - 109
DCB	59	30 - 115

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

ORGANOCHLORINE PESTICIDES by EPA 8081A

Date Extracted:	2-1-06
Date Analyzed:	2-6-06
Matrix:	Soil
Units:	ug/kg (ppb)
Lab ID:	01-190-03
Client ID:	**HB-S3-1/06**

Analyte	Result	PQL	Flags
alpha-BHC	**ND**	6.8	
gamma-BHC	**18**	6.8	
Heptachlor	**ND**	6.8	
Aldrin	**ND**	6.8	
beta-BHC	**ND**	6.8	
delta-BHC	**ND**	6.8	
Heptachlor epoxide	**ND**	6.8	
Endosulfan I	**ND**	6.8	
4,4'-DDE	**310**	14	
Dieldrin	**ND**	14	
Endrin	**ND**	14	
Endosulfan II	**ND**	14	
4,4'-DDD	**90**	14	
4,4'-DDT	**230**	14	
Endrin Aldehyde	**ND**	14	
Endosulfan Sulfate	**ND**	14	
Methoxychlor	**ND**	14	
Endrin ketone	**ND**	14	
Toxaphene	**ND**	140	
Chlordane (Technical)	**ND**	68	

Surrogate	Percent Recovery	Control Limits
TCMX	77	34 - 109
DCB	63	30 - 115

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

ORGANOCHLORINE
PESTICIDES by EPA 8081A

Date Extracted:	2-1-06
Date Analyzed:	2-6&7-06
Matrix:	Soil
Units:	ug/kg (ppb)
Lab ID:	01-190-04
Client ID:	**HB-S4-1/06**

Analyte	**Result**	**PQL**	**Flags**
alpha-BHC	**ND**	6.1	
gamma-BHC	**89**	6.1	
Heptachlor	**ND**	6.1	
Aldrin	**ND**	6.1	
beta-BHC	**ND**	6.1	
delta-BHC	**ND**	6.1	
Heptachlor epoxide	**ND**	6.1	
Endosulfan I	**ND**	6.1	
4,4'-DDE	**380**	12	
Dieldrin	**ND**	12	
Endrin	**ND**	12	
Endosulfan II	**ND**	12	
4,4'-DDD	**86**	12	
4,4'-DDT	**1800**	120	
Endrin Aldehyde	**ND**	12	
Endosulfan Sulfate	**ND**	12	
Methoxychlor	**ND**	12	
Endrin ketone	**ND**	12	
Toxaphene	**ND**	120	
Chlordane (Technical)	**ND**	61	

Surrogate	**Percent Recovery**	**Control Limits**
TCMX	80	34 - 109
DCB	69	30 - 115

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

ORGANOCHLORINE
PESTICIDES by EPA 8081A

Date Extracted:	2-1-06
Date Analyzed:	2-8-06
Matrix:	Soil
Units:	ug/kg (ppb)
Lab ID:	01-190-05
Client ID:	**HB-S5-1/06**

Analyte	Result	PQL	Flags
alpha-BHC	**ND**	6.5	
gamma-BHC	**15**	6.5	
Heptachlor	**ND**	6.5	
Aldrin	**ND**	6.5	
beta-BHC	**ND**	6.5	
delta-BHC	**ND**	6.5	
Heptachlor epoxide	**ND**	6.5	
Endosulfan I	**ND**	6.5	
4,4'-DDE	**630**	130	
Dieldrin	**ND**	13	
Endrin	**ND**	13	
Endosulfan II	**ND**	13	
4,4'-DDD	**110**	13	
4,4'-DDT	**2000**	130	
Endrin Aldehyde	**ND**	13	
Endosulfan Sulfate	**ND**	13	
Methoxychlor	**ND**	13	
Endrin ketone	**ND**	13	
Toxaphene	**ND**	130	
Chlordane (Technical)	**ND**	65	

Surrogate	Percent Recovery	Control Limits
TCMX	74	34 - 109
DCB	60	30 - 115

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

ORGANOCHLORINE
PESTICIDES by EPA 8081A

Date Extracted:	2-1-06
Date Analyzed:	2-6&7-06
Matrix:	Soil
Units:	ug/kg (ppb)
Lab ID:	01-190-06
Client ID:	**HB-S6-1/06**

Analyte	Result	PQL	Flags
alpha-BHC	**ND**	6.5	
gamma-BHC	**ND**	6.5	
Heptachlor	**ND**	6.5	
Aldrin	**ND**	6.5	
beta-BHC	**ND**	6.5	
delta-BHC	**ND**	6.5	
Heptachlor epoxide	**ND**	6.5	
Endosulfan I	**ND**	6.5	
4,4'-DDE	**1800**	260	
Dieldrin	**ND**	13	
Endrin	**ND**	13	
Endosulfan II	**ND**	13	
4,4'-DDD	**260**	13	
4,4'-DDT	**9200**	260	
Endrin Aldehyde	**ND**	13	
Endosulfan Sulfate	**ND**	13	
Methoxychlor	**ND**	13	
Endrin ketone	**ND**	13	
Toxaphene	**ND**	130	
Chlordane (Technical)	**ND**	65	

Surrogate	Percent Recovery	Control Limits
TCMX	87	34 - 109
DCB	67	30 - 115

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

ORGANOCHLORINE
PESTICIDES by EPA 8081A

Date Extracted:	2-1-06
Date Analyzed:	2-7-06
Matrix:	Soil
Units:	ug/kg (ppb)
Lab ID:	01-190-07
Client ID:	**HB-S7-1/06**

Analyte	Result	PQL	Flags
alpha-BHC	ND	6.8	
gamma-BHC	ND	6.8	
Heptachlor	ND	6.8	
Aldrin	ND	6.8	
beta-BHC	ND	6.8	
delta-BHC	ND	6.8	
Heptachlor epoxide	ND	6.8	
Endosulfan I	ND	6.8	
4,4'-DDE	280	14	
Dieldrin	ND	14	
Endrin	ND	14	
Endosulfan II	ND	14	
4,4'-DDD	110	14	
4,4'-DDT	320	14	
Endrin Aldehyde	ND	14	
Endosulfan Sulfate	ND	14	
Methoxychlor	ND	14	
Endrin ketone	ND	14	
Toxaphene	ND	140	
Chlordane (Technical)	ND	68	

Surrogate	Percent Recovery	Control Limits
TCMX	67	34 - 109
DCB	62	30 - 115

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

ORGANOCHLORINE
PESTICIDES by EPA 8081A

Date Extracted:	2-1-06
Date Analyzed:	2-7-06
Matrix:	Soil
Units:	ug/kg (ppb)
Lab ID:	01-190-08
Client ID:	**HB-S8-1/06**

Analyte	Result	PQL	Flags
alpha-BHC	**ND**	6.0	
gamma-BHC	**ND**	6.0	
Heptachlor	**ND**	6.0	
Aldrin	**ND**	6.0	
beta-BHC	**ND**	6.0	
delta-BHC	**ND**	6.0	
Heptachlor epoxide	**ND**	6.0	
Endosulfan I	**ND**	6.0	
4,4'-DDE	**150**	12	
Dieldrin	**ND**	12	
Endrin	**ND**	12	
Endosulfan II	**ND**	12	
4,4'-DDD	**130**	12	
4,4'-DDT	**350**	12	
Endrin Aldehyde	**ND**	12	
Endosulfan Sulfate	**ND**	12	
Methoxychlor	**ND**	12	
Endrin ketone	**ND**	12	
Toxaphene	**ND**	120	
Chlordane (Technical)	**ND**	60	

Surrogate	Percent Recovery	Control Limits
TCMX	72	34 - 109
DCB	66	30 - 115

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

ORGANOCHLORINE
PESTICIDES by EPA 8081A

Date Extracted:	2-1-06
Date Analyzed:	2-7-06
Matrix:	Soil
Units:	ug/kg (ppb)
Lab ID:	01-190-09
Client ID:	**HB-S9-1/06**

Analyte	**Result**	**PQL**	**Flags**
alpha-BHC	**ND**	6.7	
gamma-BHC	**17**	6.7	
Heptachlor	**ND**	6.7	
Aldrin	**ND**	6.7	
beta-BHC	**ND**	6.7	
delta-BHC	**ND**	6.7	
Heptachlor epoxide	**ND**	6.7	
Endosulfan I	**ND**	6.7	
4,4'-DDE	**47**	13	
Dieldrin	**ND**	13	
Endrin	**ND**	13	
Endosulfan II	**ND**	13	
4,4'-DDD	**17**	13	
4,4'-DDT	**50**	13	
Endrin Aldehyde	**ND**	13	
Endosulfan Sulfate	**ND**	13	
Methoxychlor	**ND**	13	
Endrin ketone	**ND**	13	
Toxaphene	**ND**	130	
Chlordane (Technical)	**ND**	67	

Surrogate	**Percent Recovery**	**Control Limits**
TCMX	77	34 - 109
DCB	66	30 - 115

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

ORGANOCHLORINE
PESTICIDES by EPA 8081A

Date Extracted:	2-1-06
Date Analyzed:	2-8-06
Matrix:	Soil
Units:	ug/kg (ppb)
Lab ID:	01-190-11
Client ID:	**HB-S11-1/06**

Analyte	Result	PQL	Flags
alpha-BHC	**ND**	6.3	
gamma-BHC	**ND**	6.3	
Heptachlor	**ND**	6.3	
Aldrin	**ND**	6.3	
beta-BHC	**ND**	6.3	
delta-BHC	**ND**	6.3	
Heptachlor epoxide	**ND**	6.3	
Endosulfan I	**ND**	6.3	
4,4'-DDE	**130**	13	
Dieldrin	**ND**	13	
Endrin	**ND**	13	
Endosulfan II	**ND**	13	
4,4'-DDD	**78**	13	
4,4'-DDT	**430**	13	
Endrin Aldehyde	**ND**	13	
Endosulfan Sulfate	**ND**	13	
Methoxychlor	**ND**	13	
Endrin ketone	**ND**	13	
Toxaphene	**ND**	130	
Chlordane (Technical)	**ND**	63	

Surrogate	Percent Recovery	Control Limits
TCMX	79	34 - 109
DCB	52	30 - 115

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

ORGANOCHLORINE
PESTICIDES by EPA 8081A

Date Extracted: 2-1-06
Date Analyzed: 2-7-06

Matrix: Soil
Units: ug/kg (ppb)

Lab ID: 01-190-12
Client ID: **HB-S12-1/06**

Analyte	Result	PQL	Flags
alpha-BHC	**ND**	6.1	
gamma-BHC	**75**	6.1	
Heptachlor	**ND**	6.1	
Aldrin	**ND**	6.1	
beta-BHC	**ND**	6.1	
delta-BHC	**ND**	6.1	
Heptachlor epoxide	**ND**	6.1	
Endosulfan I	**ND**	6.1	
4,4'-DDE	**340**	12	
Dieldrin	**ND**	12	
Endrin	**ND**	12	
Endosulfan II	**ND**	12	
4,4'-DDD	**290**	12	
4,4'-DDT	**1700**	120	
Endrin Aldehyde	**ND**	12	
Endosulfan Sulfate	**ND**	12	
Methoxychlor	**ND**	12	
Endrin ketone	**ND**	12	
Toxaphene	**ND**	120	
Chlordane (Technical)	**ND**	61	

Surrogate	Percent Recovery	Control Limits
TCMX	65	34 - 109
DCB	61	30 - 115

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

ORGANOCHLORINE PESTICIDES by EPA 8081A METHOD BLANK QUALITY CONTROL

Date Extracted:	2-1-06
Date Analyzed:	2-3-06
Matrix:	Soil
Units:	ug/kg (ppb)
Lab ID:	MB0201S1

Analyte	Result	PQL	Flags
alpha-BHC	ND	5.0	
gamma-BHC	ND	5.0	
Heptachlor	ND	5.0	
Aldrin	ND	5.0	
beta-BHC	ND	5.0	
delta-BHC	ND	5.0	
Heptachlor epoxide	ND	5.0	
Endosulfan I	ND	5.0	
4,4'-DDE	ND	10	
Dieldrin	ND	10	
Endrin	ND	10	
Endosulfan II	ND	10	
4,4'-DDD	ND	10	
4,4'-DDT	ND	10	
Endrin Aldehyde	ND	10	
Endosulfan Sulfate	ND	10	
Methoxychlor	ND	10	
Endrin ketone	ND	10	
Toxaphene	ND	100	
Chlordane (Technical)	ND	50	

Surrogate	Percent Recovery	Control Limits
TCMX	84	34 - 109
DCB	86	30 - 115

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

ORGANOCHLORINE
PESTICIDES by EPA 8081A
MS/MSD QUALITY CONTROL

Date Extracted: 2-1-06
Date Analyzed: 2-3-06

Matrix: Soil
Units: ug/kg (ppb)

Lab ID: 01-190-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
gamma-BHC	50	51.3	65	54.9	72	7	
Heptachlor	50	35.8	72	38.1	76	6	
Aldrin	50	33.3	67	35.6	71	7	
Dieldrin	125	121	66	129	73	6	
Endrin	125	103	82	106	85	3	
4,4'-DDT	125	299	36	323	55	8	V

Surrogate	Percent Recovery	Percent Recovery	Control Limits
TCMX	74	75	34 - 109
DCB	64	69	30 - 115

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

CHLORINATED ACID
HERBICIDES by EPA 8151A

Date Extracted:	2-8-06
Date Analyzed:	2-9-06
Matrix:	Soil
Units:	ug/kg (ppb) free acid equivalent
Lab ID:	01-190-03
Client ID:	**HB-S3-1/06**

Analyte	Result	PQL	Flags
Dalapon	ND	310	
Dicamba	ND	64	
MCPP	ND	6300	
MCPA	ND	6300	
Dichlorprop	ND	64	
2,4-D	ND	64	
Pentachlorophenol	ND	1.3	
2,4,5-TP (Silvex)	ND	64	
2,4,5-T	ND	64	
2,4-DB	ND	64	
Dinoseb	ND	64	

Surrogate	Percent Recovery	Control Limits
DCAA	48	39-131

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

CHLORINATED ACID HERBICIDES by EPA 8151A

Date Extracted: 2-8-06
Date Analyzed: 2-9-06

Matrix: Soil
Units: ug/kg (ppb) free acid equivalent

Lab ID: 01-190-04
Client ID: **HB-S4-1/06**

Analyte	Result	PQL	Flags
Dalapon	ND	280	
Dicamba	ND	57	
MCPP	ND	5700	
MCPA	ND	5700	
Dichlorprop	ND	58	
2,4-D	ND	57	
Pentachlorophenol	ND	1.2	
2,4,5-TP (Silvex)	ND	58	
2,4,5-T	ND	58	
2,4-DB	ND	58	
Dinoseb	ND	58	

Surrogate	Recovery	Limits
DCAA	58	39-131

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

CHLORINATED ACID HERBICIDES by EPA 8151A

Date Extracted: 2-8-06
Date Analyzed: 2-9-06

Matrix: Soil
Units: ug/kg (ppb) free acid equivalent

Lab ID: 01-190-08
Client ID: **HB-S8-1/06**

Analyte	**Result**	**PQL**	**Flags**
Dalapon	**ND**	280	
Dicamba	**ND**	57	
MCPP	**ND**	5700	
MCPA	**ND**	5600	
Dichlorprop	**ND**	57	
2,4-D	**ND**	57	
Pentachlorophenol	**ND**	1.1	
2,4,5-TP (Silvex)	**ND**	57	
2,4,5-T	**ND**	57	
2,4-DB	**ND**	57	
Dinoseb	**ND**	57	

Surrogate	**Percent Recovery**	**Control Limits**
DCAA	66	39-131

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

CHLORINATED ACID HERBICIDES by EPA 8151A

Date Extracted:	2-8-06
Date Analyzed:	2-9-06
Matrix:	Soil
Units:	ug/kg (ppb) free acid equivalent
Lab ID:	01-190-09
Client ID:	**HB-S9-1/06**

Analyte	Result	PQL	Flags
Dalapon	ND	310	
Dicamba	ND	63	
MCPP	ND	6300	
MCPA	ND	6200	
Dichlorprop	ND	63	
2,4-D	ND	63	
Pentachlorophenol	ND	1.3	
2,4,5-TP (Silvex)	ND	63	
2,4,5-T	ND	63	
2,4-DB	ND	63	
Dinoseb	ND	63	

Surrogate	Percent Recovery	Control Limits
DCAA	45	39-131

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

CHLORINATED ACID HERBICIDES by EPA 8151A

Date Extracted:	2-8-06
Date Analyzed:	2-9-06
Matrix:	Soil
Units:	ug/kg (ppb) free acid equivalent
Lab ID:	01-190-12
Client ID:	**HB-S12-1/06**

Analyte	Result	PQL	Flags
Dalapon	ND	280	
Dicamba	ND	57	
MCPP	ND	5700	
MCPA	ND	5700	
Dichlorprop	ND	58	
2,4-D	ND	57	
Pentachlorophenol	ND	1.2	
2,4,5-TP (Silvex)	ND	58	
2,4,5-T	ND	58	
2,4-DB	ND	58	
Dinoseb	ND	58	

Surrogate	Percent Recovery	Control Limits
DCAA	61	39-131

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

CHLORINATED ACID
HERBICIDES by EPA 8151A
METHOD BLANK QUALITY CONTROL

Date Extracted: 2-8-06
Date Analyzed: 2-9-06

Matrix: Soil
Units: ug/kg (ppb) free acid equivalent

Lab ID: MB0208S1

Analyte	Result	PQL	Flags
Dalapon	ND	230	
Dicamba	ND	47	
MCPP	ND	4700	
MCPA	ND	4700	
Dichlorprop	ND	47	
2,4-D	ND	47	
Pentachlorophenol	ND	0.95	
2,4,5-TP (Silvex)	ND	48	
2,4,5-T	ND	47	
2,4-DB	ND	47	
Dinoseb	ND	47	

Surrogate	Percent Recovery	Control Limits
DCAA	66	39-131

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

CHLORINATED ACID
HERBICIDES by EPA 8151A
MS/MSD QUALITY CONTROL

Date Extracted: 2-8-06
Date Analyzed: 2-9-06

Matrix: Soil
Units: ug/kg (ppb) free acid equivalent

Lab ID: 01-190-04

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Dicamba	94.0	71.2	76	72.4	77	2	
2,4-D	94.0	61.0	65	55.0	59	10	
2,4,5-T	94.8	71.7	76	64.6	68	10	
2,4-DB	94.7	89.2	94	73.1	77	20	

Surrogate	Percent Recovery	Percent Recovery	Control Limits
DCAA	74	75	39-131

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

TOTAL METALS
EPA 6010B

Date Extracted: 2-2-06
Date Analyzed: 2-3&6-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 01-190-03
Client ID: HB-S3-1/06

Analyte	Method	Result	PQL
Arsenic	6010B	**22**	14
Cadmium	6010B	**0.85**	0.68
Lead	6010B	**170**	6.8

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

TOTAL METALS
EPA 6010B

Date Extracted: 2-2-06
Date Analyzed: 2-3&6-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 01-190-04
Client ID: HB-S4-1/06

Analyte	Method	Result	PQL
Arsenic	6010B	**17**	12
Cadmium	6010B	**0.80**	0.61
Lead	6010B	**130**	6.1

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

TOTAL METALS
EPA 6010B

Date Extracted: 2-2-06
Date Analyzed: 2-3&6-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 01-190-08
Client ID: HB-S8-1/06

Analyte	Method	Result	PQL
Arsenic	6010B	**21**	12
Cadmium	6010B	**0.75**	0.60
Lead	6010B	**110**	6.0

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

TOTAL METALS
EPA 6010B

Date Extracted: 2-2-06
Date Analyzed: 2-3&6-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 01-190-09
Client ID: HB-S9-1/06

Analyte	Method	Result	PQL
Arsenic	6010B	**ND**	13
Cadmium	6010B	**ND**	0.67
Lead	6010B	**110**	6.7

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

TOTAL METALS
EPA 6010B

Date Extracted: 2-2-06
Date Analyzed: 2-3&6-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 01-190-12
Client ID: HB-S12-1/06

Analyte	Method	Result	PQL
Arsenic	6010B	**17**	12
Cadmium	6010B	**0.75**	0.61
Lead	6010B	**140**	6.1

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

TOTAL METALS
EPA 6010B
METHOD BLANK QUALITY CONTROL

Date Extracted: 2-2-06
Date Analyzed: 2-3-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: MB0202S2

Analyte	Method	Result	PQL
Arsenic	6010B	**ND**	10
Cadmium	6010B	**ND**	0.50
Lead	6010B	**ND**	5.0

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

TOTAL METALS
EPA 6010B
DUPLICATE QUALITY CONTROL

Date Extracted: 2-2-06
Date Analyzed: 2-3-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 01-190-04

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Arsenic	**13.9**	**15.5**	11	10	
Cadmium	**0.657**	**0.538**	20	0.50	
Lead	**109**	**113**	4	5.0	

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

TOTAL METALS
EPA 6010B
MS/MSD QUALITY CONTROL

Date Extracted: 2-2-06
Date Analyzed: 2-3-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 01-190-04

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Arsenic	100	**103**	89	**101**	87	1	
Cadmium	50	**46.6**	92	**46.7**	92	0	
Lead	250	**324**	86	**325**	86	0	

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-190
Project: 19897-45706-T2

% MOISTURE

Date Analyzed: 2-1-06

Client ID	Lab ID	% Moisture
HB-S1-1/06	01-190-01	25
HB-S2-1/06	01-190-02	28
HB-S3-1/06	01-190-03	26
HB-S4-1/06	01-190-04	18
HB-S5-1/06	01-190-05	23
HB-S6-1/06	01-190-06	23
HB-S7-1/06	01-190-07	26
HB-S8-1/06	01-190-08	17
HB-S9-1/06	01-190-09	25
HB-S11-1/06	01-190-11	20
HB-S12-1/06	01-190-12	18

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

G - Insufficient sample quantity for duplicate analysis.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

O - Hydrocarbons indicative of diesel fuel are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a silica gel cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

ANALYTICAL REPORT

Job Number: 580-1405-1

Job Description: 19897-45706-T2

For:

OnSite Environmental Inc
14648 NE 95th Street
Redmond, WA 98052

Attention: Mr. David Baumeister

Ivy J Bolm

Ivy J Bolm
Project Manager I
ibolm@stl-inc.com
02/09/2006

Case Narrative for job: 580-J1405-1

Client: OnSite Environmental Inc
Date: 02/09/2006

Organophosphorous Compounds by GC-MS
8141A
Sample: 580-1405-1

Surrogate recovery for Tributyl phosphate failed high. Sample results were non detect for target analytes. no other action was taken.

SAMPLE SUMMARY

Client: OnSite Environmental Inc

Job Number: 580-1405-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
580-1405-1	HB-S1-1106	Solid	01/26/2006 1040	01/31/2006 1140
580-1405-2	HB-S2-1106	Solid	01/26/2006 1205	01/31/2006 1140
580-1405-3	HB-S3-1106	Solid	01/26/2006 1220	01/31/2006 1140
580-1405-4	HB-S4-1106	Solid	01/26/2006 1300	01/31/2006 1140
580-1405-5	HB-S5-1106	Solid	01/26/2006 1315	01/31/2006 1140
580-1405-6	HB-S6-1106	Solid	01/26/2006 1445	01/31/2006 1140
580-1405-7	HB-S7-1106	Solid	01/26/2006 1425	01/31/2006 1140
580-1405-8	HB-S8-1106	Solid	01/26/2006 1540	01/31/2006 1140
580-1405-9	HB-S9-1106	Solid	01/26/2006 1525	01/31/2006 1140
580-1405-10	HB-S11-1106	Solid	01/26/2006 1125	01/31/2006 1140
580-1405-11	HB-S12-1106	Solid	01/26/2006 1310	01/31/2006 1140

Client: OnSite Environmental Inc

Job Number: 580-1405-1

Client Sample ID: HB-S1-1106

Lab Sample ID: 580-1405-1
Client Matrix: Solid

Date Sampled: 01/26/2006 1040
Date Received: 01/31/2006 1140

8141A Organophosphorous Compounds by GC-MS

Method:	8141A	Analysis Batch: 580-3918		Instrument ID:	ITS40
Preparation:	3550B	Prep Batch: 580-3694		Lab File ID:	L18385.D
Dilution:	1.0			Initial Weight/Volume:	15.6050 g
Date Analyzed:	02/03/2006 0302			Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1448			Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		32
Mevinphos		ND		32
Ethoprop		ND		32
Naled		ND		32
Sulfotepp		ND		32
Monochrotophos		ND		32
Phorate		ND		32
Dimethoate		ND		32
Demeton-O + Demeton-S		ND		32
Diazinon		ND		32
Disulfoton		ND		32
Parathion methyl		ND		32
Ronnel		ND		32
Chlorpyrifos		ND		32
Malathion		ND		32
Fenthion		ND		32
Parathion		ND		32
Trichloronate		ND		32
Tetrachlorviphos		ND		32
Merphos		ND		32
Tokuthion		ND		32
Fensulfothion		ND		32
Bolstar		ND		32
EPN		ND		32
Azinphos-methyl		ND		32
Coumaphos		ND		32

Surrogate	%Rec		Acceptance Limits
Tributyl phosphate	138	*	38 - 129
Triphenylphosphate	93		45 - 125

Client: OnSite Environmental Inc

Job Number: 580-1405-1

Client Sample ID: HB-S2-1106

Lab Sample ID:	580-1405-2	Date Sampled:	01/26/2006 1205
Client Matrix:	Solid	Date Received:	01/31/2006 1140

8141A Organophosphorous Compounds by GC-MS

Method:	8141A	Analysis Batch: 580-3918		Instrument ID:	ITS40
Preparation:	3550B	Prep Batch: 580-3694		Lab File ID:	L18386.D
Dilution:	1.0			Initial Weight/Volume:	15.0189 g
Date Analyzed:	02/03/2006 0436			Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1448			Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		33
Mevinphos		ND		33
Ethoprop		ND		33
Naled		ND		33
Sulfotepp		ND		33
Monochrotophos		ND		33
Phorate		ND		33
Dimethoate		ND		33
Demeton-O + Demeton-S		ND		33
Diazinon		ND		33
Disulfoton		ND		33
Parathion methyl		ND		33
Ronnel		ND		33
Chlorpyrifos		ND		33
Malathion		ND		33
Fenthion		ND		33
Parathion		ND		33
Trichloronate		ND		33
Tetrachlorviphos		ND		33
Merphos		ND		33
Tokuthion		ND		33
Fensulfothion		ND		33
Bolstar		ND		33
EPN		ND		33
Azinphos-methyl		ND		33
Coumaphos		ND		33

Surrogate	%Rec	Acceptance Limits
Tributyl phosphate	88	38 - 129
Triphenylphosphate	85	45 - 125

Analytical Data

Client: OnSite Environmental Inc

Job Number: 580-1405-1

Client Sample ID: HB-S3-1106

Lab Sample ID:	580-1405-3	Date Sampled:	01/26/2006 1220
Client Matrix:	Solid	Date Received:	01/31/2006 1140

8141A Organophosphorous Compounds by GC-MS

Method:	8141A	Analysis Batch: 580-3918	Instrument ID:	ITS40
Preparation:	3550B	Prep Batch: 580-3694	Lab File ID:	L18387.D
Dilution:	1.0		Initial Weight/Volume:	15.5830 g
Date Analyzed:	02/03/2006 0501		Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1448		Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		32
Mevinphos		ND		32
Ethoprop		ND		32
Naled		ND		32
Sulfotepp		ND		32
Monochrotophos		ND		32
Phorate		ND		32
Dimethoate		ND		32
Demeton-O + Demeton-S		ND		32
Diazinon		ND		32
Disulfoton		ND		32
Parathion methyl		ND		32
Ronnel		ND		32
Chlorpyrifos		ND		32
Malathion		ND		32
Fenthion		ND		32
Parathion		ND		32
Trichloronate		ND		32
Tetrachlorviphos		ND		32
Merphos		ND		32
Tokuthion		ND		32
Fensulfothion		ND		32
Bolstar		ND		32
EPN		ND		32
Azinphos-methyl		ND		32
Coumaphos		ND		32

Surrogate	%Rec	Acceptance Limits
Tributyl phosphate	85	38 - 129
Triphenylphosphate	86	45 - 125

Client: OnSite Environmental Inc | Job Number: 580-1405-1

Client Sample ID: HB-S4-1106

Lab Sample ID:	580-1405-4	Date Sampled:	01/26/2006 1300
Client Matrix:	Solid	Date Received:	01/31/2006 1140

8141A Organophosphorous Compounds by GC-MS

Method:	8141A	Analysis Batch: 580-3918	Instrument ID:	ITS40
Preparation:	3550B	Prep Batch: 580-3694	Lab File ID:	L18388.D
Dilution:	1.0		Initial Weight/Volume:	15.3441 g
Date Analyzed:	02/03/2006 0525		Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1448		Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		33
Mevinphos		ND		33
Ethoprop		ND		33
Naled		ND		33
Sulfotepp		ND		33
Monochrotophos		ND		33
Phorate		ND		33
Dimethoate		ND		33
Demeton-O + Demeton-S		ND		33
Diazinon		ND		33
Disulfoton		ND		33
Parathion methyl		ND		33
Ronnel		ND		33
Chlorpyrifos		ND		33
Malathion		ND		33
Fenthion		ND		33
Parathion		ND		33
Trichloronate		ND		33
Tetrachlorviphos		ND		33
Merphos		ND		33
Tokuthion		ND		33
Fensulfothion		ND		33
Bolstar		ND		33
EPN		ND		33
Azinphos-methyl		ND		33
Coumaphos		ND		33

Surrogate	%Rec	Acceptance Limits
Tributyl phosphate	88	38 - 129
Triphenylphosphate	92	45 - 125

Client: OnSite Environmental Inc

Job Number: 580-1405-1

Client Sample ID: HB-S5-1106

Lab Sample ID: 580-1405-5
Client Matrix: Solid

Date Sampled: 01/26/2006 1315
Date Received: 01/31/2006 1140

8141A Organophosphorous Compounds by GC-MS

Method:	8141A	Analysis Batch: 580-3918	Instrument ID:	ITS40	
Preparation:	3550B	Prep Batch: 580-3694	Lab File ID:	L18389.D	
Dilution:	1.0		Initial Weight/Volume:	15.2997	g
Date Analyzed:	02/03/2006 0549		Final Weight/Volume:	10	mL
Date Prepared:	02/01/2006 1448		Injection Volume:		

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		33
Mevinphos		ND		33
Ethoprop		ND		33
Naled		ND		33
Sulfotepp		ND		33
Monochrotophos		ND		33
Phorate		ND		33
Dimethoate		ND		33
Demeton-O + Demeton-S		ND		33
Diazinon		ND		33
Disulfoton		ND		33
Parathion methyl		ND		33
Ronnel		ND		33
Chlorpyrifos		ND		33
Malathion		ND		33
Fenthion		ND		33
Parathion		ND		33
Trichloronate		ND		33
Tetrachlorviphos		ND		33
Merphos		ND		33
Tokuthion		ND		33
Fensulfothion		ND		33
Bolstar		ND		33
EPN		ND		33
Azinphos-methyl		ND		33
Coumaphos		ND		33

Surrogate	%Rec	Acceptance Limits
Tributyl phosphate	86	38 - 129
Triphenylphosphate	92	45 - 125

Analytical Data

Client: OnSite Environmental Inc

Job Number: 580-1405-1

Client Sample ID: **HB-S6-1106**

Lab Sample ID: 580-1405-6
Client Matrix: Solid

Date Sampled: 01/26/2006 1445
Date Received: 01/31/2006 1140

8141A Organophosphorous Compounds by GC-MS

Method: 8141A
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 02/03/2006 0613
Date Prepared: 02/01/2006 1448

Analysis Batch: 580-3918
Prep Batch: 580-3694

Instrument ID: ITS40
Lab File ID: L18390.D
Initial Weight/Volume: 15.1018 g
Final Weight/Volume: 10 mL
Injection Volume:

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		33
Mevinphos		ND		33
Ethoprop		ND		33
Naled		ND		33
Sulfotepp		ND		33
Monochrotophos		ND		33
Phorate		ND		33
Dimethoate		ND		33
Demeton-O + Demeton-S		ND		33
Diazinon		ND		33
Disulfoton		ND		33
Parathion methyl		ND		33
Ronnel		ND		33
Chlorpyrifos		ND		33
Malathion		ND		33
Fenthion		ND		33
Parathion		ND		33
Trichloronate		ND		33
Tetrachlorviphos		ND		33
Merphos		ND		33
Tokuthion		ND		33
Fensulfothion		ND		33
Bolstar		ND		33
EPN		ND		33
Azinphos-methyl		ND		33
Coumaphos		ND		33

Surrogate	%Rec	Acceptance Limits
Tributyl phosphate	86	38 - 129
Triphenylphosphate	93	45 - 125

Client: OnSite Environmental Inc   Job Number: 580-1405-1

Client Sample ID: HB-S7-1106

Lab Sample ID:	580-1405-7	Date Sampled:	01/26/2006 1425
Client Matrix:	Solid	Date Received:	01/31/2006 1140

8141A Organophosphorous Compounds by GC-MS

Method:	8141A	Analysis Batch: 580-3918		Instrument ID:	ITS40
Preparation:	3550B	Prep Batch: 580-3694		Lab File ID:	L18391.D
Dilution:	1.0			Initial Weight/Volume:	15.4126 g
Date Analyzed:	02/03/2006 0637			Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1448			Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		32
Mevinphos		ND		32
Ethoprop		ND		32
Naled		ND		32
Sulfotepp		ND		32
Monochrotophos		ND		32
Phorate		ND		32
Dimethoate		ND		32
Demeton-O + Demeton-S		ND		32
Diazinon		ND		32
Disulfoton		ND		32
Parathion methyl		ND		32
Ronnel		ND		32
Chlorpyrifos		ND		32
Malathion		ND		32
Fenthion		ND		32
Parathion		ND		32
Trichloronate		ND		32
Tetrachlorviphos		ND		32
Merphos		ND		32
Tokuthion		ND		32
Fensulfothion		ND		32
Bolstar		ND		32
EPN		ND		32
Azinphos-methyl		ND		32
Coumaphos		ND		32

Surrogate	%Rec	Acceptance Limits
Tributyl phosphate	83	38 - 129
Triphenylphosphate	85	45 - 125

Analytical Data

Client: OnSite Environmental Inc | Job Number: 580-1405-1

Client Sample ID: HB-S8-1106

Lab Sample ID: 580-1405-8 | Date Sampled: 01/26/2006 1540
Client Matrix: Solid | Date Received: 01/31/2006 1140

8141A Organophosphorous Compounds by GC-MS

Method:	8141A	Analysis Batch: 580-3918		Instrument ID:	ITS40
Preparation:	3550B	Prep Batch: 580-3694		Lab File ID:	L18392.D
Dilution:	1.0			Initial Weight/Volume:	15.2808 g
Date Analyzed:	02/03/2006 0701			Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1448			Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		33
Mevinphos		ND		33
Ethoprop		ND		33
Naled		ND		33
Sulfotepp		ND		33
Monochrotophos		ND		33
Phorate		ND		33
Dimethoate		ND		33
Demeton-O + Demeton-S		ND		33
Diazinon		ND		33
Disulfoton		ND		33
Parathion methyl		ND		33
Ronnel		ND		33
Chlorpyrifos		ND		33
Malathion		ND		33
Fenthion		ND		33
Parathion		ND		33
Trichloronate		ND		33
Tetrachlorviphos		ND		33
Merphos		ND		33
Tokuthion		ND		33
Fensulfothion		ND		33
Bolstar		ND		33
EPN		ND		33
Azinphos-methyl		ND		33
Coumaphos		ND		33

Surrogate	%Rec	Acceptance Limits
Tributyl phosphate	89	38 - 129
Triphenylphosphate	89	45 - 125

Analytical Data

Client: OnSite Environmental Inc

Job Number: 580-1405-1

Client Sample ID: HB-S9-1106

Lab Sample ID: 580-1405-9
Client Matrix: Solid

Date Sampled: 01/26/2006 1525
Date Received: 01/31/2006 1140

8141A Organophosphorous Compounds by GC-MS

Method:	8141A	Analysis Batch: 580-3918		Instrument ID:	ITS40
Preparation:	3550B	Prep Batch: 580-3694		Lab File ID:	L18393.D
Dilution:	1.0			Initial Weight/Volume:	15.6519 g
Date Analyzed:	02/03/2006 0725			Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1448			Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		32
Mevinphos		ND		32
Ethoprop		ND		32
Naled		ND		32
Sulfotepp		ND		32
Monochrotophos		ND		32
Phorate		ND		32
Dimethoate		ND		32
Demeton-O + Demeton-S		ND		32
Diazinon		ND		32
Disulfoton		ND		32
Parathion methyl		ND		32
Ronnel		ND		32
Chlorpyrifos		ND		32
Malathion		ND		32
Fenthion		ND		32
Parathion		ND		32
Trichloronate		ND		32
Tetrachlorviphos		ND		32
Merphos		ND		32
Tokuthion		ND		32
Fensulfothion		ND		32
Bolstar		ND		32
EPN		ND		32
Azinphos-methyl		ND		32
Coumaphos		ND		32

Surrogate	%Rec	Acceptance Limits
Tributyl phosphate	84	38 - 129
Triphenylphosphate	89	45 - 125

Client: OnSite Environmental Inc

Job Number: 580-1405-1

Client Sample ID: HB-S11-1106

Lab Sample ID:	580-1405-10	Date Sampled:	01/26/2006 1125
Client Matrix:	Solid	Date Received:	01/31/2006 1140

8141A Organophosphorous Compounds by GC-MS

Method:	8141A	Analysis Batch: 580-3918		Instrument ID:	ITS40
Preparation:	3550B	Prep Batch: 580-3694		Lab File ID:	L18394.D
Dilution:	1.0			Initial Weight/Volume:	15.5210 g
Date Analyzed:	02/03/2006 0749			Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1448			Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		32
Mevinphos		ND		32
Ethoprop		ND		32
Naled		ND		32
Sulfotepp		ND		32
Monochrotophos		ND		32
Phorate		ND		32
Dimethoate		ND		32
Demeton-O + Demeton-S		ND		32
Diazinon		ND		32
Disulfoton		ND		32
Parathion methyl		ND		32
Ronnel		ND		32
Chlorpyrifos		ND		32
Malathion		ND		32
Fenthion		ND		32
Parathion		ND		32
Trichloronate		ND		32
Tetrachlorviphos		ND		32
Merphos		ND		32
Tokuthion		ND		32
Fensulfothion		ND		32
Bolstar		ND		32
EPN		ND		32
Azinphos-methyl		ND		32
Coumaphos		ND		32

Surrogate	%Rec	Acceptance Limits
Tributyl phosphate	106	38 - 129
Triphenylphosphate	83	45 - 125

Client: OnSite Environmental Inc

Job Number: 580-1405-1

Client Sample ID: HB-S12-1106

Lab Sample ID: 580-1405-11
Client Matrix: Solid

Date Sampled: 01/26/2006 1310
Date Received: 01/31/2006 1140

8141A Organophosphorous Compounds by GC-MS

Method: 8141A
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 02/03/2006 0813
Date Prepared: 02/01/2006 1448

Analysis Batch: 580-3918
Prep Batch: 580-3694

Instrument ID: ITS40
Lab File ID: L18395.D
Initial Weight/Volume: 15.1378 g
Final Weight/Volume: 10 mL
Injection Volume:

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		33
Mevinphos		ND		33
Ethoprop		ND		33
Naled		ND		33
Sulfotepp		ND		33
Monochrotophos		ND		33
Phorate		ND		33
Dimethoate		ND		33
Demeton-O + Demeton-S		ND		33
Diazinon		ND		33
Disulfoton		ND		33
Parathion methyl		ND		33
Ronnel		ND		33
Chlorpyrifos		ND		33
Malathion		ND		33
Fenthion		ND		33
Parathion		ND		33
Trichloronate		ND		33
Tetrachlorviphos		ND		33
Merphos		ND		33
Tokuthion		ND		33
Fensulfothion		ND		33
Bolstar		ND		33
EPN		ND		33
Azinphos-methyl		ND		33
Coumaphos		ND		33

Surrogate	%Rec	Acceptance Limits
Tributyl phosphate	87	38 - 129
Triphenylphosphate	91	45 - 125

Client: OnSite Environmental Inc Job Number: 580-1405-1

General Chemistry

Client Sample ID: HB-S1-1106

Lab Sample ID: 580-1405-1 Date Sampled: 01/26/2006 1040
Client Matrix: Solid Date Received: 01/31/2006 1140

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	77		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			
Percent Moisture	23		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			

Client Sample ID: HB-S2-1106

Lab Sample ID: 580-1405-2 Date Sampled: 01/26/2006 1205
Client Matrix: Solid Date Received: 01/31/2006 1140

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	71		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			
Percent Moisture	29		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			

Client Sample ID: HB-S3-1106

Lab Sample ID: 580-1405-3 Date Sampled: 01/26/2006 1220
Client Matrix: Solid Date Received: 01/31/2006 1140

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	74		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			
Percent Moisture	26		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			

Client Sample ID: HB-S4-1106

Lab Sample ID: 580-1405-4 Date Sampled: 01/26/2006 1300
Client Matrix: Solid Date Received: 01/31/2006 1140

General Chemistry

Client Sample ID: HB-S4-1106

Lab Sample ID: 580-1405-4   Date Sampled: 01/26/2006 1300
Client Matrix: Solid   Date Received: 01/31/2006 1140

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	82		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			
Percent Moisture	18		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			

Client Sample ID: HB-S5-1106

Lab Sample ID: 580-1405-5   Date Sampled: 01/26/2006 1315
Client Matrix: Solid   Date Received: 01/31/2006 1140

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	76		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			
Percent Moisture	24		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			

Client Sample ID: HB-S6-1106

Lab Sample ID: 580-1405-6   Date Sampled: 01/26/2006 1445
Client Matrix: Solid   Date Received: 01/31/2006 1140

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	78		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			
Percent Moisture	22		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			

Client Sample ID: HB-S7-1106

Lab Sample ID: 580-1405-7   Date Sampled: 01/26/2006 1425
Client Matrix: Solid   Date Received: 01/31/2006 1140

Client: OnSite Environmental Inc Job Number: 580-1405-1

General Chemistry

Client Sample ID: HB-S7-1106

Lab Sample ID: 580-1405-7 Date Sampled: 01/26/2006 1425
Client Matrix: Solid Date Received: 01/31/2006 1140

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	74		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			
Percent Moisture	26		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			

Client Sample ID: HB-S8-1106

Lab Sample ID: 580-1405-8 Date Sampled: 01/26/2006 1540
Client Matrix: Solid Date Received: 01/31/2006 1140

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	80		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			
Percent Moisture	20		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			

Client Sample ID: HB-S9-1106

Lab Sample ID: 580-1405-9 Date Sampled: 01/26/2006 1525
Client Matrix: Solid Date Received: 01/31/2006 1140

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	78		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			
Percent Moisture	22		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			

Client Sample ID: HB-S11-1106

Lab Sample ID: 580-1405-10 Date Sampled: 01/26/2006 1125
Client Matrix: Solid Date Received: 01/31/2006 1140

Client: OnSite Environmental Inc | Job Number: 580-1405-1

General Chemistry

Client Sample ID: HB-S11-1106

Lab Sample ID: 580-1405-10
Client Matrix: Solid

Date Sampled: 01/26/2006 1125
Date Received: 01/31/2006 1140

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	84		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			
Percent Moisture	16		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			

Client Sample ID: HB-S12-1106

Lab Sample ID: 580-1405-11
Client Matrix: Solid

Date Sampled: 01/26/2006 1310
Date Received: 01/31/2006 1140

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	82		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			
Percent Moisture	18		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			

Client: OnSite Environmental Inc

Job Number: 580-1405-1

Method Blank - Batch: 580-3694

Method: 8141A
Preparation: 3550B

Lab Sample ID: MB 580-3694/1-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 02/03/2006 0102
Date Prepared: 02/01/2006 1448

Analysis Batch: 580-3918
Prep Batch: 580-3694
Units: ug/Kg

Instrument ID: ITS40
Lab File ID: L18380.D
Initial Weight/Volume: 15.0 g
Final Weight/Volume: 10 mL
Injection Volume:

Analyte	Result	Qual	RL
Dichlorvos	ND		33
Mevinphos	ND		33
Ethoprop	ND		33
Naled	ND		33
Sulfotepp	ND		33
Monochrotophos	ND		33
Phorate	ND		33
Dimethoate	ND		33
Demeton-O + Demeton-S	ND		33
Diazinon	ND		33
Disulfoton	ND		33
Parathion methyl	ND		33
Ronnel	ND		33
Chlorpyrifos	ND		33
Malathion	ND		33
Fenthion	ND		33
Parathion	ND		33
Trichloronate	ND		33
Tetrachlorviphos	ND		33
Merphos	ND		33
Tokuthion	ND		33
Fensulfothion	ND		33
Bolstar	ND		33
EPN	ND		33
Azinphos-methyl	ND		33
Coumaphos	ND		33

Surrogate	% Rec	Acceptance Limits
Tributyl phosphate	90	38 - 129
Triphenylphosphate	84	45 - 125

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quality Control Results

Client: OnSite Environmental Inc

Job Number: 580-1405-1

Laboratory Control/
Laboratory Control Duplicate Recovery Report - Batch: 580-3694

Method: 8141A
Preparation: 3550B

LCS Lab Sample ID:	LCS 580-3694/2-A	Analysis Batch:	580-3918	Instrument ID:	ITS40
Client Matrix:	Solid	Prep Batch:	580-3694	Lab File ID:	L18381.D
Dilution:	1.0	Units:	ug/Kg	Initial Weight/Volume:	15.0 g
Date Analyzed:	02/03/2006 0126			Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1448			Injection Volume:	

LCSD Lab Sample ID:	LCSD 580-3694/3-A	Analysis Batch:	580-3918	Instrument ID:	ITS40
Client Matrix:	Solid	Prep Batch:	580-3694	Lab File ID:	L18382.D
Dilution:	1.0	Units:	ug/Kg	Initial Weight/Volume:	15.0 g
Date Analyzed:	02/03/2006 0151			Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1448			Injection Volume:	

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
Tributyl phosphate	94	90	38 - 129
Triphenylphosphate	87	89	45 - 125

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 580-3694

Method: 8141A
Preparation: 3550B

MS Lab Sample ID:	580-1405-1	Analysis Batch:	580-3918	Instrument ID:	ITS40
Client Matrix:	Solid	Prep Batch:	580-3694	Lab File ID:	L18383.D
Dilution:	1.0			Initial Weight/Volume:	15.7211 g
Date Analyzed:	02/03/2006 0214			Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1448			Injection Volume:	

MSD Lab Sample ID:	580-1405-1	Analysis Batch:	580-3918	Instrument ID:	ITS40
Client Matrix:	Solid	Prep Batch:	580-3694	Lab File ID:	L18384.D
Dilution:	1.0			Initial Weight/Volume:	15.7137 g
Date Analyzed:	02/03/2006 0238			Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1448			Injection Volume:	

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
Tributyl phosphate	116	108	38 - 129
Triphenylphosphate	108	105	45 - 125

Calculations are performed before rounding to avoid round-off errors in calculated results.

DATA REPORTING QUALIFIERS

Client: OnSite Environmental Inc Job Number: 580-1405-1

Lab Section	Qualifier	Description
GC/MS Semi VOA		
	*	LCS, LCSD, MS, MSD, MD, or Surrogate exceeds the control limits

1405

CHAIN OF CUSTODY RECORD

Page 1 of 1

OnSite Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory Reference #: 01-190

Subcontract Laboratory: Severn Trent Laboratories, Inc.

Phone #: 1 (253) 922 - 2310

Date/Time:

Contact Person:

Project Manager: David Baumeister

Project Number: 19897-45706-T2

Project Name:

OSE #	Sample ID	Date Sampled	Time	Matrix	# Jars	Analysis Requested	Comments/Special Instructions
	HB-S1-1106	1/26/06	1040	S	1	8141A ORGANOPHOS.	
	S2		1205				
	S3		1220				
	S4		1300				
	S5		1315				
	S6		1445				
	S7		1425				
	S8		1540				
	S9		1525				
	S11		1125				
	S12		1310				

Relinquished by: M. Var	date: 1/31/06	Received by: [signature]	date: 1/31/06
Company: OSE	time: 955a	Company: STL	time: 9:20
Relinquished by: [signature]	date: 1/31/6	Received by: [signature]	date: 1/31/06
Company: STL	time: 11:40	Company: STL	time: 11:40
Relinquished by:	date:	Received by:	date:
Company:	time:	Company:	time:

LOGIN SAMPLE RECEIPT CHECK LIST

Client: OnSite Environmental Inc | Job Number: 580-1405-1

Login Number: 1405

Question	T/F/NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Hand Del by Lab Courier
Cooler Temperature is acceptable.	NA	
Cooler Temperature is recorded.	NA	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	NA	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • Fax: (425) 885-4603

Chain of Custody

Company: CDM

Project Number: 19897-45706-T2

Project Name: King County / Brell Phase II

Project Manager: Lance Peterson

Sampled by: Josh Miller / Brian King

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Day
- ☐ 3 Day
- ☒ Standard (7 working days)
- ☐ ________ (other)

Laboratory Number: 01-190

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270C	PAHs by 8270C / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	VPH	EPH	8141A organophos	8051A Herbicides	6010B Metals (As, Pb, Cd)		% Moisture
1	HB-S1-1/06	1/26/06	1040	Soil	2									X							X				X
2	HB-S2-1/06	1/26/06	1205	Soil	2									X							X				
3	HB-S3-1/06	1/26/06	1220	Soil	2									X							X	X	X		
4	HB-S4-1/06	1/26/06	1300	Soil	2									X							X	X	X		
5	HB-S5-1/06	1/26/06	1315	Soil	2									X							X				
6	HB-S6-1/06	1/26/06	1445	Soil	2									X							X				
7	HB-S7-1/06	1/26/06	1425	Soil	2									X							X				
8	HB-S8-1/06	1/26/06	1540	Soil	2									X							X	X	X		
9	HB-S9-1/06	1/26/06	1525	Soil	2									X							X	X	X		
10				MM 1/31/06																					

	Signature	Company	Date	Time
Relinquished by	Brian King	CDM	1/26/06	1745
Received by	Lance Peterson	CDM	1/26/06	1745
Relinquished by	Lance Peterson	CDM	1/30/06	0730
Received by	[illegible]	OnSite Env.	1/30/06	1330
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions: Contract #E23023E

Chromatograms with final report ☐

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OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • Fax: (425) 885-4603

Chain of Custody

Laboratory Number: 01-190

Company: CDM

Project Number: 19897-45706-72

Project Name: King County / Beall Phase II

Project Manager: Lance Peterson

Sampled by: Josh Miller / Brian King

Turnaround Request (in working days)

(Check One)

- [ ] Same Day
- [ ] 1 Day
- [ ] 2 Day
- [ ] 3 Day
- [x] Standard (7 working days)
- [ ] ______ (other)

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270C	PAHs by 8270C / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	VPH	EPH	8141A organophos	8051A Herbicides	6010B Metals (As, Pb, Cd)		% Moisture
11	HB-S11-1/06	1/26/06	1125	Soil	2									X							X				X
12	HB-S12-1/06	1/26/06	1310	Soil	2									X							X	X	X		↓

	Signature	Company	Date	Time
Relinquished by	Brian King	CDM	1/26/06	1745
Received by	Lance Peterson	CDM	1/26/06	1745
Relinquished by	Lance Peterson	CDM	1/30/06	0730
Received by	[illegible]	OnSite EE	1/30/06	1330
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:

Contract #E23023E

1/31/06 Added Herbicides & Metals for Sample HB-S12-1/06 AS PER LANCE.

Chromatograms with final report ☐

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OnSite Environmental Inc.
Analytical Testing and Mobile Laboratory Services

Received
FEB 06 2006
CDM

February 2, 2006

Lance Peterson
CDM
P.O. Box 3885
Bellevue, WA 98009

Re: Analytical Data for Project 19897-45706-T2
Laboratory Reference No. 0601-186

Dear Lance:

Enclosed are the analytical results and associated quality control data for samples submitted on January 28, 2006.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Storage Shed
with Chemical
Containers

Date of Report: February 2, 2006
Samples Submitted: January 28, 2006
Laboratory Reference: 0601-186
Project: 19897-45706-T2

Case Narrative

Samples were collected on January 27, 2006 and received by the laboratory on January 28, 2006. They were maintained at the laboratory at a temperature of 2°C to 6°C except as noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Volatiles EPA 8260B Analysis

Per EPA Method 5035A, samples were received by the laboratory in pre-weighed 40 mL VOA vials within 48 hours of sample collection. They were stored in a freezer at between -7°C and -20°C until extraction or analysis.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: February 2, 2006
Samples Submitted: January 28, 2006
Laboratory Reference: 0601-186
Project: 19897-45706-T2

NWTPH-HCID

Date Extracted: 1-30-06
Date Analyzed: 1-30-06

Matrix: Soil
Units: mg/kg (ppm)

Client ID:	**HB-S38-1/06**	**HB-S46-1/06**
Lab ID:	01-186-01	01-186-02
Gasoline:	**ND**	**ND**
PQL:	24	24
Diesel Fuel:	**ND**	**ND**
PQL:	61	60
Lube Oil:	**ND**	**ND**
PQL:	120	120
Surrogate Recovery:		
o-Terphenyl	124%	120%
Flags:	Y	Y

OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

Date of Report: February 2, 2006
Samples Submitted: January 28, 2006
Laboratory Reference: 0601-186
Project: 19897-45706-T2

NWTPH-HCID
METHOD BLANK QUALITY CONTROL

Date Extracted:	1-30-06
Date Analyzed:	1-30-06
Matrix:	Soil
Units:	mg/kg (ppm)

Lab ID:	MB0130S1
Gasoline:	**ND**
PQL:	20
Diesel Fuel:	**ND**
PQL:	50
Lube Oil:	**ND**
PQL:	100
Surrogate Recovery:	
o-Terphenyl	107%
Flags	Y

Date of Report: February 2, 2006
Samples Submitted: January 28, 2006
Laboratory Reference: 0601-186
Project: 19897-45706-T2

VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted:	1-31-06
Date Analyzed:	1-31-06
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	01-186-01
Client ID:	**HB-S38-1/06**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.0011
Chloromethane	ND		0.0011
Vinyl Chloride	ND		0.0011
Bromomethane	ND		0.0011
Chloroethane	ND		0.0011
Trichlorofluoromethane	ND		0.0011
1,1-Dichloroethene	ND		0.0011
Acetone	ND		0.0054
Iodomethane	ND		0.0054
Carbon Disulfide	ND		0.0011
Methylene Chloride	ND		0.0054
(trans) 1,2-Dichloroethene	ND		0.0011
Methyl t-Butyl Ether	ND		0.0011
1,1-Dichloroethane	ND		0.0011
Vinyl Acetate	ND		0.0054
2,2-Dichloropropane	ND		0.0011
(cis) 1,2-Dichloroethene	ND		0.0011
2-Butanone	ND		0.0054
Bromochloromethane	ND		0.0011
Chloroform	ND		0.0011
1,1,1-Trichloroethane	ND		0.0011
Carbon Tetrachloride	ND		0.0011
1,1-Dichloropropene	ND		0.0011
Benzene	ND		0.0011
1,2-Dichloroethane	ND		0.0011
Trichloroethene	ND		0.0011
1,2-Dichloropropane	ND		0.0011
Dibromomethane	ND		0.0011
Bromodichloromethane	ND		0.0011
2-Chloroethyl Vinyl Ether	ND		0.0054
(cis) 1,3-Dichloropropene	ND		0.0011
Methyl Isobutyl Ketone	ND		0.0054
Toluene	ND		0.0011
(trans) 1,3-Dichloropropene	ND		0.0011

Date of Report: February 2, 2006
Samples Submitted: January 28, 2006
Laboratory Reference: 0601-186
Project: 19897-45706-T2

VOLATILES by EPA 8260B
Page 2 of 2

Lab ID: 01-186-01
Client ID: HB-S38-1/06

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.0011
Tetrachloroethene	ND		0.0011
1,3-Dichloropropane	ND		0.0011
2-Hexanone	ND		0.0054
Dibromochloromethane	ND		0.0011
1,2-Dibromoethane	ND		0.0011
Chlorobenzene	ND		0.0011
1,1,1,2-Tetrachloroethane	ND		0.0011
Ethylbenzene	ND		0.0011
m,p-Xylene	ND		0.0022
o-Xylene	ND		0.0011
Styrene	ND		0.0011
Bromoform	ND		0.0011
Isopropylbenzene	ND		0.0011
Bromobenzene	ND		0.0011
1,1,2,2-Tetrachloroethane	ND		0.0011
1,2,3-Trichloropropane	ND		0.0011
n-Propylbenzene	ND		0.0011
2-Chlorotoluene	ND		0.0011
4-Chlorotoluene	ND		0.0011
1,3,5-Trimethylbenzene	ND		0.0011
tert-Butylbenzene	ND		0.0011
1,2,4-Trimethylbenzene	ND		0.0011
sec-Butylbenzene	ND		0.0011
1,3-Dichlorobenzene	ND		0.0011
p-Isopropyltoluene	ND		0.0011
1,4-Dichlorobenzene	ND		0.0011
1,2-Dichlorobenzene	ND		0.0011
n-Butylbenzene	ND		0.0011
1,2-Dibromo-3-chloropropane	ND		0.0054
1,2,4-Trichlorobenzene	ND		0.0011
Hexachlorobutadiene	ND		0.0054
Naphthalene	ND		0.0011
1,2,3-Trichlorobenzene	ND		0.0011

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	103	71-126
Toluene, d8	112	73-130
4-Bromofluorobenzene	115	70-130

Date of Report: February 2, 2006
Samples Submitted: January 28, 2006
Laboratory Reference: 0601-186
Project: 19897-45706-T2

VOLATILES by EPA 8260B

Date Extracted: 1-31-06
Date Analyzed: 1-31-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 01-186-02
Client ID: HB-S46-1/06

Compound	**Results**	**Flags**	**PQL**
Dichlorodifluoromethane	ND		0.0011
Chloromethane	ND		0.0011
Vinyl Chloride	ND		0.0011
Bromomethane	ND		0.0011
Chloroethane	ND		0.0011
Trichlorofluoromethane	ND		0.0011
1,1-Dichloroethene	ND		0.0011
Acetone	ND		0.0053
Iodomethane	ND		0.0053
Carbon Disulfide	ND		0.0011
Methylene Chloride	ND		0.0053
(trans) 1,2-Dichloroethene	ND		0.0011
Methyl t-Butyl Ether	ND		0.0011
1,1-Dichloroethane	ND		0.0011
Vinyl Acetate	ND		0.0053
2,2-Dichloropropane	ND		0.0011
(cis) 1,2-Dichloroethene	ND		0.0011
2-Butanone	ND		0.0053
Bromochloromethane	ND		0.0011
Chloroform	ND		0.0011
1,1,1-Trichloroethane	ND		0.0011
Carbon Tetrachloride	ND		0.0011
1,1-Dichloropropene	ND		0.0011
Benzene	ND		0.0011
1,2-Dichloroethane	ND		0.0011
Trichloroethene	ND		0.0011
1,2-Dichloropropane	ND		0.0011
Dibromomethane	ND		0.0011
Bromodichloromethane	ND		0.0011
2-Chloroethyl Vinyl Ether	ND		0.0053
(cis) 1,3-Dichloropropene	ND		0.0011
Methyl Isobutyl Ketone	ND		0.0053
Toluene	ND		0.0011
(trans) 1,3-Dichloropropene	ND		0.0011

Date of Report: February 2, 2006
Samples Submitted: January 28, 2006
Laboratory Reference: 0601-186
Project: 19897-45706-T2

VOLATILES by EPA 8260B
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Lab ID: 01-186-02
Client ID: HB-S46-1/06

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.0011
Tetrachloroethene	ND		0.0011
1,3-Dichloropropane	ND		0.0011
2-Hexanone	ND		0.0053
Dibromochloromethane	ND		0.0011
1,2-Dibromoethane	ND		0.0011
Chlorobenzene	ND		0.0011
1,1,1,2-Tetrachloroethane	ND		0.0011
Ethylbenzene	ND		0.0011
m,p-Xylene	ND		0.0021
o-Xylene	ND		0.0011
Styrene	ND		0.0011
Bromoform	ND		0.0011
Isopropylbenzene	ND		0.0011
Bromobenzene	ND		0.0011
1,1,2,2-Tetrachloroethane	ND		0.0011
1,2,3-Trichloropropane	ND		0.0011
n-Propylbenzene	ND		0.0011
2-Chlorotoluene	ND		0.0011
4-Chlorotoluene	ND		0.0011
1,3,5-Trimethylbenzene	ND		0.0011
tert-Butylbenzene	ND		0.0011
1,2,4-Trimethylbenzene	ND		0.0011
sec-Butylbenzene	ND		0.0011
1,3-Dichlorobenzene	ND		0.0011
p-Isopropyltoluene	ND		0.0011
1,4-Dichlorobenzene	ND		0.0011
1,2-Dichlorobenzene	ND		0.0011
n-Butylbenzene	ND		0.0011
1,2-Dibromo-3-chloropropane	ND		0.0053
1,2,4-Trichlorobenzene	ND		0.0011
Hexachlorobutadiene	ND		0.0053
Naphthalene	ND		0.0011
1,2,3-Trichlorobenzene	ND		0.0011

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	104	71-126
Toluene, d8	109	73-130
4-Bromofluorobenzene	121	70-130

Date of Report: February 2, 2006
Samples Submitted: January 28, 2006
Laboratory Reference: 0601-186
Project: 19897-45706-T2

VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
Page 1 of 2

Date Extracted: 1-31-06
Date Analyzed: 1-31-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: MB0131S1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.0010
Chloromethane	ND		0.0010
Vinyl Chloride	ND		0.0010
Bromomethane	ND		0.0010
Chloroethane	ND		0.0010
Trichlorofluoromethane	ND		0.0010
1,1-Dichloroethene	ND		0.0010
Acetone	ND		0.0050
Iodomethane	ND		0.0050
Carbon Disulfide	ND		0.0010
Methylene Chloride	ND		0.0050
(trans) 1,2-Dichloroethene	ND		0.0010
Methyl t-Butyl Ether	ND		0.0010
1,1-Dichloroethane	ND		0.0010
Vinyl Acetate	ND		0.0050
2,2-Dichloropropane	ND		0.0010
(cis) 1,2-Dichloroethene	ND		0.0010
2-Butanone	ND		0.0050
Bromochloromethane	ND		0.0010
Chloroform	ND		0.0010
1,1,1-Trichloroethane	ND		0.0010
Carbon Tetrachloride	ND		0.0010
1,1-Dichloropropene	ND		0.0010
Benzene	ND		0.0010
1,2-Dichloroethane	ND		0.0010
Trichloroethene	ND		0.0010
1,2-Dichloropropane	ND		0.0010
Dibromomethane	ND		0.0010
Bromodichloromethane	ND		0.0010
2-Chloroethyl Vinyl Ether	ND		0.0050
(cis) 1,3-Dichloropropene	ND		0.0010
Methyl Isobutyl Ketone	ND		0.0050
Toluene	ND		0.0010
(trans) 1,3-Dichloropropene	ND		0.0010

Date of Report: February 2, 2006
Samples Submitted: January 28, 2006
Laboratory Reference: 0601-186
Project: 19897-45706-T2

VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
Page 2 of 2

Lab ID: MB0131S1

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.0010
Tetrachloroethene	ND		0.0010
1,3-Dichloropropane	ND		0.0010
2-Hexanone	ND		0.0050
Dibromochloromethane	ND		0.0010
1,2-Dibromoethane	ND		0.0010
Chlorobenzene	ND		0.0010
1,1,1,2-Tetrachloroethane	ND		0.0010
Ethylbenzene	ND		0.0010
m,p-Xylene	ND		0.0020
o-Xylene	ND		0.0010
Styrene	ND		0.0010
Bromoform	ND		0.0010
Isopropylbenzene	ND		0.0010
Bromobenzene	ND		0.0010
1,1,2,2-Tetrachloroethane	ND		0.0010
1,2,3-Trichloropropane	ND		0.0010
n-Propylbenzene	ND		0.0010
2-Chlorotoluene	ND		0.0010
4-Chlorotoluene	ND		0.0010
1,3,5-Trimethylbenzene	ND		0.0010
tert-Butylbenzene	ND		0.0010
1,2,4-Trimethylbenzene	ND		0.0010
sec-Butylbenzene	ND		0.0010
1,3-Dichlorobenzene	ND		0.0010
p-Isopropyltoluene	ND		0.0010
1,4-Dichlorobenzene	ND		0.0010
1,2-Dichlorobenzene	ND		0.0010
n-Butylbenzene	ND		0.0010
1,2-Dibromo-3-chloropropane	ND		0.0050
1,2,4-Trichlorobenzene	ND		0.0010
Hexachlorobutadiene	ND		0.0050
Naphthalene	ND		0.0010
1,2,3-Trichlorobenzene	ND		0.0010

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	102	71-126
Toluene, d8	108	73-130
4-Bromofluorobenzene	121	70-130

Date of Report: February 2, 2006
Samples Submitted: January 28, 2006
Laboratory Reference: 0601-186
Project: 19897-45706-T2

VOLATILES by EPA 8260B
SB/SBD QUALITY CONTROL

Date Extracted: 1-31-06
Date Analyzed: 1-31-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: SB0131S1

Compound	Spike Amount	SB	Percent Recovery	SBD	Percent Recovery	Recovery Limits	Flags
1,1-Dichloroethene	0.0500	0.0473	95	0.0487	97	70-130	
Benzene	0.0500	0.0485	97	0.0484	97	70-130	
Trichloroethene	0.0500	0.0504	101	0.0524	105	70-130	
Toluene	0.0500	0.0460	92	0.0499	100	70-130	
Chlorobenzene	0.0500	0.0518	104	0.0530	106	70-130	

	RPD	RPD Limit	Flags
1,1-Dichloroethene	3	11	
Benzene	0	11	
Trichloroethene	4	13	
Toluene	8	11	
Chlorobenzene	2	12	

Date of Report: February 2, 2006
Samples Submitted: January 28, 2006
Laboratory Reference: 0601-186
Project: 19897-45706-T2

% MOISTURE

Date Analyzed: 1-30-06

Client ID	Lab ID	% Moisture
HB-S38-1/06	01-186-01	18
HB-S46-1/06	01-186-02	17

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

G - Insufficient sample quantity for duplicate analysis.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

O - Hydrocarbons indicative of diesel fuel are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ___________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a silica gel cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

Page 1 of 1

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • Fax: (425) 885-4603

Company: CDM

Project Number: 19897-45706-T2

Project Name: King County/Beall Phase II

Project Manager: Lance Peterson

Sampled by: Josh Miller

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Day
- ☐ 3 Day
- ☒ Standard (7 working days)
- ☐ ______ (other)

Laboratory Number: 01-186

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B*	~~Halogenated Volatiles by 8260B~~	Semivolatiles by 8270C	PAHs by 8270C / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	VPH	EPH					% Moisture
1	HB-S38-1/06	1/27/06	1500	soil	5	X			X	~~X~~															X
2	HB-S46-1/06	1/27/06	1510	soil	5	X			X	~~X~~															↓

	Signature	Company	Date	Time
Relinquished by	Brian [illegible]	CDM	1/27/06	1650
Received by	Lance Peterson	CDM	1/27/06	1650
Relinquished by	Lance Peterson	CDM	1/28/06	1030
Received by	[illegible]	OnSite Env	1/28/06	1030
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:

King County Contract #E23023E

* Changed H.V. to VOCs As per LANCE 1.31.06

Chromatograms with final report ☒

DISTRIBUTION LEGEND: White - OnSite Copy Yellow - Report Copy Pink - Client Copy

OnSite Environmental Inc.
Analytical Testing and Mobile Laboratory Services

Received
FEB 17 2006
CDM

February 13, 2006

Lance Peterson
CDM
P.O. Box 3885
Bellevue, WA 98009

Re: Analytical Data for Project 19897-45706-T2
Laboratory Reference No. 0601-188

Dear Lance:

Enclosed are the analytical results and associated quality control data for samples submitted on January 30, 2006.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

Case Narrative

Samples were collected on January 27, 2006 and received by the laboratory on January 30, 2006. They were maintained at the laboratory at a temperature of 2°C to 6°C except as noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Organochlorine Pesticides by EPA 8081A Analysis

Due to sample matrix effects, the percent difference values for the following analytes were greater than the quality control limit of +15% (low bias) on both columns in the following continuing calibration verification standard (CCV):

PEST MID LEVEL 0203-2: 4,4'-DDT and Methoxychlor
PEST LOW LEVEL 0206-1: 4,4'-DDT
PEST LOW LEVEL 0206-2: 4,4'-DDT and Methoxychlor
PEST MID LEVEL 0206-2: 4,4'-DDT and Methoxychlor
PEST HIGH LEVEL 0206-2 Endosulfan I, 4,4'-DDT and Methoxychlor.
PEST LOW LEVEL 0206-3: Heptachlor, 4,4'-DDT, Methoxychlor and Endrin Ketone.
PEST LOW LEVEL 0207-1: delta-BHC
PEST MID LEVEL 0207-2: 4,4'-DDT
PEST HIGH LEVEL 0207-2: DCB, Heptachlor, Endosulfan I, 4,4'-DDT, Methoxychlor and Endrin Ketone.
PEST HIGH LEVEL 0208-1: Endosulfan I
PEST LOW LEVEL 0208-2: 4,4'-DDT and Methoxychlor

The percent difference values for the following analytes were greater than the quality control limit of -15% (high bias) on both columns in the following continuing calibration verification standards (CCV's):

PEST LOW LEVEL 0203-1: Endrin
PEST MID LEVEL 0203-1: Endrin
PEST LOW LEVEL 0203-2: Endrin
PEST MID LEVEL 0203-2: beta-BHC, Endrin, and 4,4'-DDD.

Since the degradation of the CCV standards was reproducible after re-injecting the sample extracts, the CCV degradation problem was attributed to the matrix of this sample.

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

NWTPH-Dx

Date Extracted: 2-3-06
Date Analyzed: 2-14-06

Matrix: Soil
Units: mg/kg (ppm)

Client ID:	**HB-S13-1/06**	**HB-S14-1/06**	**HB-S15-1/06**
Lab ID:	01-188-01	01-188-02	01-188-03
Diesel Range:	**ND**	**ND**	**ND**
PQL:	29	29	33
Identification:	—	—	—
Lube Oil Range:	**ND**	**110**	**ND**
PQL:	57	57	66
Identification:	—	Bunker C	—
Surrogate Recovery			
o-Terphenyl:	96%	89%	100%
Flags:	Y	Y	Y

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

NWTPH-Dx

Date Extracted: 2-3-06
Date Analyzed: 2-14-06

Matrix: Soil
Units: mg/kg (ppm)

Client ID:	**HB-S16-1/06**	**HB-S17-1/06**	**HB-S18-1/06**
Lab ID:	01-188-04	01-188-05	01-188-06
Diesel Range:	**ND**	**ND**	**ND**
PQL:	36	33	1500
Identification:	---	—	—
Lube Oil Range:	**2700**	**1200**	**56000**
PQL:	71	66	3000
Identification:	Bunker C	Bunker C	Bunker C
Surrogate Recovery			
o-Terphenyl:	67%	91%	—
Flags:	Y	Y	Y,S

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

NWTPH-Dx

Date Extracted: 2-3-06
Date Analyzed: 2-14-06

Matrix: Soil
Units: mg/kg (ppm)

Client ID:	**HB-S44-1/06**	**HB-S19-1/06**
Lab ID:	01-188-07	01-188-08
Diesel Range:	**ND**	**ND**
PQL:	610	27
Identification:	—	—
Lube Oil Range:	**28000**	**360**
PQL:	1200	54
Identification:	Bunker C	Bunker C
Surrogate Recovery		
o-Terphenyl:	—	104%
Flags:	Y,S	Y

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

NWTPH-Dx
METHOD BLANK QUALITY CONTROL

Date Extracted:	2-3-06
Date Analyzed:	2-14-06
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	MB0203S1
Diesel Range:	**ND**
PQL:	25
Identification:	---
Lube Oil Range:	**ND**
PQL:	50
Identification:	---
Surrogate Recovery	
o-Terphenyl:	115%
Flags:	Y

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

NWTPH-Dx
DUPLICATE QUALITY CONTROL

Date Extracted: 2-3-06
Date Analyzed: 2-3-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID:	01-188-02	01-188-02 DUP
Diesel Range:	**ND**	**ND**
PQL:	25	25
RPD:	N/A	
Surrogate Recovery		
o-Terphenyl:	86%	96%
Flags:	Y	Y

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

TOTAL METALS
EPA 6010B

Date Extracted: 2-2-06
Date Analyzed: 2-6-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 01-188-16
Client ID: HB-S45-1/06

Analyte	Method	Result	PQL
Arsenic	6010B	**20**	13
Cadmium	6010B	**1.5**	0.63
Lead	6010B	**780**	6.3

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

TOTAL METALS
EPA 6010B

Date Extracted:	2-2-06
Date Analyzed:	2-6-06
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	01-188-20
Client ID:	HB-S33-1/06

Analyte	Method	Result	PQL
Arsenic	6010B	**ND**	13
Cadmium	6010B	**ND**	0.63
Lead	6010B	**27**	6.3

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

TOTAL METALS
EPA 6010B

Date Extracted: 2-2-06
Date Analyzed: 2-6-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 01-188-21
Client ID: HB-S39-1/06

Analyte	Method	Result	PQL
Arsenic	6010B	**30**	12
Cadmium	6010B	**1.6**	0.60
Lead	6010B	**1100**	6.0

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

TOTAL METALS
EPA 6010B

Date Extracted:	2-2-06
Date Analyzed:	2-6-06
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	01-188-22
Client ID:	HB-S40-1/06

Analyte	Method	Result	PQL
Arsenic	6010B	**ND**	12
Cadmium	6010B	**0.66**	0.62
Lead	6010B	**170**	6.2

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

TOTAL METALS
EPA 6010B
METHOD BLANK QUALITY CONTROL

Date Extracted: 2-2-06
Date Analyzed: 2-3-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: MB0202S2

Analyte	Method	Result	PQL
Arsenic	6010B	**ND**	10
Cadmium	6010B	**ND**	0.50
Lead	6010B	**ND**	5.0

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

TOTAL METALS
EPA 6010B
DUPLICATE QUALITY CONTROL

Date Extracted: 2-2-06
Date Analyzed: 2-3-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 01-190-04

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Arsenic	**13.9**	**15.5**	11	10	
Cadmium	**0.657**	**0.538**	20	0.50	
Lead	**109**	**113**	4	5.0	

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

TOTAL METALS
EPA 6010B
MS/MSD QUALITY CONTROL

Date Extracted: 2-2-06
Date Analyzed: 2-3-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 01-190-04

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Arsenic	100	**103**	89	**101**	87	1	
Cadmium	50	**46.6**	92	**46.7**	92	0	
Lead	250	**324**	86	**325**	86	0	

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

CHLORINATED ACID
HERBICIDES by EPA 8151A

Date Extracted:	2-8-06
Date Analyzed:	2-9-06
Matrix:	Soil
Units:	ug/kg (ppb) free acid equivalent
Lab ID:	01-188-21
Client ID:	**HB-S39-1/06**

Analyte	**Result**	**PQL**	**Flags**
Dalapon	**ND**	280	
Dicamba	**ND**	57	
MCPP	**ND**	5700	
MCPA	**ND**	5600	
Dichlorprop	**ND**	57	
2,4-D	**ND**	57	
Pentachlorophenol	**13**	1.1	**P**
2,4,5-TP (Silvex)	**ND**	57	
2,4,5-T	**ND**	57	
2,4-DB	**ND**	57	
Dinoseb	**ND**	57	

Surrogate	**Percent Recovery**	**Control Limits**
DCAA	55	39-131

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

CHLORINATED ACID
HERBICIDES by EPA 8151A

Date Extracted:	2-8-06
Date Analyzed:	2-9-06
Matrix:	Soil
Units:	ug/kg (ppb) free acid equivalent
Lab ID:	01-188-22
Client ID:	**HB-S40-1/06**

Analyte	Result	PQL	Flags
Dalapon	ND	280	
Dicamba	ND	58	
MCPP	ND	5800	
MCPA	ND	5800	
Dichlorprop	ND	58	
2,4-D	ND	58	
Pentachlorophenol	31	1.2	P
2,4,5-TP (Silvex)	ND	59	
2,4,5-T	ND	59	
2,4-DB	ND	58	
Dinoseb	ND	58	

Surrogate	Percent Recovery	Control Limits
DCAA	50	39-131

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

CHLORINATED ACID
HERBICIDES by EPA 8151A
METHOD BLANK QUALITY CONTROL

Date Extracted: 2-8-06
Date Analyzed: 2-9-06

Matrix: Soil
Units: ug/kg (ppb) free acid equivalent

Lab ID: MB0208S1

Analyte	**Result**	**PQL**	**Flags**
Dalapon	**ND**	230	
Dicamba	**ND**	47	
MCPP	**ND**	4700	
MCPA	**ND**	4700	
Dichlorprop	**ND**	47	
2,4-D	**ND**	47	
Pentachlorophenol	**ND**	0.95	
2,4,5-TP (Silvex)	**ND**	48	
2,4,5-T	**ND**	47	
2,4-DB	**ND**	47	
Dinoseb	**ND**	47	

Surrogate	**Percent Recovery**	**Control Limits**
DCAA	66	39-131

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

CHLORINATED ACID
HERBICIDES by EPA 8151A
MS/MSD QUALITY CONTROL

Date Extracted: 2-8-06
Date Analyzed: 2-9-06

Matrix: Soil
Units: ug/kg (ppb) free acid equivalent

Lab ID: 01-190-04

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Dicamba	94.0	71.2	76	72.4	77	2	
2,4-D	94.0	61.0	65	55.0	59	10	
2,4,5-T	94.8	71.7	76	64.6	68	10	
2,4-DB	94.7	89.2	94	73.1	77	20	

Surrogate	Percent Recovery	Percent Recovery	Control Limits
DCAA	74	75	39-131

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

ORGANOCHLORINE PESTICIDES by EPA 8081A

Date Extracted:	2-2-06
Date Analyzed:	2-7-06
Matrix:	Soil
Units:	ug/kg (ppb)
Lab ID:	01-188-15
Client ID:	**HB-S29-1/06**

Analyte	**Result**	**PQL**	**Flags**
alpha-BHC	**ND**	5.9	
gamma-BHC	**ND**	5.9	
Heptachlor	**ND**	5.9	
Aldrin	**ND**	5.9	
beta-BHC	**ND**	5.9	
delta-BHC	**ND**	5.9	
Heptachlor epoxide	**ND**	5.9	
Endosulfan I	**ND**	5.9	
gamma-Chlordane	**ND**	12	
alpha-Chlordane	**ND**	12	
4,4'-DDE	**20**	12	
Dieldrin	**ND**	12	
Endrin	**ND**	12	
Endosulfan II	**ND**	12	
4,4'-DDD	**81**	12	
4,4'-DDT	**150**	12	
Endrin Aldehyde	**ND**	12	
Endosulfan Sulfate	**ND**	12	
Methoxychlor	**ND**	12	
Endrin ketone	**ND**	12	
Toxaphene	**ND**	59	

Surrogate	**Percent Recovery**	**Control Limits**
Tetrachloro-m-xylene	67	34 - 109
Decachlorobiphenyl	41	30 - 115

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

ORGANOCHLORINE
PESTICIDES by EPA 8081A

Date Extracted:	2-2-06
Date Analyzed:	2-8-06
Matrix:	Soil
Units:	ug/kg (ppb)
Lab ID:	01-188-16
Client ID:	**HB-S45-1/06**

Analyte	**Result**	**PQL**	**Flags**
alpha-BHC	**ND**	6.3	
gamma-BHC	**ND**	6.3	
Heptachlor	**ND**	6.3	
Aldrin	**ND**	6.3	
beta-BHC	**ND**	6.3	
delta-BHC	**ND**	6.3	
Heptachlor epoxide	**ND**	6.3	
Endosulfan I	**ND**	6.3	
gamma-Chlordane	**ND**	13	
alpha-Chlordane	**ND**	13	
4,4'-DDE	**45**	13	
Dieldrin	**ND**	13	
Endrin	**ND**	13	
Endosulfan II	**ND**	13	
4,4'-DDD	**170**	13	
4,4'-DDT	**1400**	130	
Endrin Aldehyde	**ND**	13	
Endosulfan Sulfate	**21**	13	
Methoxychlor	**ND**	13	
Endrin ketone	**ND**	13	
Toxaphene	**ND**	63	

Surrogate	**Percent Recovery**	**Control Limits**
Tetrachloro-m-xylene	64	34 - 109
Decachlorobiphenyl	33	30 - 115

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

ORGANOCHLORINE
PESTICIDES by EPA 8081A

Date Extracted:	2-2-06
Date Analyzed:	2-8-06
Matrix:	Soil
Units:	ug/kg (ppb)
Lab ID:	01-188-17
Client ID:	**HB-S30-1/06**

Analyte	Result	PQL	Flags
alpha-BHC	ND	6.7	
gamma-BHC	ND	6.7	
Heptachlor	ND	6.7	
Aldrin	ND	6.7	
beta-BHC	ND	6.7	
delta-BHC	ND	6.7	
Heptachlor epoxide	ND	6.7	
Endosulfan I	ND	6.7	
gamma-Chlordane	16	13	
alpha-Chlordane	22	13	
4,4'-DDE	ND	13	
Dieldrin	ND	13	
Endrin	ND	13	
Endosulfan II	ND	13	
4,4'-DDD	ND	13	
4,4'-DDT	22	13	
Endrin Aldehyde	ND	13	
Endosulfan Sulfate	ND	13	
Methoxychlor	ND	13	
Endrin ketone	ND	13	
Toxaphene	ND	67	

Surrogate	Percent Recovery	Control Limits
Tetrachloro-m-xylene	60	34 - 109
Decachlorobiphenyl	52	30 - 115

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

ORGANOCHLORINE PESTICIDES by EPA 8081A

Date Extracted:	2-2-06
Date Analyzed:	2-7-06
Matrix:	Soil
Units:	ug/kg (ppb)
Lab ID:	01-188-18
Client ID:	**HB-S31-1/06**

Analyte	**Result**	**PQL**	**Flags**
alpha-BHC	**ND**	6.8	
gamma-BHC	**ND**	6.8	
Heptachlor	**ND**	6.8	
Aldrin	**ND**	6.8	
beta-BHC	**ND**	6.8	
delta-BHC	**ND**	6.8	
Heptachlor epoxide	**ND**	6.8	
Endosulfan I	**ND**	6.8	
gamma-Chlordane	**ND**	14	
alpha-Chlordane	**ND**	14	
4,4'-DDE	**ND**	14	
Dieldrin	**ND**	14	
Endrin	**ND**	14	
Endosulfan II	**ND**	14	
4,4'-DDD	**ND**	14	
4,4'-DDT	**ND**	14	
Endrin Aldehyde	**ND**	14	
Endosulfan Sulfate	**ND**	14	
Methoxychlor	**ND**	14	
Endrin ketone	**ND**	14	
Toxaphene	**ND**	68	

Surrogate	**Percent Recovery**	**Control Limits**
Tetrachloro-m-xylene	56	34 - 109
Decachlorobiphenyl	61	30 - 115

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

ORGANOCHLORINE PESTICIDES by EPA 8081A

Date Extracted:	2-2-06
Date Analyzed:	2-7-06
Matrix:	Soil
Units:	ug/kg (ppb)
Lab ID:	01-188-19
Client ID:	**HB-S32-1/06**

Analyte	Result	PQL	Flags
alpha-BHC	ND	7.1	
gamma-BHC	ND	7.1	
Heptachlor	ND	7.1	
Aldrin	ND	7.1	
beta-BHC	ND	7.1	
delta-BHC	ND	7.1	
Heptachlor epoxide	ND	7.1	
Endosulfan I	ND	7.1	
gamma-Chlordane	ND	14	
alpha-Chlordane	ND	14	
4,4'-DDE	ND	14	
Dieldrin	ND	14	
Endrin	ND	14	
Endosulfan II	ND	14	
4,4'-DDD	ND	14	
4,4'-DDT	ND	14	
Endrin Aldehyde	ND	14	
Endosulfan Sulfate	ND	14	
Methoxychlor	ND	14	
Endrin ketone	ND	14	
Toxaphene	ND	71	

Surrogate	Percent Recovery	Control Limits
Tetrachloro-m-xylene	53	34 - 109
Decachlorobiphenyl	57	30 - 115

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

ORGANOCHLORINE PESTICIDES by EPA 8081A

Date Extracted:	2-2-06
Date Analyzed:	2-7-06
Matrix:	Soil
Units:	ug/kg (ppb)
Lab ID:	01-188-20
Client ID:	**HB-S33-1/06**

Analyte	**Result**	**PQL**	**Flags**
alpha-BHC	**ND**	6.3	
gamma-BHC	**ND**	6.3	
Heptachlor	**ND**	6.3	
Aldrin	**ND**	6.3	
beta-BHC	**ND**	6.3	
delta-BHC	**ND**	6.3	
Heptachlor epoxide	**ND**	6.3	
Endosulfan I	**ND**	6.3	
gamma-Chlordane	**ND**	13	
alpha-Chlordane	**ND**	13	
4,4'-DDE	**ND**	13	
Dieldrin	**ND**	13	
Endrin	**ND**	13	
Endosulfan II	**ND**	13	
4,4'-DDD	**ND**	13	
4,4'-DDT	**ND**	13	
Endrin Aldehyde	**ND**	13	
Endosulfan Sulfate	**ND**	13	
Methoxychlor	**ND**	13	
Endrin ketone	**ND**	13	
Toxaphene	**ND**	63	

Surrogate	**Percent Recovery**	**Control Limits**
Tetrachloro-m-xylene	59	34 - 109
Decachlorobiphenyl	57	30 - 115

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

ORGANOCHLORINE PESTICIDES by EPA 8081A

Date Extracted:	2-2-06
Date Analyzed:	2-7-06
Matrix:	Soil
Units:	ug/kg (ppb)
Lab ID:	01-188-23
Client ID:	**HB-S41-1/06**

Analyte	**Result**	**PQL**	**Flags**
alpha-BHC	**ND**	6.3	
gamma-BHC	**ND**	6.3	
Heptachlor	**ND**	6.3	
Aldrin	**ND**	6.3	
beta-BHC	**ND**	6.3	
delta-BHC	**ND**	6.3	
Heptachlor epoxide	**ND**	6.3	
Endosulfan I	**ND**	6.3	
gamma-Chlordane	**ND**	13	
alpha-Chlordane	**ND**	13	
4,4'-DDE	**ND**	13	
Dieldrin	**ND**	13	
Endrin	**ND**	13	
Endosulfan II	**ND**	13	
4,4'-DDD	**ND**	13	
4,4'-DDT	**ND**	13	
Endrin Aldehyde	**ND**	13	
Endosulfan Sulfate	**ND**	13	
Methoxychlor	**ND**	13	
Endrin ketone	**ND**	13	
Toxaphene	**ND**	63	

Surrogate	**Percent Recovery**	**Control Limits**
Tetrachloro-m-xylene	59	34 - 109
Decachlorobiphenyl	47	30 - 115

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

ORGANOCHLORINE PESTICIDES by EPA 8081A

Date Extracted: 2-2-06
Date Analyzed: 2-7-06

Matrix: Soil
Units: ug/kg (ppb)

Lab ID: 01-188-24
Client ID: **HB-S42-1/06**

Analyte	**Result**	**PQL**	**Flags**
alpha-BHC	**ND**	6.1	
gamma-BHC	**ND**	6.1	
Heptachlor	**ND**	6.1	
Aldrin	**ND**	6.1	
beta-BHC	**ND**	6.1	
delta-BHC	**ND**	6.1	
Heptachlor epoxide	**ND**	6.1	
Endosulfan I	**ND**	6.1	
gamma-Chlordane	**ND**	12	
alpha-Chlordane	**ND**	12	
4,4'-DDE	**63**	12	
Dieldrin	**ND**	12	
Endrin	**ND**	12	
Endosulfan II	**ND**	12	
4,4'-DDD	**ND**	12	
4,4'-DDT	**ND**	12	
Endrin Aldehyde	**ND**	12	
Endosulfan Sulfate	**ND**	12	
Methoxychlor	**ND**	12	
Endrin ketone	**ND**	12	
Toxaphene	**ND**	61	

Surrogate	**Percent Recovery**	**Control Limits**
Tetrachloro-m-xylene	60	34 - 109
Decachlorobiphenyl	56	30 - 115

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

ORGANOCHLORINE PESTICIDES by EPA 8081A

Date Extracted: 2-2-06
Date Analyzed: 2-7-06

Matrix: Soil
Units: ug/kg (ppb)

Lab ID: 01-188-25
Client ID: **HB-S26-1/06**

Analyte	Result	PQL	Flags
alpha-BHC	ND	5.4	
gamma-BHC	ND	5.4	
Heptachlor	ND	5.4	
Aldrin	ND	5.4	
beta-BHC	ND	5.4	
delta-BHC	ND	5.4	
Heptachlor epoxide	ND	5.4	
Endosulfan I	ND	5.4	
gamma-Chlordane	ND	11	
alpha-Chlordane	ND	11	
4,4'-DDE	ND	11	
Dieldrin	ND	11	
Endrin	ND	11	
Endosulfan II	ND	11	
4,4'-DDD	ND	11	
4,4'-DDT	ND	11	
Endrin Aldehyde	ND	11	
Endosulfan Sulfate	ND	11	
Methoxychlor	ND	11	
Endrin ketone	ND	11	
Toxaphene	ND	54	

Surrogate	Percent Recovery	Control Limits
Tetrachloro-m-xylene	43	34 - 109
Decachlorobiphenyl	46	30 - 115

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

ORGANOCHLORINE
PESTICIDES by EPA 8081A

Date Extracted:	2-2-06
Date Analyzed:	2-7-06
Matrix:	Soil
Units:	ug/kg (ppb)
Lab ID:	01-188-26
Client ID:	**HB-S27-1/06**

Analyte	**Result**	**PQL**	**Flags**
alpha-BHC	**ND**	6.0	
gamma-BHC	**ND**	6.0	
Heptachlor	**ND**	6.0	
Aldrin	**ND**	6.0	
beta-BHC	**ND**	6.0	
delta-BHC	**ND**	6.0	
Heptachlor epoxide	**ND**	6.0	
Endosulfan I	**ND**	6.0	
gamma-Chlordane	**ND**	12	
alpha-Chlordane	**ND**	12	
4,4'-DDE	**ND**	12	
Dieldrin	**ND**	12	
Endrin	**ND**	12	
Endosulfan II	**ND**	12	
4,4'-DDD	**ND**	12	
4,4'-DDT	**ND**	12	
Endrin Aldehyde	**ND**	12	
Endosulfan Sulfate	**ND**	12	
Methoxychlor	**ND**	12	
Endrin ketone	**ND**	12	
Toxaphene	**ND**	60	

Surrogate	**Percent Recovery**	**Control Limits**
Tetrachloro-m-xylene	56	34 - 109
Decachlorobiphenyl	55	30 - 115

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

ORGANOCHLORINE PESTICIDES by EPA 8081A

Date Extracted:	2-2-06
Date Analyzed:	2-7-06
Matrix:	Soil
Units:	ug/kg (ppb)
Lab ID:	01-188-27
Client ID:	**HB-S28-1/06**

Analyte	Result	PQL	Flags
alpha-BHC	**ND**	12	
gamma-BHC	**ND**	12	
Heptachlor	**ND**	12	
Aldrin	**ND**	12	
beta-BHC	**ND**	12	
delta-BHC	**ND**	12	
Heptachlor epoxide	**ND**	12	
Endosulfan I	**270**	12	
gamma-Chlordane	**ND**	23	
alpha-Chlordane	**ND**	23	
4,4'-DDE	**51**	23	
Dieldrin	**ND**	23	
Endrin	**ND**	23	
Endosulfan II	**200**	23	
4,4'-DDD	**110**	23	
4,4'-DDT	**1300**	230	
Endrin Aldehyde	**ND**	23	
Endosulfan Sulfate	**140**	23	
Methoxychlor	**ND**	23	
Endrin ketone	**ND**	23	
Toxaphene	**ND**	580	

Surrogate	Percent Recovery	Control Limits
Tetrachloro-m-xylene	56	34 - 109
Decachlorobiphenyl	42	30 - 115

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

ORGANOCHLORINE
PESTICIDES by EPA 8081A
METHOD BLANK QUALITY CONTROL

Date Extracted: 2-2-06
Date Analyzed: 2-3-06

Matrix: Soil
Units: ug/kg (ppb)

Lab ID: MB0202S1

Analyte	Result	PQL	Flags
alpha-BHC	ND	5.0	
gamma-BHC	ND	5.0	
Heptachlor	ND	5.0	
Aldrin	ND	5.0	
beta-BHC	ND	5.0	
delta-BHC	ND	5.0	
Heptachlor epoxide	ND	5.0	
Endosulfan I	ND	5.0	
gamma-Chlordane	ND	10	
alpha-Chlordane	ND	10	
4,4'-DDE	ND	10	
Dieldrin	ND	10	
Endrin	ND	10	
Endosulfan II	ND	10	
4,4'-DDD	ND	10	
4,4'-DDT	ND	10	
Endrin Aldehyde	ND	10	
Endosulfan Sulfate	ND	10	
Methoxychlor	ND	10	
Endrin ketone	ND	10	
Toxaphene	ND	50	

Surrogate	Percent Recovery	Control Limits
Tetrachloro-m-xylene	78	34 - 109
Decachlorobiphenyl	74	30 - 115

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

ORGANOCHLORINE
PESTICIDES by EPA 8081A
MS/MSD QUALITY CONTROL

Date Extracted: 2-2-06
Date Analyzed: 2-8-06

Matrix: Soil
Units: ug/kg (ppb)

Lab ID: 01-188-25

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
gamma-BHC	50	31.5	63	35.5	71	12	
Heptachlor	50	29.1	58	32.3	65	10	
Aldrin	50	28.2	56	31.0	62	10	
Dieldrin	125	75.2	60	84.2	67	11	
Endrin	125	84.8	68	94.4	76	11	
4,4'-DDT	125	77.4	62	88.5	71	13	

Surrogate	Percent Recovery	Percent Recovery	Control Limits
Tetrachloro-m-xylene	59	68	34 - 109
Decachlorobiphenyl	50	57	30 - 115

Flags:

Date of Report: February 13, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188
Project: 19897-45706-T2

% MOISTURE

Date Analyzed: 2-1,2&3-06

Client ID	Lab ID	% Moisture
HB-S13-1/06	01-188-01	13
HB-S14-1/06	01-188-02	13
HB-S15-1/06	01-188-03	24
HB-S16-1/06	01-188-04	30
HB-S17-1/06	01-188-05	24
HB-S18-1/06	01-188-06	17
HB-S44-1/06	01-188-07	18
HB-S19-1/06	01-188-08	7
HB-S29-1/06	01-188-15	15
HB-S45-1/06	01-188-16	21
HB-S30-1/06	01-188-17	25
HB-S31-1/06	01-188-18	26
HB-S32-1/06	01-188-19	30
HB-S33-1/06	01-188-20	21
HB-S39-1/06	01-188-21	17
HB-S40-1/06	01-188-22	19
HB-S41-1/06	01-188-23	21
HB-S42-1/06	01-188-24	18
HB-S26-1/06	01-188-25	8
HB-S27-1/06	01-188-26	17
HB-S28-1/06	01-188-27	14

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

G - Insufficient sample quantity for duplicate analysis.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

O - Hydrocarbons indicative of diesel fuel are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a silica gel cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z - The Diesel Range result is being impacted by the large amount of Lube Oil present in the sample.

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

ANALYTICAL REPORT

Job Number: 580-1404-1

Job Description: 19897-45706-T2

For:

OnSite Environmental Inc
14648 NE 95th Street
Redmond, WA 98052

Attention: Mr. David Baumeister

Ivy J Bolm
Project Manager I
ibolm@stl-inc.com
02/06/2006

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Severn Trent Laboratories, Inc.
STL Seattle 5755 8th Street East, Tacoma, WA 98424
Tel 253-922-2310 Fax 253-922-5047 www.stl-inc.com

Case Narrative for job: 580-J1404-1

Client: OnSite Environmental Inc

Date: 02/06/2006

Organophosphorous Compounds by GC-MS
Method **8141A**
Analysis Batch: 580-3776
Sample: 580-1404-11

The recovery result for Tributyl phosphate (surrogate) in sample 580-1404-11 from batch 580-3776 was out of acceptance limits, the percent recovery was high. The other surrogate was within limits and the sample results were all no detect. No further action was taken.

SAMPLE SUMMARY

Client: OnSite Environmental Inc

Job Number: 580-1404-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
580-1404-1	HB-S29-1/06	Solid	01/27/2006 0000	01/31/2006 1150
580-1404-2	HB-S45-1/06	Solid	01/27/2006 0000	01/31/2006 1150
580-1404-3	HB-S30-1/06	Solid	01/27/2006 0000	01/31/2006 1150
580-1404-4	HB-S31-1/06	Solid	01/27/2006 0000	01/31/2006 1150
580-1404-5	HB-S32-1/06	Solid	01/27/2006 0000	01/31/2006 1150
580-1404-6	HB-S33-1/06	Solid	01/27/2006 0000	01/31/2006 1150
580-1404-7	HB-S41-1/06	Solid	01/27/2006 0000	01/31/2006 1150
580-1404-8	HB-S42-1/06	Solid	01/27/2006 0000	01/31/2006 1150
580-1404-9	HB-S26-1/06	Solid	01/27/2006 0000	01/31/2006 1150
580-1404-10	HB-S27-1/06	Solid	01/27/2006 0000	01/31/2006 1150
580-1404-11	HB-S28-1/06	Solid	01/27/2006 0000	01/31/2006 1150

Analytical Data

Client: OnSite Environmental Inc

Job Number: 580-1404-1

Client Sample ID: HB-S29-1/06

Lab Sample ID:	580-1404-1	Date Sampled:	01/27/2006 0000
Client Matrix:	Solid	Date Received:	01/31/2006 1150

8141A Organophosphorous Compounds by GC-MS

Method:	8141A	Analysis Batch: 580-3776		Instrument ID:	ITS40
Preparation:	3550B	Prep Batch: 580-3690		Lab File ID:	L18369.D
Dilution:	1.0			Initial Weight/Volume:	15.9152 g
Date Analyzed:	02/02/2006 2041			Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1427			Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		31
Mevinphos		ND		31
Ethoprop		ND		31
Naled		ND		31
Sulfotepp		ND		31
Monochrotophos		ND		31
Phorate		ND		31
Dimethoate		ND		31
Demeton-O + Demeton-S		ND		31
Diazinon		ND		31
Disulfoton		ND		31
Parathion methyl		ND		31
Ronnel		ND		31
Chlorpyrifos		ND		31
Malathion		ND		31
Fenthion		ND		31
Parathion		ND		31
Trichloronate		ND		31
Tetrachlorviphos		ND		31
Merphos		ND		31
Tokuthion		ND		31
Fensulfothion		ND		31
Bolstar		ND		31
EPN		ND		31
Azinphos-methyl		ND		31
Coumaphos		ND		31

Surrogate	%Rec	Acceptance Limits
Tributyl phosphate	104	38 - 129
Triphenylphosphate	94	45 - 125

Client: OnSite Environmental Inc | Job Number: 580-1404-1

Client Sample ID: HB-S45-1/06

Lab Sample ID:	580-1404-2	Date Sampled:	01/27/2006 0000
Client Matrix:	Solid	Date Received:	01/31/2006 1150

8141A Organophosphorous Compounds by GC-MS

Method:	8141A	Analysis Batch: 580-3776		Instrument ID:	ITS40
Preparation:	3550B	Prep Batch: 580-3690		Lab File ID:	L18370.D
Dilution:	1.0			Initial Weight/Volume:	15.9610 g
Date Analyzed:	02/02/2006 2104			Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1427			Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		31
Mevinphos		ND		31
Ethoprop		ND		31
Naled		ND		31
Sulfotepp		ND		31
Monochrotophos		ND		31
Phorate		ND		31
Dimethoate		ND		31
Demeton-O + Demeton-S		ND		31
Diazinon		ND		31
Disulfoton		ND		31
Parathion methyl		ND		31
Ronnel		ND		31
Chlorpyrifos		ND		31
Malathion		ND		31
Fenthion		ND		31
Parathion		ND		31
Trichloronate		ND		31
Tetrachlorviphos		ND		31
Merphos		ND		31
Tokuthion		ND		31
Fensulfothion		ND		31
Bolstar		ND		31
EPN		ND		31
Azinphos-methyl		ND		31
Coumaphos		ND		31

Surrogate	%Rec	Acceptance Limits
Tributyl phosphate	101	38 - 129
Triphenylphosphate	95	45 - 125

Analytical Data

Client: OnSite Environmental Inc — Job Number: 580-1404-1

Client Sample ID: HB-S30-1/06

Lab Sample ID:	580-1404-3	Date Sampled:	01/27/2006 0000
Client Matrix:	Solid	Date Received:	01/31/2006 1150

8141A Organophosphorous Compounds by GC-MS

Method:	8141A	Analysis Batch: 580-3776	Instrument ID: ITS40
Preparation:	3550B	Prep Batch: 580-3690	Lab File ID: L18371.D
Dilution:	1.0		Initial Weight/Volume: 15.3027 g
Date Analyzed:	02/02/2006 2128		Final Weight/Volume: 10 mL
Date Prepared:	02/01/2006 1427		Injection Volume:

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		33
Mevinphos		ND		33
Ethoprop		ND		33
Naled		ND		33
Sulfotepp		ND		33
Monochrotophos		ND		33
Phorate		ND		33
Dimethoate		ND		33
Demeton-O + Demeton-S		ND		33
Diazinon		ND		33
Disulfoton		ND		33
Parathion methyl		ND		33
Ronnel		ND		33
Chlorpyrifos		ND		33
Malathion		ND		33
Fenthion		ND		33
Parathion		ND		33
Trichloronate		ND		33
Tetrachlorviphos		ND		33
Merphos		ND		33
Tokuthion		ND		33
Fensulfothion		ND		33
Bolstar		ND		33
EPN		ND		33
Azinphos-methyl		ND		33
Coumaphos		ND		33

Surrogate	%Rec	Acceptance Limits
Tributyl phosphate	99	38 - 129
Triphenylphosphate	93	45 - 125

Client: OnSite Environmental Inc　　　　Job Number: 580-1404-1

Client Sample ID: HB-S31-1/06

Lab Sample ID:	580-1404-4	Date Sampled:	01/27/2006 0000
Client Matrix:	Solid	Date Received:	01/31/2006 1150

8141A Organophosphorous Compounds by GC-MS

Method:	8141A	Analysis Batch: 580-3776		Instrument ID:	ITS40
Preparation:	3550B	Prep Batch: 580-3690		Lab File ID:	L18372.D
Dilution:	1.0			Initial Weight/Volume:	15.1098 g
Date Analyzed:	02/02/2006 2152			Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1427			Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		33
Mevinphos		ND		33
Ethoprop		ND		33
Naled		ND		33
Sulfotepp		ND		33
Monochrotophos		ND		33
Phorate		ND		33
Dimethoate		ND		33
Demeton-O + Demeton-S		ND		33
Diazinon		ND		33
Disulfoton		ND		33
Parathion methyl		ND		33
Ronnel		ND		33
Chlorpyrifos		ND		33
Malathion		ND		33
Fenthion		ND		33
Parathion		ND		33
Trichloronate		ND		33
Tetrachlorviphos		ND		33
Merphos		ND		33
Tokuthion		ND		33
Fensulfothion		ND		33
Bolstar		ND		33
EPN		ND		33
Azinphos-methyl		ND		33
Coumaphos		ND		33

Surrogate	%Rec	Acceptance Limits
Tributyl phosphate	97	38 - 129
Triphenylphosphate	84	45 - 125

Analytical Data

Client: OnSite Environmental Inc | Job Number: 580-1404-1

Client Sample ID: HB-S32-1/06

Lab Sample ID:	580-1404-5	Date Sampled:	01/27/2006 0000
Client Matrix:	Solid	Date Received:	01/31/2006 1150

8141A Organophosphorous Compounds by GC-MS

Method:	8141A	Analysis Batch: 580-3776	Instrument ID:	ITS40
Preparation:	3550B	Prep Batch: 580-3690	Lab File ID:	L18373.D
Dilution:	1.0		Initial Weight/Volume:	15.5821 g
Date Analyzed:	02/02/2006 2216		Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1427		Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		32
Mevinphos		ND		32
Ethoprop		ND		32
Naled		ND		32
Sulfotepp		ND		32
Monochrotophos		ND		32
Phorate		ND		32
Dimethoate		ND		32
Demeton-O + Demeton-S		ND		32
Diazinon		ND		32
Disulfoton		ND		32
Parathion methyl		ND		32
Ronnel		ND		32
Chlorpyrifos		ND		32
Malathion		ND		32
Fenthion		ND		32
Parathion		ND		32
Trichloronate		ND		32
Tetrachlorviphos		ND		32
Merphos		ND		32
Tokuthion		ND		32
Fensulfothion		ND		32
Bolstar		ND		32
EPN		ND		32
Azinphos-methyl		ND		32
Coumaphos		ND		32

Surrogate	%Rec	Acceptance Limits
Tributyl phosphate	100	38 - 129
Triphenylphosphate	89	45 - 125

Client: OnSite Environmental Inc

Job Number: 580-1404-1

Client Sample ID: HB-S33-1/06

Lab Sample ID:	580-1404-6	Date Sampled:	01/27/2006 0000
Client Matrix:	Solid	Date Received:	01/31/2006 1150

8141A Organophosphorous Compounds by GC-MS

Method:	8141A	Analysis Batch: 580-3776		Instrument ID:	ITS40
Preparation:	3550B	Prep Batch: 580-3690		Lab File ID:	L18374.D
Dilution:	1.0			Initial Weight/Volume:	15.1301 g
Date Analyzed:	02/02/2006 2239			Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1427			Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		33
Mevinphos		ND		33
Ethoprop		ND		33
Naled		ND		33
Sulfotepp		ND		33
Monochrotophos		ND		33
Phorate		ND		33
Dimethoate		ND		33
Demeton-O + Demeton-S		ND		33
Diazinon		ND		33
Disulfoton		ND		33
Parathion methyl		ND		33
Ronnel		ND		33
Chlorpyrifos		ND		33
Malathion		ND		33
Fenthion		ND		33
Parathion		ND		33
Trichloronate		ND		33
Tetrachlorviphos		ND		33
Merphos		ND		33
Tokuthion		ND		33
Fensulfothion		ND		33
Bolstar		ND		33
EPN		ND		33
Azinphos-methyl		ND		33
Coumaphos		ND		33

Surrogate	%Rec	Acceptance Limits
Tributyl phosphate	104	38 - 129
Triphenylphosphate	96	45 - 125

Client: OnSite Environmental Inc | Job Number: 580-1404-1

Client Sample ID: HB-S41-1/06

Lab Sample ID:	580-1404-7	Date Sampled:	01/27/2006 0000
Client Matrix:	Solid	Date Received:	01/31/2006 1150

8141A Organophosphorous Compounds by GC-MS

Method:	8141A	Analysis Batch: 580-3776		Instrument ID:	ITS40
Preparation:	3550B	Prep Batch: 580-3690		Lab File ID:	L18375.D
Dilution:	1.0			Initial Weight/Volume:	15.3511 g
Date Analyzed:	02/02/2006 2303			Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1427			Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		33
Mevinphos		ND		33
Ethoprop		ND		33
Naled		ND		33
Sulfotepp		ND		33
Monochrotophos		ND		33
Phorate		ND		33
Dimethoate		ND		33
Demeton-O + Demeton-S		ND		33
Diazinon		ND		33
Disulfoton		ND		33
Parathion methyl		ND		33
Ronnel		ND		33
Chlorpyrifos		ND		33
Malathion		ND		33
Fenthion		ND		33
Parathion		ND		33
Trichloronate		ND		33
Tetrachlorviphos		ND		33
Merphos		ND		33
Tokuthion		ND		33
Fensulfothion		ND		33
Bolstar		ND		33
EPN		ND		33
Azinphos-methyl		ND		33
Coumaphos		ND		33

Surrogate	%Rec	Acceptance Limits
Tributyl phosphate	106	38 - 129
Triphenylphosphate	90	45 - 125

Analytical Data

Client: OnSite Environmental Inc

Job Number: 580-1404-1

Client Sample ID: HB-S42-1/06

Lab Sample ID: 580-1404-8
Client Matrix: Solid

Date Sampled: 01/27/2006 0000
Date Received: 01/31/2006 1150

8141A Organophosphorous Compounds by GC-MS

Method:	8141A	Analysis Batch: 580-3776	Instrument ID:	ITS40	
Preparation:	3550B	Prep Batch: 580-3690	Lab File ID:	L18376.D	
Dilution:	1.0		Initial Weight/Volume:	15.0315	g
Date Analyzed:	02/02/2006 2327		Final Weight/Volume:	10	mL
Date Prepared:	02/01/2006 1427		Injection Volume:		

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		33
Mevinphos		ND		33
Ethoprop		ND		33
Naled		ND		33
Sulfotepp		ND		33
Monochrotophos		ND		33
Phorate		ND		33
Dimethoate		ND		33
Demeton-O + Demeton-S		ND		33
Diazinon		ND		33
Disulfoton		ND		33
Parathion methyl		ND		33
Ronnel		ND		33
Chlorpyrifos		ND		33
Malathion		ND		33
Fenthion		ND		33
Parathion		ND		33
Trichloronate		ND		33
Tetrachlorviphos		ND		33
Merphos		ND		33
Tokuthion		ND		33
Fensulfothion		ND		33
Bolstar		ND		33
EPN		ND		33
Azinphos-methyl		ND		33
Coumaphos		ND		33

Surrogate	%Rec	Acceptance Limits
Tributyl phosphate	101	38 - 129
Triphenylphosphate	83	45 - 125

Client: OnSite Environmental Inc | Job Number: 580-1404-1

Client Sample ID: HB-S26-1/06

Lab Sample ID:	580-1404-9	Date Sampled:	01/27/2006 0000
Client Matrix:	Solid	Date Received:	01/31/2006 1150

8141A Organophosphorous Compounds by GC-MS

Method:	8141A	Analysis Batch: 580-3776		Instrument ID:	ITS40
Preparation:	3550B	Prep Batch: 580-3690		Lab File ID:	L18377.D
Dilution:	1.0			Initial Weight/Volume:	15.9153 g
Date Analyzed:	02/02/2006 2351			Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1427			Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		31
Mevinphos		ND		31
Ethoprop		ND		31
Naled		ND		31
Sulfotepp		ND		31
Monochrotophos		ND		31
Phorate		ND		31
Dimethoate		ND		31
Demeton-O + Demeton-S		ND		31
Diazinon		ND		31
Disulfoton		ND		31
Parathion methyl		ND		31
Ronnel		ND		31
Chlorpyrifos		ND		31
Malathion		ND		31
Fenthion		ND		31
Parathion		ND		31
Trichloronate		ND		31
Tetrachlorviphos		ND		31
Merphos		ND		31
Tokuthion		ND		31
Fensulfothion		ND		31
Bolstar		ND		31
EPN		ND		31
Azinphos-methyl		ND		31
Coumaphos		ND		31

Surrogate	%Rec	Acceptance Limits
Tributyl phosphate	91	38 - 129
Triphenylphosphate	90	45 - 125

Analytical Data

Client: OnSite Environmental Inc   Job Number: 580-1404-1

Client Sample ID: **HB-S27-1/06**

Lab Sample ID:	580-1404-10	Date Sampled:	01/27/2006 0000
Client Matrix:	Solid	Date Received:	01/31/2006 1150

8141A Organophosphorous Compounds by GC-MS

Method:	8141A	Analysis Batch: 580-3776	Instrument ID:	ITS40
Preparation:	3550B	Prep Batch: 580-3690	Lab File ID:	L18378.D
Dilution:	1.0		Initial Weight/Volume:	15.6410 g
Date Analyzed:	02/03/2006 0014		Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1427		Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		32
Mevinphos		ND		32
Ethoprop		ND		32
Naled		ND		32
Sulfotepp		ND		32
Monochrotophos		ND		32
Phorate		ND		32
Dimethoate		ND		32
Demeton-O + Demeton-S		ND		32
Diazinon		ND		32
Disulfoton		ND		32
Parathion methyl		ND		32
Ronnel		ND		32
Chlorpyrifos		ND		32
Malathion		ND		32
Fenthion		ND		32
Parathion		ND		32
Trichloronate		ND		32
Tetrachlorviphos		ND		32
Merphos		ND		32
Tokuthion		ND		32
Fensulfothion		ND		32
Bolstar		ND		32
EPN		ND		32
Azinphos-methyl		ND		32
Coumaphos		ND		32

Surrogate	%Rec	Acceptance Limits
Tributyl phosphate	94	38 - 129
Triphenylphosphate	86	45 - 125

Client: OnSite Environmental Inc | Job Number: 580-1404-1

Client Sample ID: HB-S28-1/06

Lab Sample ID:	580-1404-11	Date Sampled:	01/27/2006 0000
Client Matrix:	Solid	Date Received:	01/31/2006 1150

8141A Organophosphorous Compounds by GC-MS

Method:	8141A	Analysis Batch: 580-3776	Instrument ID:	ITS40
Preparation:	3550B	Prep Batch: 580-3690	Lab File ID:	L18379.D
Dilution:	1.0		Initial Weight/Volume:	15.1524 g
Date Analyzed:	02/03/2006 0038		Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1427		Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		33
Mevinphos		ND		33
Ethoprop		ND		33
Naled		ND		33
Sulfotepp		ND		33
Monochrotophos		ND		33
Phorate		ND		33
Dimethoate		ND		33
Demeton-O + Demeton-S		ND		33
Diazinon		ND		33
Disulfoton		ND		33
Parathion methyl		ND		33
Ronnel		ND		33
Chlorpyrifos		ND		33
Malathion		ND		33
Fenthion		ND		33
Parathion		ND		33
Trichloronate		ND		33
Tetrachlorviphos		ND		33
Merphos		ND		33
Tokuthion		ND		33
Fensulfothion		ND		33
Bolstar		ND		33
EPN		ND		33
Azinphos-methyl		ND		33
Coumaphos		ND		33

Surrogate	%Rec		Acceptance Limits
Tributyl phosphate	156	*	38 - 129
Triphenylphosphate	99		45 - 125

General Chemistry

Client Sample ID: HB-S29-1/06

Lab Sample ID:	580-1404-1	Date Sampled:	01/27/2006 0000
Client Matrix:	Solid	Date Received:	01/31/2006 1150

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	86		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			
Percent Moisture	14		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			

Client Sample ID: HB-S45-1/06

Lab Sample ID:	580-1404-2	Date Sampled:	01/27/2006 0000
Client Matrix:	Solid	Date Received:	01/31/2006 1150

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	80		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			
Percent Moisture	20		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			

Client Sample ID: HB-S30-1/06

Lab Sample ID:	580-1404-3	Date Sampled:	01/27/2006 0000
Client Matrix:	Solid	Date Received:	01/31/2006 1150

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	75		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			
Percent Moisture	25		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			

Client Sample ID: HB-S31-1/06

Lab Sample ID:	580-1404-4	Date Sampled:	01/27/2006 0000
Client Matrix:	Solid	Date Received:	01/31/2006 1150

Client: OnSite Environmental Inc | Job Number: 580-1404-1

General Chemistry

Client Sample ID: **HB-S31-1/06**

Lab Sample ID: 580-1404-4 | Date Sampled: 01/27/2006 0000
Client Matrix: Solid | Date Received: 01/31/2006 1150

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	77		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			
Percent Moisture	23		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			

Client Sample ID: **HB-S32-1/06**

Lab Sample ID: 580-1404-5 | Date Sampled: 01/27/2006 0000
Client Matrix: Solid | Date Received: 01/31/2006 1150

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	73		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			
Percent Moisture	27		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			

Client Sample ID: **HB-S33-1/06**

Lab Sample ID: 580-1404-6 | Date Sampled: 01/27/2006 0000
Client Matrix: Solid | Date Received: 01/31/2006 1150

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	81		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			
Percent Moisture	19		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			

Client Sample ID: **HB-S41-1/06**

Lab Sample ID: 580-1404-7 | Date Sampled: 01/27/2006 0000
Client Matrix: Solid | Date Received: 01/31/2006 1150

General Chemistry

Client Sample ID: HB-S41-1/06

Lab Sample ID: 580-1404-7 | Date Sampled: 01/27/2006 0000
Client Matrix: Solid | Date Received: 01/31/2006 1150

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	80		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			
Percent Moisture	20		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			

Client Sample ID: HB-S42-1/06

Lab Sample ID: 580-1404-8 | Date Sampled: 01/27/2006 0000
Client Matrix: Solid | Date Received: 01/31/2006 1150

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	84		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			
Percent Moisture	16		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			

Client Sample ID: HB-S26-1/06

Lab Sample ID: 580-1404-9 | Date Sampled: 01/27/2006 0000
Client Matrix: Solid | Date Received: 01/31/2006 1150

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	92		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			
Percent Moisture	7.8		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			

Client Sample ID: HB-S27-1/06

Lab Sample ID: 580-1404-10 | Date Sampled: 01/27/2006 0000
Client Matrix: Solid | Date Received: 01/31/2006 1150

Client: OnSite Environmental Inc

Job Number: 580-1404-1

General Chemistry

Client Sample ID: HB-S27-1/06

Lab Sample ID: 580-1404-10
Client Matrix: Solid

Date Sampled: 01/27/2006 0000
Date Received: 01/31/2006 1150

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	86		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			
Percent Moisture	14		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			

Client Sample ID: HB-S28-1/06

Lab Sample ID: 580-1404-11
Client Matrix: Solid

Date Sampled: 01/27/2006 0000
Date Received: 01/31/2006 1150

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	88		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			
Percent Moisture	12		%	0.10	1.0	160.3
	Anly Batch: 580-3693	Date Analyzed	02/01/2006 1447			

Quality Control Results

Client: OnSite Environmental Inc

Job Number: 580-1404-1

Method Blank - Batch: 580-3690

Method: 8141A
Preparation: 3550B

Lab Sample ID: MB 580-3690/1-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 02/02/2006 1842
Date Prepared: 02/01/2006 1427

Analysis Batch: 580-3776
Prep Batch: 580-3690
Units: ug/Kg

Instrument ID: ITS40
Lab File ID: L18364.D
Initial Weight/Volume: 15.0 g
Final Weight/Volume: 10 mL
Injection Volume:

Analyte	Result	Qual	RL
Dichlorvos	ND		33
Mevinphos	ND		33
Ethoprop	ND		33
Naled	ND		33
Sulfotepp	ND		33
Monochrotophos	ND		33
Phorate	ND		33
Dimethoate	ND		33
Demeton-O + Demeton-S	ND		33
Diazinon	ND		33
Disulfoton	ND		33
Parathion methyl	ND		33
Ronnel	ND		33
Chlorpyrifos	ND		33
Malathion	ND		33
Fenthion	ND		33
Parathion	ND		33
Trichloronate	ND		33
Tetrachlorviphos	ND		33
Merphos	ND		33
Tokuthion	ND		33
Fensulfothion	ND		33
Bolstar	ND		33
EPN	ND		33
Azinphos-methyl	ND		33
Coumaphos	ND		33

Surrogate	% Rec	Acceptance Limits
Tributyl phosphate	96	38 - 129
Triphenylphosphate	95	45 - 125

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: OnSite Environmental Inc | Job Number: 580-1404-1

Laboratory Control/
Laboratory Control Duplicate Recovery Report - Batch: 580-3690

Method: 8141A
Preparation: 3550B

LCS Lab Sample ID:	LCS 580-3690/2-A	Analysis Batch:	580-3776	Instrument ID:	ITS40
Client Matrix:	Solid	Prep Batch:	580-3690	Lab File ID:	L18365.D
Dilution:	1.0	Units:	ug/Kg	Initial Weight/Volume:	15.0 g
Date Analyzed:	02/02/2006 1906			Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1427			Injection Volume:	

LCSD Lab Sample ID:	LCSD 580-3690/3-A	Analysis Batch:	580-3776	Instrument ID:	ITS40
Client Matrix:	Solid	Prep Batch:	580-3690	Lab File ID:	L18366.D
Dilution:	1.0	Units:	ug/Kg	Initial Weight/Volume:	15.0 g
Date Analyzed:	02/02/2006 1929			Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1427			Injection Volume:	

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
Tributyl phosphate	98	104	38 - 129
Triphenylphosphate	93	92	45 - 125

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 580-3690

Method: 8141A
Preparation: 3550B

MS Lab Sample ID:	580-1404-1	Analysis Batch:	580-3776	Instrument ID:	ITS40
Client Matrix:	Solid	Prep Batch:	580-3690	Lab File ID:	L18367.D
Dilution:	1.0			Initial Weight/Volume:	15.7772 g
Date Analyzed:	02/02/2006 1953			Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1427			Injection Volume:	

MSD Lab Sample ID:	580-1404-1	Analysis Batch:	580-3776	Instrument ID:	ITS40
Client Matrix:	Solid	Prep Batch:	580-3690	Lab File ID:	L18368.D
Dilution:	1.0			Initial Weight/Volume:	15.8465 g
Date Analyzed:	02/02/2006 2017			Final Weight/Volume:	10 mL
Date Prepared:	02/01/2006 1427			Injection Volume:	

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
Tributyl phosphate	96	94	38 - 129
Triphenylphosphate	82	79	45 - 125

Calculations are performed before rounding to avoid round-off errors in calculated results.

DATA REPORTING QUALIFIERS

Client: OnSite Environmental Inc Job Number: 580-1404-1

Lab Section	Qualifier	Description
GC/MS Semi VOA		
	*	LCS, LCSD, MS, MSD, MD, or Surrogate exceeds the control limits

#1404

CHAIN OF CUSTODY RECORD

OnSite Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory Reference #: 01-188

Subcontract Laboratory: Severn Trent Laboratories, Inc.

Phone #: 1 (253) 922 - 2310

Date/Time:

Contact Person:

Project Manager: David Baumeister

Project Number: 19897-45706-TZ

Project Name:

	OSE #	Sample ID	Date Sampled	Time	Matrix	# Jars	Analysis Requested	Comments/Special Instructions
1	15	HB-S29-1/06	1/27/06		S	1	Organophosphorus Pesticides 8141A	
2	16	HB-S45-1/06						
3	17	HB-S30-1/06						
4	18	HB-S31-1/06						
5	19	HB-S32-1/06						
6	20	HB-S33-1/06						
7	23	HB-S41-1/06						
8	24	HB-S42-1/06						
9	25	HB-S26-1/06						
10	26	HB-S27-1/06						
11	27	HB-S28-1/06						

Relinquished by: M. Va	date: 1/31/06	Received by: Jack Nelson STL	date: 1/31/06		
Company: OSE	time: 955	Company: STL	time: 955		
Relinquished by: Jack Nelson	date: 1/31/6	Received by: [illegible]	date: 1/31/06		
Company: STL	time: 11:40	Company: STL	time: 11:50a		
Relinquished by:	date:	Received by:	date:		
Company:	time:	Company:	time:		

LOGIN SAMPLE RECEIPT CHECK LIST

Client: OnSite Environmental Inc

Job Number: 580-1404-1

Login Number: 1404

Question	T/F/NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	del by courier
Cooler Temperature is acceptable.	NA	
Cooler Temperature is recorded.	NA	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	NA	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	

SAFE ENVIRONMENT OF AMERICA, INC. *dba*

MED-TOX NORTHWEST

2/9/2006

OnSite Environmental, Inc.
14648 NE 95th St
Redmond, WA 98052

Re: Bulk Asbestos Sample Analysis for Med-Tox Northwest Laboratory Batch # 60070

Dear Mr. David Baumeister,

Please find enclosed the test results for the bulk sample(s) submitted to our laboratory for evaluation of possible asbestos content. Unless otherwise stated in the report, all samples analyzed were in good condition upon receipt by the laboratory. Samples are held in archive for 1 year following analysis and then properly disposed of as hazardous waste.

Analysis was performed using polarized light microscopy (PLM) in accordance with Test Method US EPA/600/R-93/116. Representative portions of your sample(s) were prepared on glass slides and analyzed at magnifications of 100X to 400X using dispersion staining and/or Boecke line techniques. Unless stated otherwise on your report, fiber content was quantified by calibrated visual estimation in accordance with the method.

Any comments the analyst may wish to make with regard to your sample(s) will appear as a note directly below the sample number on your report.

The Environmental Protection Agency (EPA) does not regulate materials containing <1% (less than one percent) asbestos. The regulatory level falls at the limit of detection for EPA/600/R-93/116. Variation in data increases as the quantity of asbestos decreases toward the limit of detection. Therefore, the EPA recommends point counting for samples containing between <1% and 10% asbestos (NESHAP, 40 CFR Part 61). If your analyst has not recommended a point count but you feel that a point count might be beneficial, please feel free to call and request one.

Please note, vinyl floor tiles may contain asbestos fibers too small to be detected by PLM. For this reason, negative results and results of <1% asbestos for vinyl floor tiles analyzed by US EPA/600/R-93/116 are not considered conclusive by the EPA. More sensitive methods of analysis such as electron microscopy are recommended for these samples.

The test results on this report refer only to the samples submitted. The accuracy with which these samples represent the materials *in situ* is totally dependent on the acuity of the person who took the samples.

This test report is not valid unless it bears the signature of a NVLAP approved signatory. Any reproduction of this document must include the entire document in order to be valid. Neither the NVLAP accreditation of this laboratory nor this report can be used to claim product endorsement by NVLAP or any agency of the U.S. Government.

Thank you for choosing Med-Tox Northwest laboratory services. If you have any questions regarding this report, please feel free to contact us.

Sincerely,

Carol Evans

Carol Evans, BS Cer E
Laboratory Manager

NVLAP®
102021-0

2020 "A" Street SE • Suite #102 • Auburn, Washington 98002 • PHONE (253) 351-0677 • FAX (253) 351-0688 • E-mail: medtoxnw@msn.com
Website: www.medtoxnw.com

SAFE ENVIRONMENT OF AMERICA, INC. *dba*
MED-TOX
NORTHWEST

ANALYTICAL LABORATORY REPORT

Polarized Light Microscopy (PLM) by Method EPA/600/R-93/116

OnSite Environmental, Inc.
14648 NE 95th St
Redmond, WA 98052

Med-Tox NW Job #: L6781(1)
Laboratory Batch #: 60070
Date Received: 2/2/2006
Samples Received: 6
Date Analyzed: 2/9/2006
Samples Analyzed: 6

Attention: Mr. David Baumeister

Project: King County / Beall Phase II

Client Project #: 19897-45706-TZ

Lab ID	Client Sample ID	Layer	Description	Asbestos Fibers Present	Non-asbestos Fibers	Non-Fibrous Components
60369	HB-S21-1/06	1	Brown soil	**Chrysotile**	Cellulose	Miscellaneous organic and inorganic debris
60370	HB-S22-1/06	1	Brown soil	**None detected**	Cellulose	Miscellaneous organic and inorganic debris
60371	HB-S23-1/06	1	Brown soil	**Chrysotile**	Cellulose	Miscellaneous organic and inorganic debris
60372	HB-S24-1/06	1	Brown soil	**Amosite**	Cellulose	Miscellaneous organic and inorganic debris
60373	HB-S25-1/06	1	Brown soil	**None detected**	Cellulose	Miscellaneous organic and inorganic debris
60374	HB-S43-1/06	1	Brown soil	**None detected**	Cellulose	Miscellaneous organic and inorganic debris

Samples were reviewed for homogeneity, and representative portions were selected for further analysis. Presence or absence of asbestos was noted along with the type of asbestos, if present. Recent data from superfund sites provide evidence that soil and debris containing significantly less than 1% asbestos can release unacceptable air concentrations of asbestos fibers. Please read the enclosed document from the US EPA for further information. This document is currently available on the internet at the following site:
http://www.epa.gov/region09/toxic/noa/eldorado/pdf/memo722b.pdf

Analyzed by Carol Evans

Carol Evans
Reviewed by Carol Evans, Laboratory Manager

2020 "A" Street SE • Suite #102 • Auburn, Washington 98002 • PHONE (253) 351-0677 • FAX (253) 351-0688 • E-mail: medtoxnw@msn.com
Website: www.medtoxnw.com

CHAIN OF CUSTODY RECORD

Batch 60070 Page 1 of 1

OnSite Environmental Inc. 425-855-4603 fax

14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

L6781(1)

Laboratory Reference #: 01-188

Subcontract Laboratory: Med Tox

Phone #:

Date/Time:

Contact Person: CAROL

Project Manager: David Baumeister

Project Number: 19897-457ea-T2

Project Name:

60369-60374

OSE #	Sample ID	Time	Date Sampled	Matrix	# Jars	Analysis Requested	Comments/Special Instructions
	HB-S21-1/06		1/27/06	S	1	Asbestos	5 day TAT per Blair (phone) CE 2/3/06
	HB-S22-1/06						
	HB-S23-1/06						
	HB-S24-1/06						
	HB-S25-1/06						
	HB-S43-1/06						

Relinquished by: [signature]	date: 2/1/06	Received by: CEvans	date: 2/2/06
Company: OSE	time: 2:30pm	Company: MTNW	time: 13:00
Relinquished by:	date:	~~Received by:~~ Analyzed CEvans	date: 2/9/06
Company:	time:	Company: MTNW	time: 10:05
Relinquished by:	date:	Received by:	date:
Company:	time:	Company:	time:

SAFE ENVIRONMENT OF AMERICA, INC. dba
MED-TOX NORTHWEST

2020 'A' St SE, Suite 102
Auburn, Washington 98002
Telephone (253) 351-0677, Fax (253) 351-0688

Chain of Custody

Number of Samples: 6	Due Date: / Due Time:	Page 1 of 1	
Lab Batch Number: ~~60070~~ 60070 CE	Archive Box No.	MTNW Proj. No. L6781(1)	

Company: OnSite Environmental, Inc.	
Report to: David Baumeister	
Street: 14648 NE 95th St	
City: Redmond	State/Zip: WA 98052
Phone: (425) 883-3881	Fax: (425) 885-4603
Cell:	3885
Email:	
Project Name: King County Beall Phase II	
Project No. / PO Number	

Turn-Around Times
- ☐ 2 hours
- ☐ 4 hours
- ☐ Same day
- ☐ 1 work day
- ☐ 2 work days
- ☐ 3 work days
- ☐ 4 work days
- ☐ 5 work days
- ☐ Other

Bulk Asbestos
- ☐ PLM
- ☐ SEM
- ☐ TEM

Airborne Asbestos
- ☐ PCM
- ☐ TEM - AHERA
- ☐ TEM - Modified EPA
- ☐ TEM - NIOSH 7402
- ☐ Yamate II

Metals *(Select metals from list)*
- ☐ Air
- ☐ Wipe
- ☐ Chip
- ☐ TCLP
- ☐ Lead (Pb)
- ☐ Priority pollutant (13)
- ☐ TAL (23)
- ☐ Antimony (Sb)
- ☐ Arsenic (As)
- ☐ Barium (Ba)
- ☐ Beryllium (Be)
- ☐ Cadmium (Cd)
- ☐ Chromium (Cr)
- ☐ Copper (Cu)
- ☐ Mercury (Hg)
- ☐ Nickel (Ni)
- ☐ Selenium (Se)
- ☐ Silver (Ag)
- ☐ Thallium (Tl)
- ☐
- ☐

Fuel
- ☐ AK-GRO
- ☐ AK-DRO
- ☐ TPH-HCD (WA/OR)
- ☐ BETX/TPH-C (WA/OR)
- ☐ BETX (by 8020)
- ☐ TPH-G (WA/OR)
- ☐ TPH-D (WA/OR)
- ☐ 8015 Modified
- ☐ 418.1 (WA/OR)
- ☐ 413.2
- ☐

Organic Compound
- ☐ 8240 GCMS volatile
- ☐ 8270 GCMS semi-vol
- ☐ 8140 OP pesticide
- ☐ 8150 OC herbicide
- ☐ 8080 pesticide/PCB
- ☐ 8080 PCB std/low
- ☐ Aromatic VOC
- ☐ 8040 phenol
- ☐ 8010 Halogenated/VOC
- ☐ 8310 HPLC PAH

Fungal Non-viable
- ☐ Airborne
- ☐ Bulk
- ☐ Tape Lift

Other (Please specify)
- ☐
- ☐

	Sample ID	Lab ID	Comments	Special Instructions
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

6 @ $9.50	Relinquished by Courier (Signature)		Received by (Signature) C Evans		Analyzed by (Signature) C Evans	
	Print Name		Print Name Carol Evans		Print Name	
	Date	Time	Date 2/2/06	Time 13:00	Date 2/9/06	Time 10:05

\\Adam\data\active\LAB\COC\OnSite Environmental COC

Due date and time for samples received after 4:30 PM will be calculated from 8:00 AM the following business day.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

AUG 10 2004

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

OSWER 9345.4-05

MEMORANDUM

SUBJECT: Clarifying Cleanup Goals and Identification of New Assessment Tools for Evaluating Asbestos at Superfund Cleanups

FROM: Michael B. Cook, Director
Office of Superfund Remediation and Technology Innovation

TO: Superfund National Policy Managers, Regions 1-10

Purpose

The purpose of this memo is twofold. The first purpose is to clarify that Regions should develop risk-based, site-specific action levels to determine if response actions should be taken when materials containing less than 1 percent asbestos (including chrysotile and amphibole asbestos) are found on a site. Regions should not assume that materials containing less than 1 percent asbestos do not pose an unreasonable risk to human health. The second purpose is to outline some activities underway to assist in the evaluation of asbestos risks at Superfund sites.

It is important to note that this memorandum is not a regulation itself, nor does it change or substitute for any regulations. Thus, it does not impose legally binding requirements on EPA, States, or the regulated community. This memorandum does not confer legal rights or impose legal obligations upon any member of the public. Interested parties are free to raise questions and objections about the substance of this memorandum and the appropriateness of the application of this memorandum in a particular situation. EPA and other decision makers retain the discretion to adopt approaches on a case-by-case basis that differ from those described in this memorandum. The use of the word "should" in this document means that something is suggested or recommended, but not required.

Background

The 1 percent threshold for asbestos-containing materials was first used in the 1973 National Emissions Standards for Hazardous Air Pollutants (NESHAP), where the intent of the threshold was:

... to ban the use of materials which contain significant quantities of asbestos, but to allow the use of materials which would: (1) contain trace amounts of asbestos which occur in numerous natural substances, and (2) include very small quantities of asbestos (less than 1 percent) added to enhance the material's effectiveness. (38 FR 8821)

All subsequent EPA regulations and the Asbestos Hazardous Emergency Response Act Statute included this 1 percent threshold. In the 1990 NESHAP revisions, EPA retained the threshold, stating that it was related to the phase contrast microscopy (PCM) analytical method detection limits. The Occupational Safety and Health Administration (OSHA) Standards also defined an asbestos-containing material as a material containing more than 1 percent of asbestos[1] (29 CFR Part 1910.1001 and 29 CFR Part 910.134). The wide use of the 1 percent threshold in regulations may have caused site managers to assume that levels below the threshold did not pose an unreasonable risk to human health. However, it is important to note that the 1 percent threshold concept was related to the limit of detection for the analytical methods available at the time and also to EPA's prioritization of resources on materials containing higher percentages of asbestos.

Issue

Currently, many site managers continue to employ the use of the 1 percent threshold to determine if response actions for asbestos should be undertaken. However, based upon scientific discussions and findings reported by EPA and ATSDR from the Libby, Montana Superfund site, as well as EPA's "Peer Consultation Workshop on a Proposed Asbestos Cancer Risk Assessment[2]," there may be confusion regarding the appropriate use of the 1 percent threshold at Superfund sites. This concern was discussed at EPA's "Asbestos Site Evaluation, Communication, and Cleanup Workshop[3]," and it was concluded that the 1 percent threshold for asbestos in soil/debris as an action level may not be protective of human health in all instances of site cleanups. The 1 percent threshold is not risk-based and an accurate exposure value could only be determined through site sampling techniques that generate fibers from soil and bulk samples. Therefore, we recommend the development of risk-based, site-specific action levels to determine if response actions for asbestos in soil/debris should be undertaken.

Recent data from the Libby site and other sites provide evidence that soil/debris containing significantly less than 1 percent asbestos can release unacceptable air concentrations of all types of asbestos fibers (i.e., serpentine/chrysotile and amphibole/tremolite). The most critical determining factors in the level of airborne concentrations are the degree of disturbance, which is associated with the level of activity occurring on the site, and the presence of complete exposure pathways. For example, activities such as excavation or plowing generate large amounts of dust that can result in the generation of airborne fibers that can be inhaled even from a complex soil matrix. To address this evolving issue, OSRTI will be hosting a review of methods for determining conversion of soil to air concentrations in 2004.

Future Action

OSRTI has formed three technical working groups to assist in developing guidance and policy relating to risk assessment, field sampling, and analytical methods. These working groups have already contributed to a new toolbox that is located on the EPA Intranet. The location of the tool box is http://intranet.epa.gov/osrtinet/hottopic.htm.

The toolbox will be continually updated as products are developed and will eventually contain information on risk assessments, generic site sampling, and analytical approaches for asbestos cleanup projects. In the interim, numerous site reports that discuss specific concerns and issues from current asbestos site actions are contained in the toolbox. Additionally, to facilitate the development of sampling plans, there are examples of approved site sampling plans with data quality objectives, and a list of asbestos analytical laboratories which have passed an EPA audit.

Our goal is to have the majority of the guidance and policy documents prepared by the end of this year. If you have any questions, please consult with Richard Troast of my staff, who is the lead scientist within OSRTI for asbestos. He can be reached at (703) 603-8805 or by e-mail at: troast.richard@epa.gov.

cc:

Nancy Riveland, Superfund lead Region Coordinator, USEPA Region 9
Eric Steinhaus in Region 8
NARPM Co-Chairs
OSRTI Managers
Robert Springer, Senior Advisor to OSWER AA
Jim Woolford, FFRRO
Debbie Dietrich, OEPPR
Matt Hale, OSW
Cliff Rothenstein, OUST
Linda Garczynski, OBCR
Dave Kling, FFEO
Susan Bromm, OSRE
Earl Salo, OGC
Charles Openchowski, OGC
Joanna Gibson, OSRTI Documents Coordinator

Endnotes:

1. Pursuant to industry comments, the 1994 amendments to the OSHA Standards incorporated a definition of asbestos-containing material that included the 1 percent threshold to be consistent with EPA, and noted that the National Institute for

Occupational Safety and Health (NIOSH) had raised questions whether even one percent may be below the accuracy level for certain microscopic methods. However, OSHA's Hazard Communication Standard requires a Material Safety Data Sheet (MSDS) to be prepared by the manufacturer or importer of a chemical substance, mixture, or product containing more than 0.1 percent of any carcinogen, including asbestos. Additionally, OSHA has recently issued several letters stating that some of the requirements in the OSHA Asbestos Construction Standard (29 CFR 1926.1101) do cover materials containing less than one percent asbestos.

2. USEPA's *Peer Consultation Workshop on a Proposed Asbestos Cancer Risk Assessment* was held in San Francisco, California on February 25-27, 2003. The purpose of the workshop was to discuss the scientific merit of the proposed methodology developed for EPA by Dr. Wayne Berman and Dr. Kenny Crump. The proposed methodology distinguishes carcinogenic potency by asbestos fiber size and asbestos fiber type and advocates use of a new exposure index to characterize carcinogenic risk. Proceedings from this conference can be located at: http://www.epa.gov/superfund/programs/risk/asbestos/index.htm.

3. USEPA's *Asbestos Site Evaluation, Communication and Cleanup Workshop* was held in Keystone, Colorado on September 23-26, 2003. The purpose of the workshop was to provide an opportunity to share lessons learned from working on large sites contaminated with asbestos. The meeting was also used to identify key outstanding technical and policy issues, and to begin to develop a consistent approach to measuring "success", especially short-term impacts and long-term risk reduction. Proceedings from this conference can be located at: http://www.epa.gov/superfund/programs/risk/asbestos/workshop/index.htm.

CDM

CHAIN-OF-CUSTODY

Date 1/27/06 Page 1 of 4

Laboratory Number: 01-188

PROJECT INFORMATION

Project Manager: Lance Peterson

Project Name: King County / Beall Phase II

Project Number: 19847-45706-12

Site Location: Beall Greenhouses Sampled By: JHM/BRK

DISPOSAL INFORMATION

☒ Lab Disposal (return if not indicated)

Disposal Method:

Disposed by: Disposal Date:

QC INFORMATION (check one)

☐ SW-846 ☐ CLP ☐ Screening ☒ CDM Std. ☐ Special

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	PETROLEUM HYDROCARBONS: TPH-HCID State:	TPH-G State:	TPH-D State: NW	TPH-418.1 State:	8015M Fuel Hydrocarbon	TPH Special Instructions	ORGANIC COMPOUNDS: 8010 Halogenated VOCs	8020 Aromatic VOCs	8020M - BETX only	8240 GC/MS Volatiles	8270 GC/MS Semivolatiles	8310 PAHs	8040 Phenols	DWS - Volatiles and Semivolatiles	PESTS/PCBs: 8080 OC Pest/PCBs	8080M PCBs only	8140 OP Pesticides	8150 OC Herbicides	DWS - Herb/Pest	METALS: Selected Metals: list	Organic Lead (Ca)	TCL Metals (23)	Priority Poll. Metals (13)	DWS - Metals	MFSP - Metals (Wa)	LEACHING TESTS: TCLP - Volatiles (ZHE)	TCLP - Semivolatiles	TCLP - Pesticides	TCLP - Metals	OTHER: [illegible]	6010B Metals (As Pb Cd)	8051 Herbicides	8141A Organophos. Pesticides	8081A Pesticides	NUMBER OF CONTAINERS
HB-S13-1/06	1/27/06	845	soil	1			X																											X					1
HB-S14-1/06	1/27/06	905	soil	2			X																											X					1
HB-S15-1/06	1/27/06	915	soil	3			X																											X					1
HB-S16-1/06	1/27/06	955	soil	4			X																											X					1
HB-S17-1/06	1/27/06	1045	soil	5			X																											X					1
HB-S18-1/06	1/27/06	1110	soil	6			X																											X					1
HB-S44-1/06	1/27/06	1110	soil	7			X																											X					1
HB-S19-1/06	1/27/06	1140	soil	8			X																											X					1

LAB INFORMATION

Lab Name: Onsite Env.

Lab Address: 14648 NE 95th St Redmond WA 98052

Via: –

SAMPLE RECEIPT

Total Number of Containers:

Chain-of-Custody Seals: Y/N/NA

Intact?: Y/N/NA

Received in Good Condition/Cold:

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Brian King Time: 1730	Signature: Lance Peterson Time: 1400	Signature: Time:
Printed Name: Brian King Date: 1/27/06	Printed Name: Lance Peterson Date: 1/30/06	Printed Name: Date:
Company: CDM	Company: CDM	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: 3.
Signature: Lance Peterson Time: 1730	Signature: [illegible] Time: 1420	Signature: Time:
Printed Name: Lance Peterson Date: 1/27/06	Printed Name: Erin Goodlaw Date: 1/30/06	Printed Name: Date:
Company: CDM	Company: OnSite Env.	Company:

Turn Around Time: ☒ Standard ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 1 wk.

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions: NWTPHDx: quantitate as Bunker C

CDM

CHAIN-OF-CUSTODY

Date 1/27/06 Page 2 of 4

Laboratory Number: 01-188

PROJECT INFORMATION

Project Manager: Lance Peterson

Project Name: King Co / Beall Phase II

Project Number: 19897-45706-72

Site Location: ______ Sampled By: BEK / JDM

DISPOSAL INFORMATION

☒ Lab Disposal (return if not indicated)

Disposal Method: ______

Disposed by: ______ Disposal Date: ______

QC INFORMATION (check one)

☐ SW-846 ☐ CLP ☐ Screening ☒ CDM Std. ☐ Special

ANALYSIS REQUEST

PETROLEUM HYDROCARBONS: TPH-HCID – TPH Special Instructions; ORGANIC COMPOUNDS: 8010 Halogenated VOCs – DWS - Volatiles and Semivolatiles; PESTS/PCBs: 8080 OC Pest/PCBs – DWS - Herb/Pest; METALS: Selected Metals: list – MFSP - Metals (Wa); LEACHING TESTS: TCLP - Volatiles (ZHE) – TCLP - Metals; OTHER: moisture % – Asbestos

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TPH-HCID State:	TPH-G State:	TPH-D State:	TPH-418.1 State:	8015M Fuel Hydrocarbon	TPH Special Instructions	8010 Halogenated VOCs	8020 Aromatic VOCs	8020M - BETX only	8240 GC/MS Volatiles	8270 GC/MS Semivolatiles	8310 PAHs	8040 Phenols	DWS - Volatiles and Semivolatiles	8080 OC Pest/PCBs	8080M PCBs only	8140 OP Pesticides	8150 OC Herbicides	DWS - Herb/Pest	Selected Metals: list	Organic Lead (Ca)	TCL Metals (23)	Priority Poll. Metals (13)	DWS - Metals	MFSP - Metals (Wa)	TCLP - Volatiles (ZHE)	TCLP - Semivolatiles	TCLP - Pesticides	TCLP - Metals	moisture %	6010B metals (As, Pb, Cd)	8141A Organophos. Pesticides	8081A Pesticides	Asbestos	NUMBER OF CONTAINERS
HB-S21-1/06	1/27/06	905	soil	9																																		X	1
HB-S22-1/06	1/27/06	920	soil	10																																		X	1
HB-S23-1/06	1/27/06	930	soil	11																																		X	1
HB-S24-1/06	1/27/06	940	soil	12																																		X	1
HB-S25-1/06	1/27/06	1005	soil	13																																		X	1
HB-S43-1/06	1/27/06	1015	soil	14																																		X	1
HB-S29-1/06	1/27/06	1150	soil	15																															X	X	X	X		2
HB-S45-1/06	1/27/06	1215	soil	16																															X	X	X	X		3

LAB INFORMATION

Lab Name: OnSite Env.

Lab Address: 14648 NE 95th ST
Redmond WA 98052

Via:

SAMPLE RECEIPT

Total Number of Containers:

Chain-of-Custody Seals: Y/N/NA

Intact?: Y/N/NA

Received in Good Condition/Cold:

Turn Around Time: ☒ Standard ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 1 wk.

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions:
Asbestos testing by EPA Methods 600/M4-82-020 and 600/R-93/116 (polarized light microscopy/dispersion staining)

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Brian King Time: 1730	Signature: Lance Peterson Time: 1420	Signature: Time:
Printed Name: Brian King Date: 1/27/06	Printed Name: Lance Peterson Date: 1/30/06	Printed Name: Date:
Company: CDM	Company: CDM	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: 3.
Signature: Lance Peterson Time: 1730	Signature: [illegible] Time: 1420	Signature: Time:
Printed Name: Lance Peterson Date: 1/27/06	Printed Name: [illegible] Date: 1/30/06	Printed Name: Date:
Company: CDM	Company: OnSite Env.	Company:

CDM

CHAIN-OF-CUSTODY

Date 1/27/06 Page 3 of 4

Laboratory Number: 01-188

PROJECT INFORMATION

Project Manager: Lance Peterson

Project Name: King County / Beall Phase II

Project Number: 19897-45706-72

Site Location: ______ Sampled By: BDK / DDM

DISPOSAL INFORMATION

☒ Lab Disposal (return if not indicated)

Disposal Method: ______

Disposed by: ______ Disposal Date: ______

QC INFORMATION (check one)

☐ SW-846 ☐ CLP ☐ Screening ☒ CDM Std. ☐ Special

ANALYSIS REQUEST

PETROLEUM HYDROCARBONS: TPH-HCID State: | TPH-G State: | TPH-D State: | TPH-418.1 State: | 8015M Fuel Hydrocarbon | TPH Special Instructions

ORGANIC COMPOUNDS: 8010 Halogenated VOCs | 8020 Aromatic VOCs | 8020M - BETX only | 8240 GC/MS Volatiles | 8270 GC/MS Semivolatiles | 8310 PAHs | 8040 Phenols | DWS - Volatiles and Semivolatiles

PESTS/PCBs: 8080 OC Pest/PCBs | 8080M PCBs only | 8140 OP Pesticides | 8150 OC Herbicides | DWS - Herb/Pest

METALS: Selected Metals: list | Organic Lead (Ca) | TCL Metals (23) | Priority Poll. Metals (13) | DWS - Metals | MFSP - Metals (Wa)

LEACHING TESTS: TCLP - Volatiles (ZHE) | TCLP - Semivolatiles | TCLP - Pesticides | TCLP - Metals

OTHER: Moisture % | 8151A Herbicides | 6010B Metals (As, Pb, Cd) | 8141A Organophos. Pesticides | 8081A Pesticides

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Moisture %	8151A Herbicides	6010B Metals (As, Pb, Cd)	8141A Organophos. Pesticides	8081A Pesticides	NUMBER OF CONTAINERS
HB-S30-1/06	1/27/06	1245	soil	17	X			X	X	2
HB-S31-1/06	1/27/06	1310	soil	18	X			X	X	2
HB-S32-1/06	1/27/06	1350	soil	19	X			X	X	2
HB-S33-1/06	1/27/06	1450	soil	20	X		X	X	X	3
HB-S39-1/06	1/27/06	1400	soil	21	X	X	X			2
HB-S40-1/06	1/27/06	1410	soil	22	X	X	X			2
HB-S41-1/06	1/27/06	1220	soil	23	X			X	X	3
HB-S42-1/06	1/27/06	1250	soil	24	X			X	X	3

LAB INFORMATION

Lab Name: Onsite Env.

Lab Address: 14648 NE 95th St Redmond WA 98052

Via:

SAMPLE RECEIPT

Total Number of Containers:

Chain-of-Custody Seals: Y/N/NA

Intact?: Y/N/NA

Received in Good Condition/Cold:

Turn Around Time: ☒ Standard ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 1 wk.

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions:

	RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature / Time	Brian King / 1730	Lance Peterson / 1400	
Printed Name / Date	Brian King / 1/27/06	Lance Peterson / 1/30/06	
Company	CDM	CDM	

	RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: 3.
Signature / Time	Lance Peterson / 1730	[signature] / 1420	
Printed Name / Date	Lance Peterson / 1/27/06	Blair Goodin	
Company	CDM	OnSite Env.	

CDM

CHAIN-OF-CUSTODY

Date 1/27/06 Page 4 of 4

Laboratory Number: 01-188

PROJECT INFORMATION

Project Manager: Lance Peterson

Project Name: King County / Beall Phase II

Project Number: 19897-45706-72

Site Location: ______ Sampled By: BRK/JPM

DISPOSAL INFORMATION

☒ Lab Disposal (return if not indicated)

Disposal Method: ______

Disposed by: ______ Disposal Date: ______

QC INFORMATION (check one)

☐ SW-846 ☐ CLP ☐ Screening ☒ CDM Std. ☐ Special

SAMPLE ID	DATE	TIME	MATRIX	LAB ID
HB-S26-1/06	1/27/06	1035	soil	25
HB-S27-1/06	1/27/06	1120	soil	26
HB-S28-1/06	1/27/06	1130	soil	27

ANALYSIS REQUEST

SAMPLE ID	PETROLEUM HYDROCARBONS: TPH-HCID State:	TPH-G State:	TPH-D State:	TPH-418.1 State:	8015M Fuel Hydrocarbon	TPH Special Instructions	ORGANIC COMPOUNDS: 8010 Halogenated VOCs	8020 Aromatic VOCs	8020M - BETX only	8240 GC/MS Volatiles	8270 GC/MS Semivolatiles	8310 PAHs	8040 Phenols	DWS - Volatiles and Semivolatiles	PESTS/PCBs: 8080 OC Pest/PCBs	8080M PCBs only	8140 OP Pesticides	8150 OC Herbicides	DWS - Herb/Pest	METALS: Selected Metals: list	Organic Lead (Ca)	TCL Metals (23)	Priority Poll. Metals (13)	DWS - Metals	MFSP - Metals (Wa)	LEACHING TESTS: TCLP - Volatiles (ZHE)	TCLP - Semivolatiles	TCLP - Pesticides	TCLP - Metals	OTHER: % Moisture			8141A Organophos. Pesticides	8081A Pesticides	NUMBER OF CONTAINERS
HB-S26-1/06																														X			X	X	2
HB-S27-1/06																														X			X	X	2
HB-S28-1/06																														X			X	X	2

LAB INFORMATION

Lab Name: OnSite Env

Lab Address: 14648 NE 95th St
Redmond WA 98052

Via:

SAMPLE RECEIPT

Total Number of Containers:	
Chain-of-Custody Seals: Y/N/NA	
Intact?: Y/N/NA	
Received in Good Condition/Cold:	

Turn Around Time: ☒ Standard ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 1 wk.

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions:

	RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature:	BrianKing	Lance Peterson	
Time:	1730	1400	
Printed Name:	Brian King	Lance Peterson	
Date:	1/27/06	1/30/06	
Company:	CDM	CDM	

	RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: 3.
Signature:	Lance Peterson	[illegible]	
Time:	1730	1420	
Printed Name:	Lance Peterson	Blair Goodlow	
Date:	1/27/06		
Company:	CDM	OnSite Env	

OnSite
Environmental Inc.
Analytical Testing and Mobile Laboratory Services

March 3, 2006

Received
MAR 08 2006
CDM

Lance Peterson
CDM
P.O. Box 3885
Bellevue, WA 98009

Re: Analytical Data for Project 19897-45706-T2
Laboratory Reference No. 0601-188B

Dear Lance:

Enclosed are the analytical results and associated quality control data for samples submitted on January 30, 2006.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: March 3, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188B
Project: 19897-45706-T2

Case Narrative

Samples were collected on January 27, 2006 and received by the laboratory on January 30, 2006. They were maintained at the laboratory at a temperature of 2°C to 6°C except as noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

PAHs EPA 8270C/SIM Analysis

The client requested analysis of sample HB-S16-1/06 on 2-23-06, thirteen days after the holding time had expired.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: March 3, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188B
Project: 19897-45706-T2

PAHs by EPA 8270C/SIM

Date Extracted:	2-23-06
Date Analyzed:	2-24-06
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	02-188-04
Client ID:	**HB-S16-1/06**

Compound:	**Results**	**Flags**	**PQL**
Naphthalene	ND		0.0095
2-Methylnaphthalene	0.013		0.0095
1-Methylnaphthalene	ND		0.0095
Acenaphthylene	0.030		0.0095
Acenaphthene	ND		0.0095
Fluorene	ND		0.0095
Phenanthrene	0.057		0.0095
Anthracene	0.026		0.0095
Fluoranthene	0.10		0.0095
Pyrene	0.097		0.0095
Benzo[a]anthracene	0.050		0.0095
Chrysene	0.080		0.0095
Benzo[b]fluoranthene	0.092		0.0095
Benzo[k]fluoranthene	0.036		0.0095
Benzo[a]pyrene	0.10		0.0095
Indeno(1,2,3-c,d)pyrene	0.12		0.0095
Dibenz[a,h]anthracene	0.040		0.0095
Benzo[g,h,i]perylene	0.67		0.0095

Surrogate :	**Percent Recovery**	**Control Limits**
Nitrobenzene-d5	65	49 - 121
2-Fluorobiphenyl	84	53 - 110
Terphenyl-d14	90	64 - 123

Date of Report: March 3, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188B
Project: 19897-45706-T2

PAHs by EPA 8270C/SIM
METHOD BLANK QUALITY CONTROL

Date Extracted:	2-23-06
Date Analyzed:	2-24-06
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	MB0223S1

Compound:	Results	Flags	PQL
Naphthalene	ND		0.0067
2-Methylnaphthalene	ND		0.0067
1-Methylnaphthalene	ND		0.0067
Acenaphthylene	ND		0.0067
Acenaphthene	ND		0.0067
Fluorene	ND		0.0067
Phenanthrene	ND		0.0067
Anthracene	ND		0.0067
Fluoranthene	ND		0.0067
Pyrene	ND		0.0067
Benzo[a]anthracene	ND		0.0067
Chrysene	ND		0.0067
Benzo[b]fluoranthene	ND		0.0067
Benzo[k]fluoranthene	ND		0.0067
Benzo[a]pyrene	ND		0.0067
Indeno(1,2,3-c,d)pyrene	ND		0.0067
Dibenz[a,h]anthracene	ND		0.0067
Benzo[g,h,i]perylene	ND		0.0067

Surrogate :	Percent Recovery	Control Limits
Nitrobenzene-d5	66	49 - 121
2-Fluorobiphenyl	71	53 - 110
Terphenyl-d14	92	64 - 123

Date of Report: March 3, 2006
Samples Submitted: January 30, 2006
Laboratory Reference: 0601-188B
Project: 19897-45706-T2

PAHs by EPA 8270C/SIM
MS/MSD QUALITY CONTROL

Date Extracted: 2-23-06
Date Analyzed: 2-24-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 02-222-03

Compound:	Sample Amount	Spike Amount	MS	Percent Recovery	MSD	Percent Recovery	Recovery Limits	Flags
Naphthalene	ND	0.0833	0.0528	63	0.0554	66	30-115	
Acenaphthylene	ND	0.0833	0.0660	79	0.0681	82	46-125	
Acenaphthene	ND	0.0833	0.0616	74	0.0638	77	40-119	
Fluorene	ND	0.0833	0.0663	80	0.0671	81	50-133	
Phenanthrene	ND	0.0833	0.0701	84	0.0704	84	48-128	
Anthracene	ND	0.0833	0.0694	83	0.0688	83	53-134	
Fluoranthene	ND	0.0833	0.0795	95	0.0803	96	50-143	
Pyrene	ND	0.0833	0.0777	93	0.0785	94	44-139	
Benzo[a]anthracene	ND	0.0833	0.0761	91	0.0768	92	62-129	
Chrysene	ND	0.0833	0.0779	93	0.0783	94	42-127	
Benzo[b]fluoranthene	ND	0.0833	0.0785	94	0.0783	94	57-132	
Benzo[k]fluoranthene	ND	0.0833	0.0773	93	0.0793	95	57-131	
Benzo[a]pyrene	ND	0.0833	0.0723	87	0.0741	89	59-132	
Indeno(1,2,3-c,d)pyrene	ND	0.0833	0.0842	101	0.0850	102	55-135	
Dibenz[a,h]anthracene	ND	0.0833	0.0862	103	0.0877	105	36-146	
Benzo[g,h,i]perylene	ND	0.0833	0.0792	95	0.0801	96	42-140	

	RPD	RPD Limit	Flags
Naphthalene	5	25	
Acenaphthylene	3	25	
Acenaphthene	4	25	
Fluorene	1	25	
Phenanthrene	0	25	
Anthracene	1	25	
Fluoranthene	1	25	
Pyrene	1	25	
Benzo[a]anthracene	1	25	
Chrysene	1	25	
Benzo[b]fluoranthene	0	25	
Benzo[k]fluoranthene	3	25	
Benzo[a]pyrene	2	25	
Indeno(1,2,3-c,d)pyrene	1	25	
Dibenz[a,h]anthracene	2	25	
Benzo[g,h,i]perylene	1	25	

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

G - Insufficient sample quantity for duplicate analysis.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

O - Hydrocarbons indicative of diesel fuel are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a silica gel cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

CDM

CHAIN-OF-CUSTODY

Date 1/27/06 Page 1 of 4

PROJECT INFORMATION

Project Manager: Lance Peterson

Project Name: King County / Beall Phase II

Project Number: 19847 - 45706 - T2

Site Location: Beall Greenhouses Sampled By: JBM/BRK

DISPOSAL INFORMATION

☒ Lab Disposal (return if not indicated)

Disposal Method:

Disposed by: Disposal Date:

QC INFORMATION (check one)

☐ SW-846 ☐ CLP ☐ Screening ☒ CDM Std. ☐ Special

Laboratory Number: 01-188

ANALYSIS REQUEST

- PETROLEUM HYDROCARBONS: TPH-HCID State: ; TPH-G State: ; TPH-Dx State: NW; TPH-418.1 State: ; 8015M Fuel Hydrocarbon; TPH Special Instructions
- ORGANIC COMPOUNDS: 8010 Halogenated VOCs; 8020 Aromatic VOCs; 8020M - BETX only; 8240 GC/MS Volatiles; 8270 GC/MS Semivolatiles; ~~8310~~ 8270 PAHs; 8040 Phenols; DWS - Volatiles and Semivolatiles
- PESTS/PCBs: 8080 OC Pest/PCBs; 8080M PCBs only; 8140 OP Pesticides; 8150 OC Herbicides; DWS - Herb/Pest
- METALS: Selected Metals: list; Organic Lead (Ca); TCL Metals (23); Priority Poll. Metals (13); DWS - Metals; MFSP - Metals (Wa)
- LEACHING TESTS: TCLP - Volatiles (ZHE); TCLP - Semivolatiles; TCLP - Pesticides; TCLP - Metals
- OTHER: [illegible] %; 6010 B Metals (As Pb Cd); 8051 Herbicides; 8141A Organophos. Pesticides; 8081A Pesticides
- NUMBER OF CONTAINERS

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TPH-Dx	8270 PAHs	OTHER: [illegible] %	NUMBER OF CONTAINERS
HB-S13-1/06	1/27/06	845	soil	1	X		X	1
HB-S14-1/06	1/27/06	905	soil	2	X		X	1
HB-S15-1/06	1/27/06	915	soil	3	X		X	1
HB-S16-1/06	1/27/06	955	soil	4	X	⊗	X	1
HB-S17-1/06	1/27/06	1045	soil	5	X		X	1
HB-S18-1/06	1/27/06	1110	soil	6	X		X	1
HB-S44-1/06	1/27/06	1110	soil	7	X		X	1
HB-S19-1/06	1/27/06	1140	soil	8	X		X	1

LAB INFORMATION

Lab Name: Onsite Env.

Lab Address: 14648 NE 95th St Redmond WA 98052

Via:

SAMPLE RECEIPT

Total Number of Containers:

Chain-of-Custody Seals: Y/N/NA

Intact?: Y/N/NA

Received in Good Condition/Cold:

Turn Around Time: ☒ Standard ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 1 wk.

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions:
NWTPHDx: quantitate as Bunker C
⊗ Added 2/23/06. DB

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: [signature] Time: 1730	Signature: [signature] Time: 1400	Signature: Time:
Printed Name: Brian King Date: 1/27/06	Printed Name: Lance Peterson Date: 1/30/06	Printed Name: Date:
Company: CDM	Company: CDM	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: 3.
Signature: [signature] Time: 1730	Signature: [signature] Time: 1420	Signature: Time:
Printed Name: Lance Peterson Date: 1/27/06	Printed Name: Dkii Goodlow Date: 1/30/06	Printed Name: Date:
Company: CDM	Company: OnSite Env	Company:

CDM

CHAIN-OF-CUSTODY

Date 1/27/06 Page 2 of 4

Laboratory Number: 01-188

PROJECT INFORMATION

Project Manager: Lance Peterson

Project Name: King Co / Beall Phase II

Project Number: 18897-45706-T2

Site Location: ______ Sampled By: BEK / JDM

DISPOSAL INFORMATION

☒ Lab Disposal (return if not indicated)

Disposal Method: ______

Disposed by: ______ Disposal Date: ______

QC INFORMATION (check one)

☐ SW-846 ☐ CLP ☐ Screening ☒ CDM Std. ☐ Special

ANALYSIS REQUEST

- PETROLEUM HYDROCARBONS: TPH-HCID State: | TPH-G State: | TPH-D State: | TPH-418.1 State: | 8015M Fuel Hydrocarbon | TPH Special Instructions
- ORGANIC COMPOUNDS: 8010 Halogenated VOCs | 8020 Aromatic VOCs | 8020M - BETX only | 8240 GC/MS Volatiles | 8270 GC/MS Semivolatiles | 8310 PAHs | 8040 Phenols | DWS - Volatiles and Semivolatiles
- PESTS/PCBs: 8080 OC Pest/PCBs | 8080M PCBs only | 8140 OP Pesticides | 8150 OC Herbicides | DWS - Herb/Pest
- METALS: Selected Metals: list | Organic Lead (Ca) | TCL Metals (23) | Priority Poll. Metals (13) | DWS - Metals | MFSP - Metals (Wa)
- LEACHING TESTS: TCLP - Volatiles (ZHE) | TCLP - Semivolatiles | TCLP - Pesticides | TCLP - Metals
- OTHER: % moisture | 6010B metals (As, Pb, Cd) | 8141A Organophos. Pesticides | 8081A Pesticides | Asbestos

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	% moisture	6010B metals (As, Pb, Cd)	8141A Organophos. Pesticides	8081A Pesticides	Asbestos	NUMBER OF CONTAINERS
HB-S21-1/06	1/27/06	905	soil	9					X	1
HB-S22-1/06	1/27/06	920	soil	10					X	1
HB-S23-1/06	1/27/06	930	soil	11					X	1
HB-S24-1/06	1/27/06	940	soil	12					X	1
HB-S25-1/06	1/27/06	1005	soil	13					X	1
HB-S43-1/06	1/27/06	1015	soil	14					X	1
HB-S29-1/06	1/27/06	1150	soil	15	X	[illegible]	X	X		2
HB-S45-1/06	1/27/06	1215	soil	16	X	X	X	X		3

LAB INFORMATION

Lab Name: OnSite Env.

Lab Address: 14648 NE 95th ST Redmond WA 98052

Via:

Turn Around Time: ☒ Standard ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 1 wk.

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions: Asbestos testing by EPA Methods 600/M4-82-020 and 600/R-93/116 (polarized light microscopy/dispersion staining)

SAMPLE RECEIPT

Total Number of Containers:

Chain-of-Custody Seals: Y/N/NA

Intact?: Y/N/NA

Received in Good Condition/Cold:

	RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature / Time	Brian King / 1730	Lance Peterson / 1400	
Printed Name / Date	Brian King / 1/27/06	Lance Peterson / 1/30/06	
Company	CDM	CDM	

	RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: 3.
Signature / Time	Lance Peterson / 1730	[illegible] / 1420	
Printed Name / Date	Lance Peterson / 1/27/06	Steve Goodtea / 1/30/06	
Company	CDM	OnSite Env.	

CDM

CHAIN-OF-CUSTODY

Date 1/27/06 Page 3 of 4

Laboratory Number: 01-188

PROJECT INFORMATION

Project Manager: Lance Peterson

Project Name: King County / Beall Phase II

Project Number: 19897-45706-T2

Site Location: ______ Sampled By: BRK/JDM

DISPOSAL INFORMATION

☒ Lab Disposal (return if not indicated)

Disposal Method: ______

Disposed by: ______ Disposal Date: ______

QC INFORMATION (check one)

☐ SW-846 ☐ CLP ☐ Screening ☒ CDM Std. ☐ Special

SAMPLE ID	DATE	TIME	MATRIX	LAB ID
HB-S30-1/06	1/27/06	1245	soil	17
HB-S31-1/06	1/27/06	1310	soil	18
HB-S32-1/06	1/27/06	1350	soil	19
HB-S33-1/06	1/27/06	1450	soil	20
HB-S39-1/06	1/27/06	1400	soil	21
HB-S40-1/06	1/27/06	1410	soil	22
HB-S41-1/06	1/27/06	1220	soil	23
HB-S42-1/06	1/27/06	1250	soil	24

ANALYSIS REQUEST

SAMPLE ID	PETROLEUM HYDROCARBONS: TPH-HCID State:	TPH-G State:	TPH-D State:	TPH-418.1 State:	8015M Fuel Hydrocarbon	TPH Special Instructions	ORGANIC COMPOUNDS: 8010 Halogenated VOCs	8020 Aromatic VOCs	8020M - BETX only	8240 GC/MS Volatiles	8270 GC/MS Semivolatiles	8310 PAHs	8040 Phenols	DWS - Volatiles and Semivolatiles	PESTS/PCBs: 8080 OC Pest/PCBs	8080M PCBs only	8140 OP Pesticides	8150 OC Herbicides	DWS - Herb/Pest	METALS: Selected Metals: list	Organic Lead (Ca)	TCL Metals (23)	Priority Poll. Metals (13)	DWS - Metals	MFSP - Metals (Wa)	LEACHING TESTS: TCLP - Volatiles (ZHE)	TCLP - Semivolatiles	TCLP - Pesticides	TCLP - Metals	OTHER: % Moisture	8151A Herbicides	6010B Metals (As, Pb, Cd)	8141A Organophos. Pesticides	8081A Pesticides	NUMBER OF CONTAINERS
HB-S30-1/06																														X			X	X	2
HB-S31-1/06																														X			X	X	2
HB-S32-1/06																														X			X	X	2
HB-S33-1/06																														X		X	X	X	3
HB-S39-1/06																														X	X	X			2
HB-S40-1/06																														X	X	X			2
HB-S41-1/06																														X			X	X	3
HB-S42-1/06																														X			X	X	3

LAB INFORMATION

Lab Name: OnSite Env.

Lab Address: 14648 NE 95th St Redmond WA 98052

Via:

SAMPLE RECEIPT

Total Number of Containers:

Chain-of-Custody Seals: Y/N/NA

Intact?: Y/N/NA

Received in Good Condition/Cold:

Turn Around Time: ☒ Standard ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 1 wk.

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions:

	RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature:	Brian King	Lance Peterson	
Time:	1730	1400	
Printed Name:	Brian King	Lance Peterson	
Date:	1/27/06	1/30/06	
Company:	CDM	CDM	

	RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: 3.
Signature:	Lance Peterson	[illegible]	
Time:	1730	1420	
Printed Name:	Lance Peterson	Blair Goodru	
Date:	1/27/06		
Company:	CDM	OnSite Env.	

CDM

CHAIN-OF-CUSTODY

Date 1/27/06 Page 4 of 4

Laboratory Number: 01-188

PROJECT INFORMATION

Project Manager: Lance Peterson

Project Name: King County / Beall Phase II

Project Number: 19897-45706-T2

Site Location: ______ Sampled By: BRK/JPM

DISPOSAL INFORMATION

☒ Lab Disposal (return if not indicated)

Disposal Method: ______

Disposed by: ______ Disposal Date: ______

QC INFORMATION (check one)

☐ SW-846 ☐ CLP ☐ Screening ☒ CDM Std. ☐ Special

ANALYSIS REQUEST

PETROLEUM HYDROCARBONS: TPH-HCID State: ; TPH-G State: ; TPH-D State: ; TPH-418.1 State: ; 8015M Fuel Hydrocarbon; TPH Special Instructions

ORGANIC COMPOUNDS: 8010 Halogenated VOCs; 8020 Aromatic VOCs; 8020M - BETX only; 8240 GC/MS Volatiles; 8270 GC/MS Semivolatiles; 8310 PAHs; 8040 Phenols; DWS - Volatiles and Semivolatiles

PESTS/PCBs: 8080 OC Pest/PCBs; 8080M PCBs only; 8140 OP Pesticides; 8150 OC Herbicides; DWS - Herb/Pest

METALS: Selected Metals: list; Organic Lead (Ca); TCL Metals (23); Priority Poll. Metals (13); DWS - Metals; MFSP - Metals (Wa)

LEACHING TESTS: TCLP - Volatiles (ZHE); TCLP - Semivolatiles; TCLP - Pesticides; TCLP - Metals

OTHER: % moisture; 8141A Organophos. Pesticides; 8081A Pesticides

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	% moisture	8141A Organophos. Pesticides	8081A Pesticides	NUMBER OF CONTAINERS
HB-S26-1/06	1/27/06	1035	soil	25	X	X	X	2
HB-S27-1/06	1/27/06	1120	soil	26	X	X	X	2
HB-S28-1/06	1/27/06	1130	soil	27	X	X	X	2

LAB INFORMATION

Lab Name: OnSite Env

Lab Address: 14648 NE 95th ST Redmond WA 98052

Via:

SAMPLE RECEIPT

Total Number of Containers:

Chain-of-Custody Seals: Y/N/NA

Intact?: Y/N/NA

Received in Good Condition/Cold:

Turn Around Time: ☒ Standard ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 1 wk.

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions:

	RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature:	Brian King	Lance Peterson	
Time:	1730	1400	
Printed Name:	Brian King	Lance Peterson	
Date:	1/27/06	1/30/06	
Company:	CDM	CDM	

	RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: 3.
Signature:	Lance Peterson	[illegible]	
Time:	1730	1420	
Printed Name:	Lance Peterson	Blair Goodrow	
Date:	1/27/06		
Company:	CDM	OS Env	

OnSite Environmental Inc.

Analytical Testing and Mobile Laboratory Services

Received
FEB 17 2006
CDM

February 15, 2006

Lance Peterson
CDM
P.O. Box 3885
Bellevue, WA 98009

Re: Analytical Data for Project 19897-47506
Laboratory Reference No. 0602-019

Dear Lance:

Enclosed are the analytical results and associated quality control data for samples submitted on February 1, 2006.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: February 15, 2006
Samples Submitted: February 1, 2006
Laboratory Reference: 0602-019
Project: 19897-47506

Case Narrative

Samples were collected on January 31, 2006 and received by the laboratory on February 1, 2006. They were maintained at the laboratory at a temperature of 2°C to 6°C except as noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: February 15, 2006
Samples Submitted: February 1, 2006
Laboratory Reference: 0602-019
Project: 19897-47506

NWTPH-HCID

Date Extracted: 2-3-06
Date Analyzed: 2-3-06

Matrix: Soil
Units: mg/kg (ppm)

Client ID:	**HB-S20-1/06**	**HB-S39-1/06**
Lab ID:	02-019-02	02-019-03
Gasoline:	**ND**	**ND**
PQL:	380	24
Diesel Fuel:	**Diesel Fuel #2**	**ND**
PQL:	940	59
Lube Oil:	**Lube Oil**	**ND**
PQL:	1900	120
Surrogate Recovery:		
o-Terphenyl	---	118%
Flags:	Y,S	Y

Date of Report: February 15, 2006
Samples Submitted: February 1, 2006
Laboratory Reference: 0602-019
Project: 19897-47506

NWTPH-HCID
METHOD BLANK QUALITY CONTROL

Date Extracted:	2-3-06
Date Analyzed:	2-3-06
Matrix:	Soil
Units:	mg/kg (ppm)

Lab ID:	MB0203S1
Gasoline:	**ND**
PQL:	20
Diesel Fuel:	**ND**
PQL:	50
Lube Oil:	**ND**
PQL:	100
Surrogate Recovery:	
o-Terphenyl	120%
Flags	Y

Date of Report: February 15, 2006
Samples Submitted: February 1, 2006
Laboratory Reference: 0602-019
Project: 19897-47506

NWTPH-Dx

Date Extracted: 2-10-06
Date Analyzed: 2-14-06

Matrix: Soil
Units: mg/kg (ppm)

Client ID:	**HB-S20-1/06**	**HB-S39-1/06**
Lab ID:	02-019-02	02-019-03
Diesel Range:	**ND**	**ND**
PQL:	9400	29
Identification:	—	—
Lube Oil Range:	**180000**	**ND**
PQL:	19000	59
Identification:	Bunker C	—
Surrogate Recovery		
o-Terphenyl:	---	92%
Flags:	Y,S	Y

Date of Report: February 15, 2006
Samples Submitted: February 1, 2006
Laboratory Reference: 0602-019
Project: 19897-47506

NWTPH-Dx
METHOD BLANK QUALITY CONTROL

Date Extracted:	2-10-06
Date Analyzed:	2-11-06
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	MB0210S2
Diesel Range:	**ND**
PQL:	25
Identification:	---
Lube Oil Range:	**ND**
PQL:	50
Identification:	---
Surrogate Recovery	
o-Terphenyl:	99%
Flags:	Y

Date of Report: February 15, 2006
Samples Submitted: February 1, 2006
Laboratory Reference: 0602-019
Project: 19897-47506

NWTPH-Dx
DUPLICATE QUALITY CONTROL

Date Extracted: 2-10-06
Date Analyzed: 2-12-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID:	02-116-08	02-116-08 DUP
Diesel Range:	**51.9**	**49.1**
PQL:	25	25
RPD:	6	
Surrogate Recovery		
o-Terphenyl:	88%	83%
Flags:	Y	Y

Date of Report: February 15, 2006
Samples Submitted: February 1, 2006
Laboratory Reference: 0602-019
Project: 19897-47506

ORGANOCHLORINE PESTICIDES by EPA 8081A

Date Extracted:	2-2-06
Date Analyzed:	2-8-06
Matrix:	Soil
Units:	ug/kg (ppb)
Lab ID:	02-019-01
Client ID:	**HB-S10-1/06**

Analyte	Result	PQL	Flags
alpha-BHC	ND	6.8	
gamma-BHC	ND	6.8	
Heptachlor	ND	6.8	
Aldrin	ND	6.8	
beta-BHC	ND	6.8	
delta-BHC	ND	6.8	
Heptachlor epoxide	ND	6.8	
Endosulfan I	ND	6.8	
gamma-Chlordane	ND	14	
alpha-Chlordane	ND	14	
4,4'-DDE	ND	14	
Dieldrin	ND	14	
Endrin	ND	14	
Endosulfan II	ND	14	
4,4'-DDD	ND	14	
4,4'-DDT	ND	14	
Endrin Aldehyde	ND	14	
Endosulfan Sulfate	ND	14	
Methoxychlor	ND	14	
Endrin ketone	ND	14	
Toxaphene	ND	68	

Surrogate	Percent Recovery	Control Limits
Tetrachloro-m-xylene	60	34 - 109
Decachlorobiphenyl	49	30 - 115

Flags:

Date of Report: February 15, 2006
Samples Submitted: February 1, 2006
Laboratory Reference: 0602-019
Project: 19897-47506

ORGANOCHLORINE PESTICIDES by EPA 8081A

Date Extracted: 2-2-06
Date Analyzed: 2-3-06

Matrix: Soil
Units: ug/kg (ppb)

Lab ID: 02-019-04
Client ID: **HB-S34-1/06**

Analyte	**Result**	**PQL**	**Flags**
alpha-BHC	**ND**	6.3	
gamma-BHC	**ND**	6.3	
Heptachlor	**ND**	6.3	
Aldrin	**ND**	6.3	
beta-BHC	**ND**	6.3	
delta-BHC	**ND**	6.3	
Heptachlor epoxide	**ND**	6.3	
Endosulfan I	**ND**	6.3	
gamma-Chlordane	**ND**	13	
alpha-Chlordane	**ND**	13	
4,4'-DDE	**ND**	13	
Dieldrin	**ND**	13	
Endrin	**ND**	13	
Endosulfan II	**ND**	13	
4,4'-DDD	**ND**	13	
4,4'-DDT	**ND**	13	
Endrin Aldehyde	**ND**	13	
Endosulfan Sulfate	**ND**	13	
Methoxychlor	**ND**	13	
Endrin ketone	**ND**	13	
Toxaphene	**ND**	63	

Surrogate	**Percent Recovery**	**Control Limits**
Tetrachloro-m-xylene	65	34 - 109
Decachlorobiphenyl	53	30 - 115

Flags:

Date of Report: February 15, 2006
Samples Submitted: February 1, 2006
Laboratory Reference: 0602-019
Project: 19897-47506

**ORGANOCHLORINE
PESTICIDES by EPA 8081A
METHOD BLANK QUALITY CONTROL**

Date Extracted:	2-2-06
Date Analyzed:	2-3-06
Matrix:	Soil
Units:	ug/kg (ppb)
Lab ID:	MB0202S1

Analyte	**Result**	**PQL**	**Flags**
alpha-BHC	**ND**	5.0	
gamma-BHC	**ND**	5.0	
Heptachlor	**ND**	5.0	
Aldrin	**ND**	5.0	
beta-BHC	**ND**	5.0	
delta-BHC	**ND**	5.0	
Heptachlor epoxide	**ND**	5.0	
Endosulfan I	**ND**	5.0	
gamma-Chlordane	**ND**	10	
alpha-Chlordane	**ND**	10	
4,4'-DDE	**ND**	10	
Dieldrin	**ND**	10	
Endrin	**ND**	10	
Endosulfan II	**ND**	10	
4,4'-DDD	**ND**	10	
4,4'-DDT	**ND**	10	
Endrin Aldehyde	**ND**	10	
Endosulfan Sulfate	**ND**	10	
Methoxychlor	**ND**	10	
Endrin ketone	**ND**	10	
Toxaphene	**ND**	50	

Surrogate	**Percent Recovery**	**Control Limits**
Tetrachloro-m-xylene	78	34 - 109
Decachlorobiphenyl	74	30 - 115

Flags:

Date of Report: February 15, 2006
Samples Submitted: February 1, 2006
Laboratory Reference: 0602-019
Project: 19897-47506

ORGANOCHLORINE
PESTICIDES by EPA 8081A
MS/MSD QUALITY CONTROL

Date Extracted: 2-2-06
Date Analyzed: 2-8-06

Matrix: Soil
Units: ug/kg (ppb)

Lab ID: 01-188-25

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
gamma-BHC	50	31.5	63	35.5	71	12	
Heptachlor	50	29.1	58	32.3	65	10	
Aldrin	50	28.2	56	31.0	62	10	
Dieldrin	125	75.2	60	84.2	67	11	
Endrin	125	84.8	68	94.4	76	11	
4,4'-DDT	125	77.4	62	88.5	71	13	

Surrogate	Percent Recovery	Percent Recovery	Control Limits
Tetrachloro-m-xylene	59	68	34 - 109
Decachlorobiphenyl	50	57	30 - 115

Flags:

Date of Report: February 15, 2006
Samples Submitted: February 1, 2006
Laboratory Reference: 0602-019
Project: 19897-47506

CHLORINATED ACID HERBICIDES by EPA 8151A

Date Extracted:	2-6-06
Date Analyzed:	2-9-06
Matrix:	Soil
Units:	ug/kg (ppb) free acid equivalent
Lab ID:	02-019-04
Client ID:	**HB-S34-1/06**

Analyte	**Result**	**PQL**	**Flags**
Dalapon	**ND**	290	
Dicamba	**ND**	59	
MCPP	**ND**	12000	
MCPA	**ND**	12000	
Dichlorprop	**ND**	60	
2,4-D	**ND**	59	
Pentachlorophenol	**ND**	1.2	
2,4,5-TP (Silvex)	**ND**	60	
2,4,5-T	**ND**	60	
2,4-DB	**ND**	60	
Dinoseb	**ND**	60	

Surrogate	**Percent Recovery**	**Control Limits**
DCAA	59	39-131

Flags:

Date of Report: February 15, 2006
Samples Submitted: February 1, 2006
Laboratory Reference: 0602-019
Project: 19897-47506

CHLORINATED ACID
HERBICIDES by EPA 8151A
METHOD BLANK QUALITY CONTROL

Date Extracted: 2-6-06
Date Analyzed: 2-9-06

Matrix: Soil
Units: ug/kg (ppb) free acid equivalent

Lab ID: MB0206S1

Analyte	Result	PQL	Flags
Dalapon	ND	230	
Dicamba	ND	47	
MCPP	ND	9400	
MCPA	ND	9400	
Dichlorprop	ND	47	
2,4-D	ND	47	
Pentachlorophenol	ND	0.95	
2,4,5-TP (Silvex)	ND	48	
2,4,5-T	ND	47	
2,4-DB	ND	47	
Dinoseb	ND	47	

Surrogate	Percent Recovery	Control Limits
DCAA	57	39-131

Flags:

Date of Report: February 15, 2006
Samples Submitted: February 1, 2006
Laboratory Reference: 0602-019
Project: 19897-47506

CHLORINATED ACID
HERBICIDES by EPA 8151A
MS/MSD QUALITY CONTROL

Date Extracted: 2-6-06
Date Analyzed: 2-9-06

Matrix: Soil
Units: ug/kg (ppb) free acid equivalent

Lab ID: 02-019-04

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Dicamba	94.0	70.9	76	80.4	86	12	
2,4-D	94.0	52.3	56	57.7	61	10	
2,4,5-T	94.8	57.6	61	67.6	71	16	
2,4-DB	94.7	73.6	78	76.6	81	4	

Surrogate	Percent Recovery	Percent Recovery	Control Limits
DCAA	68	74	39-131

Flags:

Date of Report: February 15, 2006
Samples Submitted: February 1, 2006
Laboratory Reference: 0602-019
Project: 19897-47506

TOTAL METALS
EPA 6010B

Date Extracted: 2-2-06
Date Analyzed: 2-6-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 02-019-01
Client ID: HB-S10-1/06

Analyte	Method	Result	PQL
Arsenic	6010B	**ND**	14
Cadmium	6010B	**ND**	0.68
Lead	6010B	**32**	6.8

Date of Report: February 15, 2006
Samples Submitted: February 1, 2006
Laboratory Reference: 0602-019
Project: 19897-47506

TOTAL METALS
EPA 6010B

Date Extracted: 2-2-06
Date Analyzed: 2-6-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 02-019-04
Client ID: HB-S34-1/06

Analyte	Method	Result	PQL
Arsenic	6010B	**ND**	13
Cadmium	6010B	**ND**	0.63
Lead	6010B	**22**	6.3

Date of Report: February 15, 2006
Samples Submitted: February 1, 2006
Laboratory Reference: 0602-019
Project: 19897-47506

TOTAL METALS
EPA 6010B
METHOD BLANK QUALITY CONTROL

Date Extracted:	2-2-06
Date Analyzed:	2-3-06
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	MB0202S2

Analyte	Method	Result	PQL
Arsenic	6010B	**ND**	10
Cadmium	6010B	**ND**	0.50
Lead	6010B	**ND**	5.0

Date of Report: February 15, 2006
Samples Submitted: February 1, 2006
Laboratory Reference: 0602-019
Project: 19897-47506

TOTAL METALS
EPA 6010B
DUPLICATE QUALITY CONTROL

Date Extracted: 2-2-06
Date Analyzed: 2-3-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 01-190-04

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Arsenic	**13.9**	**15.5**	11	10	
Cadmium	**0.657**	**0.538**	20	0.50	
Lead	**109**	**113**	4	5.0	

Date of Report: February 15, 2006
Samples Submitted: February 1, 2006
Laboratory Reference: 0602-019
Project: 19897-47506

TOTAL METALS
EPA 6010B
MS/MSD QUALITY CONTROL

Date Extracted: 2-2-06
Date Analyzed: 2-3-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 01-190-04

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Arsenic	100	**103**	89	**101**	87	1	
Cadmium	50	**46.6**	92	**46.7**	92	0	
Lead	250	**324**	86	**325**	86	0	

Date of Report: February 15, 2006
Samples Submitted: February 1, 2006
Laboratory Reference: 0602-019
Project: 19897-47506

% MOISTURE

Date Analyzed: 2-2&3-06

Client ID	Lab ID	% Moisture
HB-S10-1/06	02-019-01	26
HB-S20-1/06	02-019-02	47
HB-S39-1/06	02-019-03	15
HB-S34-1/06	02-019-04	21

OnSite
Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

G - Insufficient sample quantity for duplicate analysis.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

O - Hydrocarbons indicative of diesel fuel are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ___________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

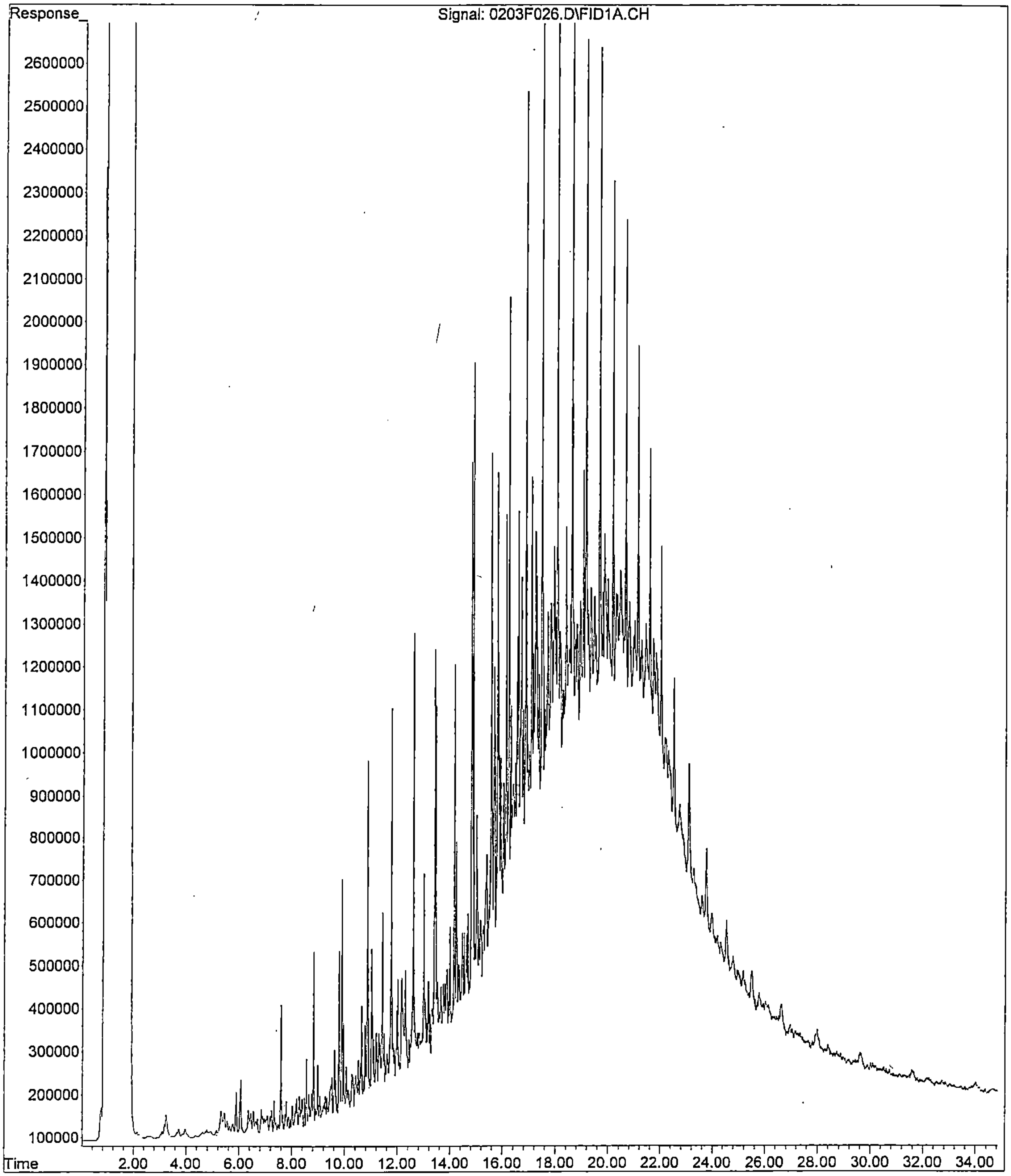
X - Sample extract treated with a silica gel cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

```
File         :X:\DIESELS\TERI\DATA\T060203\0203F026.D
Operator     : DY
Acquired     : 04 Feb 2006   3:47     using AcqMethod F060110.M
Instrument :    Teri
Sample Name: 02-019-02  10x hc
Misc Info  : 1
Vial Number: 26
```



ANALYTICAL REPORT

Job Number: 580-1439-1

Job Description: 19897-47506

For:

OnSite Environmental Inc
14648 NE 95th Street
Redmond, WA 98052

Attention: Mr. David Baumeister

Ivy J Bolm
Project Manager I
ibolm@stl-inc.com
02/09/2006

SAMPLE SUMMARY

Client: OnSite Environmental Inc

Job Number: 580-1439-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
580-1439-1	HB-S10-1/06	Solid	01/31/2006 1230	02/02/2006 1310
580-1439-2	HB-S34-1/06	Solid	01/31/2006 0800	02/02/2006 1310

Client: OnSite Environmental Inc | Job Number: 580-1439-1

Client Sample ID: **HB-S10-1/06**

Lab Sample ID: 580-1439-1
Client Matrix: Solid

Date Sampled: 01/31/2006 1230
Date Received: 02/02/2006 1310

8141A Organophosphorous Compounds by GC-MS

Method:	8141A	Analysis Batch: 580-3931	Instrument ID:	ITS40	
Preparation:	3550B	Prep Batch: 580-3785	Lab File ID:	L18410.D	
Dilution:	1.0		Initial Weight/Volume:	15.1478	g
Date Analyzed:	02/04/2006 1654		Final Weight/Volume:	10	mL
Date Prepared:	02/04/2006 1315		Injection Volume:		

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		33
Mevinphos		ND		33
Ethoprop		ND		33
Naled		ND		33
Sulfotepp		ND		33
Monochrotophos		ND		33
Phorate		ND		33
Dimethoate		ND		33
Demeton-O + Demeton-S		ND		33
Diazinon		ND		33
Disulfoton		ND		33
Parathion methyl		ND		33
Ronnel		ND		33
Chlorpyrifos		ND		33
Malathion		ND		33
Fenthion		ND		33
Parathion		ND		33
Trichloronate		ND		33
Tetrachlorviphos		ND		33
Merphos		ND		33
Tokuthion		ND		33
Fensulfothion		ND		33
Bolstar		ND		33
EPN		ND		33
Azinphos-methyl		ND		33
Coumaphos		ND		33

Surrogate	%Rec	Acceptance Limits
Tributyl phosphate	66	38 - 129
Triphenylphosphate	76	45 - 125

Analytical Data

Client: OnSite Environmental Inc | Job Number: 580-1439-1

Client Sample ID: HB-S34-1/06

Lab Sample ID:	580-1439-2	Date Sampled:	01/31/2006 0800
Client Matrix:	Solid	Date Received:	02/02/2006 1310

8141A Organophosphorous Compounds by GC-MS

Method:	8141A	Analysis Batch: 580-3931		Instrument ID:	ITS40
Preparation:	3550B	Prep Batch: 580-3785		Lab File ID:	L18411.D
Dilution:	1.0			Initial Weight/Volume:	15.2365 g
Date Analyzed:	02/04/2006 1718			Final Weight/Volume:	10 mL
Date Prepared:	02/04/2006 1315			Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		33
Mevinphos		ND		33
Ethoprop		ND		33
Naled		ND		33
Sulfotepp		ND		33
Monochrotophos		ND		33
Phorate		ND		33
Dimethoate		ND		33
Demeton-O + Demeton-S		ND		33
Diazinon		ND		33
Disulfoton		ND		33
Parathion methyl		ND		33
Ronnel		ND		33
Chlorpyrifos		ND		33
Malathion		ND		33
Fenthion		ND		33
Parathion		ND		33
Trichloronate		ND		33
Tetrachlorviphos		ND		33
Merphos		ND		33
Tokuthion		ND		33
Fensulfothion		ND		33
Bolstar		ND		33
EPN		ND		33
Azinphos-methyl		ND		33
Coumaphos		ND		33

Surrogate	%Rec	Acceptance Limits
Tributyl phosphate	61	38 - 129
Triphenylphosphate	79	45 - 125

General Chemistry

Client Sample ID: HB-S10-1/06

Lab Sample ID: 580-1439-1
Client Matrix: Solid

Date Sampled: 01/31/2006 1230
Date Received: 02/02/2006 1310

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	75		%	0.10	1.0	160.3
	Anly Batch: 580-3786	Date Analyzed	02/04/2006 1539			
Percent Moisture	25		%	0.10	1.0	160.3
	Anly Batch: 580-3786	Date Analyzed	02/04/2006 1539			

Client Sample ID: HB-S34-1/06

Lab Sample ID: 580-1439-2
Client Matrix: Solid

Date Sampled: 01/31/2006 0800
Date Received: 02/02/2006 1310

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	79		%	0.10	1.0	160.3
	Anly Batch: 580-3786	Date Analyzed	02/04/2006 1539			
Percent Moisture	21		%	0.10	1.0	160.3
	Anly Batch: 580-3786	Date Analyzed	02/04/2006 1539			

Quality Control Results

Client: OnSite Environmental Inc

Job Number: 580-1439-1

Method Blank - Batch: 580-3785

Method: 8141A
Preparation: 3550B

Lab Sample ID: MB 580-3785/1-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 02/04/2006 1454
Date Prepared: 02/04/2006 1315

Analysis Batch: 580-3931
Prep Batch: 580-3785
Units: ug/Kg

Instrument ID: ITS40
Lab File ID: L18405.D
Initial Weight/Volume: 15.0000 g
Final Weight/Volume: 10 mL
Injection Volume:

Analyte	Result	Qual	RL
Dichlorvos	ND		33
Mevinphos	ND		33
Ethoprop	ND		33
Naled	ND		33
Sulfotepp	ND		33
Monochrotophos	ND		33
Phorate	ND		33
Dimethoate	ND		33
Demeton-O + Demeton-S	ND		33
Diazinon	ND		33
Disulfoton	ND		33
Parathion methyl	ND		33
Ronnel	ND		33
Chlorpyrifos	ND		33
Malathion	ND		33
Fenthion	ND		33
Parathion	ND		33
Trichloronate	ND		33
Tetrachlorviphos	ND		33
Merphos	ND		33
Tokuthion	ND		33
Fensulfothion	ND		33
Bolstar	ND		33
EPN	ND		33
Azinphos-methyl	ND		33
Coumaphos	ND		33

Surrogate	% Rec	Acceptance Limits
Tributyl phosphate	91	38 - 129
Triphenylphosphate	91	45 - 125

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: OnSite Environmental Inc

Job Number: 580-1439-1

Laboratory Control/
Laboratory Control Duplicate Recovery Report - Batch: 580-3785

Method: 8141A
Preparation: 3550B

LCS Lab Sample ID:	LCS 580-3785/2-A	Analysis Batch:	580-3931	Instrument ID:	ITS40
Client Matrix:	Solid	Prep Batch:	580-3785	Lab File ID:	L18406.D
Dilution:	1.0	Units:	ug/Kg	Initial Weight/Volume:	15.0000 g
Date Analyzed:	02/04/2006 1518			Final Weight/Volume:	10 mL
Date Prepared:	02/04/2006 1315			Injection Volume:	

LCSD Lab Sample ID:	LCSD 580-3785/3-A	Analysis Batch:	580-3931	Instrument ID:	ITS40
Client Matrix:	Solid	Prep Batch:	580-3785	Lab File ID:	L18407.D
Dilution:	1.0	Units:	ug/Kg	Initial Weight/Volume:	15.0000 g
Date Analyzed:	02/04/2006 1542			Final Weight/Volume:	10 mL
Date Prepared:	02/04/2006 1315			Injection Volume:	

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
Tributyl phosphate	90	100	38 - 129
Triphenylphosphate	109	110	45 - 125

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 580-3785

Method: 8141A
Preparation: 3550B

MS Lab Sample ID:	580-1439-1	Analysis Batch:	580-3931	Instrument ID:	ITS40
Client Matrix:	Solid	Prep Batch:	580-3785	Lab File ID:	L18408.D
Dilution:	1.0			Initial Weight/Volume:	15.1235 g
Date Analyzed:	02/04/2006 1606			Final Weight/Volume:	10 mL
Date Prepared:	02/04/2006 1315			Injection Volume:	

MSD Lab Sample ID:	580-1439-1	Analysis Batch:	580-3931	Instrument ID:	ITS40
Client Matrix:	Solid	Prep Batch:	580-3785	Lab File ID:	L18409.D
Dilution:	1.0			Initial Weight/Volume:	15.2314 g
Date Analyzed:	02/04/2006 1630			Final Weight/Volume:	10 mL
Date Prepared:	02/04/2006 1315			Injection Volume:	

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
Tributyl phosphate	78	77	38 - 129
Triphenylphosphate	97	86	45 - 125

Calculations are performed before rounding to avoid round-off errors in calculated results.

DATA REPORTING QUALIFIERS

Lab Section	Qualifier	Description

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • Fax: (425) 885-4603

Chain of Custody

Laboratory Number: 02-019

Company: CDM
Project Number: 19897-47506
Project Name: Brall Greenhouse Phase II
Project Manager: Lance Peterson
Sampled by: Josh Miller

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Day
- ☐ 3 Day
- ☒ Standard (7 working days)
- ☐ ______ (other)

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270C	PAHs by 8270C / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	VPH	EPH	Pesticides by 8141A	(organophosphates)	6010B metals	(As, Pb, Cd)	% Moisture
1	HB-S10-1/06	1/31	1230	Soil	3									X							X		X		X
2	HB-S20-1/06		800		1	X		⊗																	X
3	HB-~~S??~~ S39 DR-1/06		945		2	X		⊗																	X
4	HB-S34-1/06		1345		3									X	X						X		X		X

	Signature	Company	Date	Time
Relinquished by	Josh Miller	CDM	1/31/06	1700
Received by	Lance Peterson	CDM	1/31/06	1700
Relinquished by	Lance Peterson	CDM	2/1/06	1140
Received by	[illegible]	OnSite Env	2/1/06	1300
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:

King County Contract #E23023E

⊗ NWTPH Dx: please quantitate as Bunker C

⊗ Added 2/7/06 DB

Chromatograms with final report ☒

DISTRIBUTION LEGEND: White - OnSite Copy Yellow - Report Copy Pink - Client Copy

OnSite Environmental Inc.
Analytical Testing and Mobile Laboratory Services

February 24, 2006

Received
FEB 28 2006
CDM

Lance Peterson
CDM
P.O. Box 3885
Bellevue, WA 98009

Re: Analytical Data for Project 19897-47506
Laboratory Reference No. 0602-043

Dear Lance:

Enclosed are the analytical results and associated quality control data for samples submitted on February 3, 2006.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881 • Fax (425) 885-4603

Date of Report: February 24, 2006
Samples Submitted: February 3, 2006
Laboratory Reference: 0602-043
Project: 19897-47506

Case Narrative

Samples were collected on February 2, 2006 and received by the laboratory on February 3 2006. They were maintained at the laboratory at a temperature of 2°C to 6°C except as noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: February 24, 2006
Samples Submitted: February 3, 2006
Laboratory Reference: 0602-043
Project: 19897-47506

ORGANOCHLORINE PESTICIDES by EPA 8081A

Date Extracted: 2-9-06
Date Analyzed: 2-11-06

Matrix: Soil
Units: ug/kg (ppb)

Lab ID: 02-043-02
Client ID: **HB-TP2-4.5**

Analyte	Result	PQL	Flags
alpha-BHC	ND	6.0	
gamma-BHC	ND	6.0	
Heptachlor	ND	6.0	
Aldrin	ND	6.0	
beta-BHC	ND	6.0	
delta-BHC	ND	6.0	
Heptachlor epoxide	ND	6.0	
Endosulfan I	ND	6.0	
gamma-Chlordane	ND	12	
alpha-Chlordane	ND	12	
4,4'-DDE	ND	12	
Dieldrin	ND	12	
Endrin	ND	12	
Endosulfan II	ND	12	
4,4'-DDD	ND	12	
4,4'-DDT	ND	12	
Endrin Aldehyde	ND	12	
Endosulfan Sulfate	ND	12	
Methoxychlor	ND	12	
Endrin ketone	ND	12	
Toxaphene	ND	60	

Surrogate	Percent Recovery	Control Limits
Tetrachloro-m-xylene	58	34 - 109
Decachlorobiphenyl	45	30 - 115

Flags:

Date of Report: February 24, 2006
Samples Submitted: February 3, 2006
Laboratory Reference: 0602-043
Project: 19897-47506

ORGANOCHLORINE
PESTICIDES by EPA 8081A
METHOD BLANK QUALITY CONTROL

Date Extracted:	2-9-06
Date Analyzed:	2-11-06
Matrix:	Soil
Units:	ug/kg (ppb)
Lab ID:	MB0209S1

Analyte	**Result**	**PQL**
alpha-BHC	ND	5.0
gamma-BHC	ND	5.0
Heptachlor	ND	5.0
Aldrin	ND	5.0
beta-BHC	ND	5.0
delta-BHC	ND	5.0
Heptachlor epoxide	ND	5.0
Endosulfan I	ND	5.0
gamma-Chlordane	ND	10
alpha-Chlordane	ND	10
4,4'-DDE	ND	10
Dieldrin	ND	10
Endrin	ND	10
Endosulfan II	ND	10
4,4'-DDD	ND	10
4,4'-DDT	ND	10
Endrin Aldehyde	ND	10
Endosulfan Sulfate	ND	10
Methoxychlor	ND	10
Endrin ketone	ND	10
Toxaphene	ND	50

Surrogate	**Percent Recovery**	**Control Limits**
Tetrachloro-m-xylene	65	34 - 109
Decachlorobiphenyl	76	30 - 115

Flags:

Date of Report: February 24, 2006
Samples Submitted: February 3, 2006
Laboratory Reference: 0602-043
Project: 19897-47506

ORGANOCHLORINE
PESTICIDES by EPA 8081A
MS/MSD QUALITY CONTROL

Date Extracted: 2-9-06
Date Analyzed: 2-11-06

Matrix: Soil
Units: ug/kg (ppb)

Lab ID: 02-043-02

Analyte	**Spike Level**	**MS**	**Percent Recovery**	**MSD**	**Percent Recovery**	**RPD**	**Flags**
gamma-BHC	50	32.6	65	30.0	60	8	
Heptachlor	50	33.3	67	31.1	62	7	
Aldrin	50	33.1	66	30.6	61	8	
Dieldrin	125	88.1	71	84.1	67	5	
Endrin	125	100	80	92.5	74	8	
4,4'-DDT	125	93.5	75	89.2	71	5	

Surrogate	**Percent Recovery**	**Percent Recovery**	**Control Limits**
Tetrachloro-m-xylene	57	58	34 - 109
Decachlorobiphenyl	48	48	30 - 115

Flags:

Date of Report: February 24, 2006
Samples Submitted: February 3, 2006
Laboratory Reference: 0602-043
Project: 19897-47506

NWTPH-Dx

Date Extracted: 2-16-06
Date Analyzed: 02-19&20-06

Matrix: Soil
Units: mg/kg (ppm)

Client ID:	**HB-TP3-3**	**HB-TP4-4.5**	**HB-TP5-5**
Lab ID:	02-043-03	02-043-04	02-043-05
Diesel Range:	**ND**	**ND**	**ND**
PQL:	150	32	30
Identification:	---	---	---
Bunker C Range:	**5300**	**1600**	**1700**
PQL:	300	63	60
Identification:			
Surrogate Recovery			
o-Terphenyl:	92%	99%	102%
Flags:	Y	Y	Y

Date of Report: February 24, 2006
Samples Submitted: February 3, 2006
Laboratory Reference: 0602-043
Project: 19897-47506

NWTPH-Dx

Date Extracted: 2-16-06
Date Analyzed: 2-19-06

Matrix: Soil
Units: mg/kg (ppm)

Client ID:	**HB-TP8-2.5**	**HB-TP9-2.0**
Lab ID:	02-043-08	02-043-09
Diesel Range:	**ND**	**ND**
PQL:	30	29
Identification:	---	---
Lube Oil Range:	**ND**	**ND**
PQL:	60	58
Identification:	---	---
Surrogate Recovery		
o-Terphenyl:	89%	97%
Flags:	Y	Y

Date of Report: February 24, 2006
Samples Submitted: February 3, 2006
Laboratory Reference: 0602-043
Project: 19897-47506

NWTPH-Dx
METHOD BLANK QUALITY CONTROL

Date Extracted:	2-16-06
Date Analyzed:	2-16-06
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	MB0216S1
Diesel Range:	**ND**
PQL:	25
Identification:	---
Lube Oil Range:	**ND**
PQL:	50
Identification:	---
Surrogate Recovery	
o-Terphenyl:	105%
Flags:	Y

Date of Report: February 24, 2006
Samples Submitted: February 3, 2006
Laboratory Reference: 0602-043
Project: 19897-47506

NWTPH-Dx
DUPLICATE QUALITY CONTROL

Date Extracted: 2-16-06
Date Analyzed: 2-20-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID:	02-043-03	02-043-03 DUP
Diesel Range:	**ND**	**ND**
PQL:	130	130
RPD:	N/A	
Surrogate Recovery		
o-Terphenyl:	92%	74%
Flags:	Y	Y

Date of Report: February 24, 2006
Samples Submitted: February 3, 2006
Laboratory Reference: 0602-043
Project: 19897-47506

% MOISTURE

Date Analyzed: 2-6&16-06

Client ID	Lab ID	% Moisture
HB-TP2-4.5	02-043-02	16
HB-TP3-3	02-043-03	18
HB-TP4-4.5	02-043-04	21
HB-TP5-5	02-043-05	17
HB-TP8-2.5	02-043-08	17
HB-TP9-2.0	02-043-09	14

OnSite
Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

G - Insufficient sample quantity for duplicate analysis.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

O - Hydrocarbons indicative of diesel fuel are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a silica gel cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

ANALYTICAL REPORT

Job Number: 580-1459-1

Job Description: 19897-47506

For:

OnSite Environmental Inc
14648 NE 95th Street
Redmond, WA 98052

Attention: Mr. David Baumeister

Ivy J Bolm
Project Manager I
ibolm@stl-inc.com
02/14/2006

STL Seattle is a part of Severn Trent Laboratories, Inc.

Severn Trent Laboratories, Inc.
STL Seattle 5755 8th Street East, Tacoma, WA 98424
Tel 253-922-2310 Fax 253-922-5047 www.stl-inc.com

SAMPLE SUMMARY

Client: OnSite Environmental Inc

Job Number: 580-1459-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
580-1459-1	HB-TP2-4.5	Solid	02/02/2006 0825	02/06/2006 1345

Client: OnSite Environmental Inc

Job Number: 580-1459-1

Client Sample ID: HB-TP2-4.5

Lab Sample ID:	580-1459-1	Date Sampled:	02/02/2006 0825
Client Matrix:	Solid	Date Received:	02/06/2006 1345

8141A Organophosphorous Compounds by GC-MS

Method:	8141A	Analysis Batch: 580-4029	Instrument ID:	ITS40
Preparation:	3550B	Prep Batch: 580-4001	Lab File ID:	L18446.D
Dilution:	1.0		Initial Weight/Volume:	15.1286 g
Date Analyzed:	02/13/2006 1758		Final Weight/Volume:	10 mL
Date Prepared:	02/13/2006 1148		Injection Volume:	

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	RL
Dichlorvos		ND		33
Mevinphos		ND		33
Ethoprop		ND		33
Naled		ND		33
Sulfotepp		ND		33
Monochrotophos		ND		33
Phorate		ND		33
Dimethoate		ND		33
Demeton-O + Demeton-S		ND		33
Diazinon		ND		33
Disulfoton		ND		33
Parathion methyl		ND		33
Ronnel		ND		33
Chlorpyrifos		ND		33
Malathion		ND		33
Fenthion		ND		33
Parathion		ND		33
Trichloronate		ND		33
Tetrachlorviphos		ND		33
Merphos		ND		33
Tokuthion		ND		33
Fensulfothion		ND		33
Bolstar		ND		33
EPN		ND		33
Azinphos-methyl		ND		33
Coumaphos		ND		33

Surrogate	%Rec	Acceptance Limits
Tributyl phosphate	89	38 - 129
Triphenylphosphate	77	45 - 125

Client: OnSite Environmental Inc

Job Number: 580-1459-1

General Chemistry

Client Sample ID: **HB-TP2-4.5**

Lab Sample ID: 580-1459-1
Client Matrix: Solid

Date Sampled: 02/02/2006 0825
Date Received: 02/06/2006 1345

Analyte	Result	Qual	Units	RL	Dil	Method
Percent Solids	85		%	0.10	1.0	160.3
	Anly Batch: 580-4004	Date Analyzed	02/13/2006 1209			
Percent Solids	84		%	0.10	1.0	160.3
	Anly Batch: 580-3831	Date Analyzed	02/07/2006 1130			
Percent Moisture	16		%	0.10	1.0	160.3
	Anly Batch: 580-3831	Date Analyzed	02/07/2006 1130			
Percent Moisture	15		%	0.10	1.0	160.3
	Anly Batch: 580-4004	Date Analyzed	02/13/2006 1209			

QUALITY CONTROL RESULTS

Client: OnSite Environmental Inc

Job Number: 580-1459-1

Surrogate Recovery Report

8141A Organophosphorous Compounds by GC-MS

Client Matrix: Solid

Lab Sample ID	Client Sample	(TPP) (%Rec)	Tributyl phospha
580-1459-1	HB-TP2-4.5	77	89
580-1459-1MS	HB-TP2-4.5	81	78
580-1459-1MSD	HB-TP2-4.5	76	84
LCS 580-4001/2-A	LCS	77	79
LCSD 580-4001/3-A	LCSD	79	81
MB 580-4001/1-A	MB	71	80

Surrogate		Acceptance Limits
(TPP)	Triphenylphosphate	45 - 125
Tributyl	Tributyl phosphate	38 - 129

Client: OnSite Environmental Inc

Job Number: 580-1459-1

Method Blank - Batch: 580-4001

Method: 8141A
Preparation: 3550B

Lab Sample ID: MB 580-4001/1-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 02/13/2006 1558
Date Prepared: 02/13/2006 1148

Analysis Batch: 580-4029
Prep Batch: 580-4001
Units: ug/Kg

Instrument ID: ITS40
Lab File ID: L18441.D
Initial Weight/Volume: 15.0000 g
Final Weight/Volume: 10 mL
Injection Volume:

Analyte	Result	Qual	RL
Dichlorvos	ND		33
Mevinphos	ND		33
Ethoprop	ND		33
Naled	ND		33
Sulfotepp	ND		33
Monochrotophos	ND		33
Phorate	ND		33
Dimethoate	ND		33
Demeton-O + Demeton-S	ND		33
Diazinon	ND		33
Disulfoton	ND		33
Parathion methyl	ND		33
Ronnel	ND		33
Chlorpyrifos	ND		33
Malathion	ND		33
Fenthion	ND		33
Parathion	ND		33
Trichloronate	ND		33
Tetrachlorviphos	ND		33
Merphos	ND		33
Tokuthion	ND		33
Fensulfothion	ND		33
Bolstar	ND		33
EPN	ND		33
Azinphos-methyl	ND		33
Coumaphos	ND		33

Surrogate	% Rec	Acceptance Limits
Tributyl phosphate	80	38 - 129
Triphenylphosphate	71	45 - 125

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: OnSite Environmental Inc

Job Number: 580-1459-1

Laboratory Control/
Laboratory Control Duplicate Recovery Report - Batch: 580-4001

Method: 8141A
Preparation: 3550B

LCS Lab Sample ID:	LCS 580-4001/2-A	Analysis Batch:	580-4029	Instrument ID:	ITS40
Client Matrix:	Solid	Prep Batch:	580-4001	Lab File ID:	L18442.D
Dilution:	1.0	Units:	ug/Kg	Initial Weight/Volume:	15.0000 g
Date Analyzed:	02/13/2006 1622			Final Weight/Volume:	10 mL
Date Prepared:	02/13/2006 1148			Injection Volume:	

LCSD Lab Sample ID:	LCSD 580-4001/3-A	Analysis Batch:	580-4029	Instrument ID:	ITS40
Client Matrix:	Solid	Prep Batch:	580-4001	Lab File ID:	L18443.D
Dilution:	1.0	Units:	ug/Kg	Initial Weight/Volume:	15.0000 g
Date Analyzed:	02/13/2006 1646			Final Weight/Volume:	10 mL
Date Prepared:	02/13/2006 1148			Injection Volume:	

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
Tributyl phosphate	79	81	38 - 129
Triphenylphosphate	77	79	45 - 125

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 580-4001

Method: 8141A
Preparation: 3550B

MS Lab Sample ID:	580-1459-1	Analysis Batch:	580-4029	Instrument ID:	ITS40
Client Matrix:	Solid	Prep Batch:	580-4001	Lab File ID:	L18444.D
Dilution:	1.0			Initial Weight/Volume:	15.1232 g
Date Analyzed:	02/13/2006 1710			Final Weight/Volume:	10 mL
Date Prepared:	02/13/2006 1148			Injection Volume:	

MSD Lab Sample ID:	580-1459-1	Analysis Batch:	580-4029	Instrument ID:	ITS40
Client Matrix:	Solid	Prep Batch:	580-4001	Lab File ID:	L18445.D
Dilution:	1.0			Initial Weight/Volume:	15.1324 g
Date Analyzed:	02/13/2006 1734			Final Weight/Volume:	10 mL
Date Prepared:	02/13/2006 1148			Injection Volume:	

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
Tributyl phosphate	78	84	38 - 129
Triphenylphosphate	81	76	45 - 125

Calculations are performed before rounding to avoid round-off errors in calculated results.

CHAIN OF CUSTODY RECORD

Page 1 of 1

OnSite Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory Reference #: 02-043

Subcontract Laboratory: Severn Trent Laboratories, Inc.

Phone #: 1 (253) 922 - 2310

Project Manager: David Baumeister

Date/Time: 2/3/06 2:30pm

Project Number: 19897-47506

Contact Person: KIM

Project Name:

OSE #	Sample ID	Date Sampled	Time	Matrix	# Jars	Analysis Requested	Comments/Special Instructions
	HB-TP2-4.5	2/2/06	825	S	1	8141 ORGANO.PHOS.	

Relinquished by: [signature]	date: 2/6/06	Received by: [signature]	date: 2/6/6
Company: OSE	time: 1055	Company: STC	time: 1055
Relinquished by: [signature]	date: 2/6/6	Received by: K	date: 2/6/06
Company: STC	time: 1545	Company: STL	time: 1545
Relinquished by:	date:	Received by:	date:
Company:	time:	Company:	time:

Page 9 of 9

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • Fax: (425) 885-4603

Chain of Custody

Laboratory Number: 02-043

Company: CDM

Project Number: 19897-47506

Project Name: King County, Beall Phase II

Project Manager: Lance Peterson

Sampled by: Josh Miller

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Day
- ☐ 3 Day
- ☑ Standard (7 working days)
- ☐ ______ (other)

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270C	PAHs by 8270C / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	VPH	EPH	8141 Organo Phos.		Hold		% Moisture
1	HB-TP1-2.5	2/2/06	0815	Soil	1																		X		
2	HB-TP2-4.5		0825		2									X							X				X
3	HB-TP3-3		0910		1			X															X		X
4	HB-TP4-4.5		0925					X															X		X
5	HB-TP5-5		0950					X															X		X
6	HB-TP6-5		1005																				X		
7	HB-TP7-5		1025																				X		
8	HB-TP8-2.5		1045					X															X		X
9	HB-TP9-2.0		1130					X															X		X

	Signature	Company	Date	Time
Relinquished by	Josh Miller	CDM	2/3/06	1200
Received by		OnSite Env	2/3/06	1345
Relinquished by				
Received by				
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions

King County Contract: # E23023E

Added 2/13/06 .DB

NWTPH Dx: please qualify as Bunker C.

Chromatograms with final report ☐

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OnSite
Environmental Inc.
Analytical Testing and Mobile Laboratory Services

March 3, 2006

Lance Peterson
CDM
P.O. Box 3885
Bellevue, WA 98009

Received
MAR 08 2006
CDM

Re: Analytical Data for Project 19897-47506
Laboratory Reference No. 0602-043B

Dear Lance:

Enclosed are the analytical results and associated quality control data for samples submitted on February 3, 2006.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: March 3, 2006
Samples Submitted: February 3, 2006
Laboratory Reference: 0602-043B
Project: 19897-47506

Case Narrative

Samples were collected on February 2, 2006 and received by the laboratory on February 3, 2006. They were maintained at the laboratory at a temperature of 2°C to 6°C except as noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below

PAHs EPA 8270C/SIM Analysis

The client requested the analysis of samples HB-TP3-3 and HB-TP5-5 on 2-23-06, six days after the holding time had expired.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: March 3, 2006
Samples Submitted: February 3, 2006
Laboratory Reference: 0602-043B
Project: 19897-47506

PAHs by EPA 8270C/SIM

Date Extracted:	2-23-06
Date Analyzed:	2-24-06
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	02-043-03
Client ID:	**HB-TP3-3**

Compound:	**Results**	**Flags**	**PQL**
Naphthalene	ND		0.0081
2-Methylnaphthalene	ND		0.0081
1-Methylnaphthalene	ND		0.0081
Acenaphthylene	0.33		0.0081
Acenaphthene	ND		0.0081
Fluorene	0.024		0.0081
Phenanthrene	ND		0.0081
Anthracene	0.15		0.0081
Fluoranthene	ND		0.0081
Pyrene	ND		0.0081
Benzo[a]anthracene	0.027		0.0081
Chrysene	ND		0.0081
Benzo[b]fluoranthene	ND		0.0081
Benzo[k]fluoranthene	ND		0.0081
Benzo[a]pyrene	0.021		0.0081
Indeno(1,2,3-c,d)pyrene	0.36		0.0081
Dibenz[a,h]anthracene	0.033		0.0081
Benzo[g,h,i]perylene	0.66		0.0081

Surrogate :	**Percent Recovery**	**Control Limits**
Nitrobenzene-d5	67	49 - 121
2-Fluorobiphenyl	73	53 - 110
Terphenyl-d14	85	64 - 123

Date of Report: March 3, 2006
Samples Submitted: February 3, 2006
Laboratory Reference: 0602-043B
Project: 19897-47506

PAHs by EPA 8270C/SIM

Date Extracted:	2-23-06
Date Analyzed:	2-24-06
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	02-043-05
Client ID:	**HB-TP5-5**

Compound:	Results	Flags	PQL
Naphthalene	ND		0.0080
2-Methylnaphthalene	ND		0.0080
1-Methylnaphthalene	ND		0.0080
Acenaphthylene	0.016		0.0080
Acenaphthene	ND		0.0080
Fluorene	ND		0.0080
Phenanthrene	ND		0.0080
Anthracene	ND		0.0080
Fluoranthene	ND		0.0080
Pyrene	ND		0.0080
Benzo[a]anthracene	ND		0.0080
Chrysene	0.016		0.0080
Benzo[b]fluoranthene	ND		0.0080
Benzo[k]fluoranthene	ND		0.0080
Benzo[a]pyrene	0.0087		0.0080
Indeno(1,2,3-c,d)pyrene	0.013		0.0080
Dibenz[a,h]anthracene	ND		0.0080
Benzo[g,h,i]perylene	0.076		0.0080

Surrogate :	Percent Recovery	Control Limits
Nitrobenzene-d5	72	49 - 121
2-Fluorobiphenyl	77	53 - 110
Terphenyl-d14	83	64 - 123

Date of Report: March 3, 2006
Samples Submitted: February 3, 2006
Laboratory Reference: 0602-043B
Project: 19897-47506

PAHs by EPA 8270C/SIM
METHOD BLANK QUALITY CONTROL

Date Extracted: 2-23-06
Date Analyzed: 2-24-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: MB0223S1

Compound:	**Results**	**Flags**	**PQL**
Naphthalene	ND		0.0067
2-Methylnaphthalene	ND		0.0067
1-Methylnaphthalene	ND		0.0067
Acenaphthylene	ND		0.0067
Acenaphthene	ND		0.0067
Fluorene	ND		0.0067
Phenanthrene	ND		0.0067
Anthracene	ND		0.0067
Fluoranthene	ND		0.0067
Pyrene	ND		0.0067
Benzo[a]anthracene	ND		0.0067
Chrysene	ND		0.0067
Benzo[b]fluoranthene	ND		0.0067
Benzo[k]fluoranthene	ND		0.0067
Benzo[a]pyrene	ND		0.0067
Indeno(1,2,3-c,d)pyrene	ND		0.0067
Dibenz[a,h]anthracene	ND		0.0067
Benzo[g,h,i]perylene	ND		0.0067

Surrogate :	**Percent Recovery**	**Control Limits**
Nitrobenzene-d5	66	49 - 121
2-Fluorobiphenyl	71	53 - 110
Terphenyl-d14	92	64 - 123

Date of Report: March 3, 2006
Samples Submitted: February 3, 2006
Laboratory Reference: 0602-043B
Project: 19897-47506

PAHs by EPA 8270C/SIM
MS/MSD QUALITY CONTROL

Date Extracted: 2-23-06
Date Analyzed: 2-24-06

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 02-222-03

Compound:	Sample Amount	Spike Amount	MS	Percent Recovery	MSD	Percent Recovery	Recovery Limits	Flags
Naphthalene	ND	0.0833	0.0528	63	0.0554	66	30-115	
Acenaphthylene	ND	0.0833	0.0660	79	0.0681	82	46-125	
Acenaphthene	ND	0.0833	0.0616	74	0.0638	77	40-119	
Fluorene	ND	0.0833	0.0663	80	0.0671	81	50-133	
Phenanthrene	ND	0.0833	0.0701	84	0.0704	84	48-128	
Anthracene	ND	0.0833	0.0694	83	0.0688	83	53-134	
Fluoranthene	ND	0.0833	0.0795	95	0.0803	96	50-143	
Pyrene	ND	0.0833	0.0777	93	0.0785	94	44-139	
Benzo[a]anthracene	ND	0.0833	0.0761	91	0.0768	92	62-129	
Chrysene	ND	0.0833	0.0779	93	0.0783	94	42-127	
Benzo[b]fluoranthene	ND	0.0833	0.0785	94	0.0783	94	57-132	
Benzo[k]fluoranthene	ND	0.0833	0.0773	93	0.0793	95	57-131	
Benzo[a]pyrene	ND	0.0833	0.0723	87	0.0741	89	59-132	
Indeno(1,2,3-c,d)pyrene	ND	0.0833	0.0842	101	0.0850	102	55-135	
Dibenz[a,h]anthracene	ND	0.0833	0.0862	103	0.0877	105	36-146	
Benzo[g,h,i]perylene	ND	0.0833	0.0792	95	0.0801	96	42-140	

	RPD	RPD Limit	Flags
Naphthalene	5	25	
Acenaphthylene	3	25	
Acenaphthene	4	25	
Fluorene	1	25	
Phenanthrene	0	25	
Anthracene	1	25	
Fluoranthene	1	25	
Pyrene	1	25	
Benzo[a]anthracene	1	25	
Chrysene	1	25	
Benzo[b]fluoranthene	0	25	
Benzo[k]fluoranthene	3	25	
Benzo[a]pyrene	2	25	
Indeno(1,2,3-c,d)pyrene	1	25	
Dibenz[a,h]anthracene	2	25	
Benzo[g,h,i]perylene	1	25	

OnSite
Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

G - Insufficient sample quantity for duplicate analysis.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

O - Hydrocarbons indicative of diesel fuel are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a silica gel cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • Fax: (425) 885-4603

Chain of Custody

Page 1 of 1

Company: CDM

Project Number: 19897-47506

Project Name: King County, Beall Phase II

Project Manager: Lance Peterson

Sampled by: Josh Miller

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Day
- ☐ 3 Day
- ☒ Standard (7 working days)
- ☐ ______ (other)

Laboratory Number: 02-043

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270C	PAHs by 8270C / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	VPH	EPH	8141 Organo Phos.		Hold		% Moisture
1	HB-TP1-2.5	2/2/06	0815	soil	1																		X		
2	HB-TP2-4.5		0825		2									X							X		[illegible]	-10	X
3	HB-TP3-3		0910		1			⊗				O											X		⊗
4	HB-TP4-4.5		0925					⊗															X		⊗
5	HB-TP5-5		0950					⊗				O											X		⊗
6	HB-TP6-5		1005																				X		
7	HB-TP7-5		1025																				X		
8	HB-TP8-2.5		1045					⊗															X		⊗
9	HB-TP9-2.0		1130					⊗															X		⊗

	Signature	Company	Date	Time
Relinquished by	Josh Miller	CDM	2/3/06	1200
Received by	[signature]	OnSite Env	2/3/06	1345
Relinquished by				
Received by				
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions

King County Contract: # E23023E

⊗ Added 2/13/06. DB
NWTPH Dx: please quantify as Bunker C.

O-Added 2/23/06. DB.

Chromatograms with final report ☐

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Appendix F

Appendix F
Terrestrial Ecological Evaluation Information

Tier I Evaluation

Evaluation of Exclusion from Terrestrial Ecological Evaluation

Terrestrial Ecological Evaluation Exclusion Criteria

Some contaminated sites are excluded from conducting a Terrestrial Ecological Evaluation (TEE). The Model Toxics Control Act states, however, that exclusion from the TEE does not exclude the site for consideration of effects on aquatic or sediment ecological receptors.

Reasons for Exclusion:

Pursuant to WAC 173-340-7491, a site is eligible for exclusion if it meets any of the following criteria:

1. POINT OF COMPLIANCE WAC 173-340-7491(1)(A)

   - No contamination present at site.
   - All contamination is below 15 feet prior to remedial activities.
   - All contamination is below six feet and an institutional control has been implemented, as required by WAC 173-340-440.
   - All contamination is below a site-specific point of compliance established in compliance with WAC 173-340-7490(4)(b) with an institutional control implemented as required by WAC 173-340-440.

2. BARRIERS TO EXPOSURE WAC 173-340-7491(1)(B)

   - All contaminated soil is or will be covered by physical barriers that prevent exposure to plants and wildlife and an institutional control will be implemented, as required by WAC 173-340-440.

   An exclusion based on future land use must have a completion date for future development that is acceptable to the Washington State Department of Ecology.

3. UNDEVELOPED LAND WAC 173-340-7491(1)(C)

   - There is less than one-quarter acre of contiguous undeveloped land on or within 500 feet of any area of the site and any of the following chemicals is present: chlorinated dioxins or furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor epoxide, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, or pentachlorobenzene.

   - For sites not containing any of the chemicals mentioned above, there are less than one-and-a-half acres of contiguous undeveloped land on or within 500 feet of any area of the site.

"Undeveloped land" is land that is not covered by building, roads, paved areas, or other barriers that would prevent wildlife from feeding on plants, earthworms, insects, or other food in or on the soil.

"Contiguous" undeveloped land is an area of undeveloped land that is not divided into smaller areas of the highways, extensive paving, or similar structures that are likely to reduce the potential use of the overall area by wildlife.

4. BACKGROUND CONCENTRATIONS WAC 173-340-7491(1)(D)

- Concentrations of hazardous substances in soil do not exceed background levels as described in WAC 173-340-709.

Tier II Evaluation

Evaluation of Applicability of Simplified Terrestrial Ecological Evaluation

Table 749-1
Simplified Terrestrial Ecological Evaluation – Exposure Analysis Procedure under WAC 173-340-7492(2)(a)(ii).[a]

Estimate the area of contiguous (connected) undeveloped land on the site or within 500 feet of any area of the site to the nearest 1/2 acre (1/4 acre if the area is less than 0.5 acre). "Undeveloped land" means land that is not covered by existing buildings, roads, paved areas or other barriers that will prevent wildlife from feeding on plants, earthworms, insects or other food in or on the soil.	
1) From the table below, find the number of points corresponding to the area and enter this number in the box to the right.	
Area (acres) — Points 0.25 or less — 4 0.5 — 5 1.0 — 6 1.5 — 7 2.0 — 8 2.5 — 9 3.0 — 10 3.5 — 11 4.0 or more — 12	12
2) Is this an industrial or commercial property? See WAC 173-340-7490(3)(c). If yes, enter a score of 3 in the box to the right. If no, enter a score of 1.	1
3) Enter a score in the box to the right for the habitat quality of the site, using the rating system shown below[b]. (High = 1, Intermediate = 2, Low = 3)	2
4) Is the undeveloped land likely to attract wildlife? If yes, enter a score of 1 in the box to the right. If no, enter a score of 2. See footnote c.	1
5) Are there any of the following soil contaminants present: Chlorinated dioxins/furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, pentachlorobenzene? If yes, enter a score of 1 in the box to the right. If no, enter a score of 4.	1
6) Add the numbers in the boxes on lines 2 through 5 and enter this number in the box to the right. If this number is larger than the number in the box on line 1, the simplified terrestrial ecological evaluation may be ended under WAC 173-340-7492 (2)(a)(ii).	5

Footnotes:

a It is expected that this habitat evaluation will be undertaken by an experienced field biologist. If this is not the case, enter a conservative score (1) for questions 3 and 4.

b **Habitat rating system.** Rate the quality of the habitat as high, intermediate or low based on your professional judgment as a field biologist. The following are suggested factors to consider in making this evaluation:
Low: Early successional vegetative stands; vegetation predominantly noxious, nonnative, exotic plant species or weeds. Areas severely disturbed by human activity, including intensively cultivated croplands. Areas isolated from other habitat used by wildlife.
High: Area is ecologically significant for one or more of the following reasons: Late-successional native plant communities present; relatively high species diversity; used by an uncommon or rare species; priority habitat (as defined by the Washington Department of Fish and Wildlife); part of a larger area of habitat where size or fragmentation may be important for the retention of some species.
Intermediate: Area does not rate as either high or low.

c Indicate "yes" if the area attracts wildlife or is likely to do so. Examples: Birds frequently visit the area to feed; evidence of high use by mammals (tracks, scat, etc.); habitat "island" in an industrial area; unusual features of an area that make it important for feeding animals; heavy use during seasonal migrations.

Since 5<12 the simplified terrestrial ecological evaluation may not be ended under WAC 173-340-7492(2)(a)(ii).

Ecological Indicator Soil Concentrations

Table 749-3 from WAC 173-340-900

Table 749-3

Ecological Indicator Soil Concentrations (mg/kg) for Protection of Terrestrial Plants and Animals.[a] For chemicals where a value is not provided, see footnote b.

Note: These values represent soil concentrations that are expected to be protective at any MTCA site and are provided for use in eliminating hazardous substances from further consideration under WAC 173-340-7493(2)(a)(i). Where these values are exceeded, various options are provided for demonstrating that the hazardous substance does not pose a threat to ecological receptors at a site, or for developing site-specific remedial standards for eliminating threats to ecological receptors. See WAC 173-340-7493(1)(b)(i), 173-340-7493(2)(a)(ii) and 173-340-7493(3).

Hazardous Substance[b]	Plants[c]	Soil Biota[d]	Wildlife[e]
METALS:[f]			
Aluminum (soluble salts)	50		
Antimony	5		
Arsenic III			7
Arsenic V	10	60	132
Barium	500		102
Beryllium	10		
Boron	0.5		
Bromine	10		
Cadmium	4	20	14
Chromium (total)	42[g]	42[g]	67
Cobalt	20		
Copper	100	50	217
Fluorine	200		
Iodine	4		
Lead	50	500	118
Lithium	35[g]		
Manganese	1,100[g]		1,500
Mercury, inorganic	0.3	0.1	5.5
Mercury, organic			0.4
Molybdenum	2		7
Nickel	30	200	980
Selenium	1	70	0.3
Silver	2		
Technetium	0.2		
Thallium	1		
Tin	50		
Uranium	5		
Vanadium	2		
Zinc	86[g]	200	360
PESTICIDES:			
Aldrin			0.1
Benzene hexachloride (including lindane)			6
Chlordane		1	2.7
DDT/DDD/DDE (total)			0.75
Dieldrin			0.07
Endrin			0.2
Hexachlorobenzene			17
Heptachlor/heptachlor epoxide (total)			0.4
Pentachlorophenol	3	6	4.5
OTHER CHLORINATED ORGANICS:			
1,2,3,4-Tetrachlorobenzene		10	
1,2,3-Trichlorobenzene		20	
1,2,4-Trichlorobenzene		20	
1,2-Dichloropropane		700	
1,4-Dichlorobenzene		20	
2,3,4,5-Tetrachlorophenol		20	
2,3,5,6-Tetrachloroaniline	20	20	
2,4,5-Trichloroaniline	20	20	
2,4,5-Trichlorophenol	4	9	
2,4,6-Trichlorophenol		10	
2,4-Dichloroaniline		100	
3,4-Dichloroaniline		20	
3,4-Dichlorophenol	20	20	
3-Chloroaniline	20	30	
3-Chlorophenol	7	10	
Chlorinated dibenzofurans (total)			2E-06
Chloroacetamide		2	
Chlorobenzene		40	
Dioxins			2E-06
Hexachlorocyclo-pentadiene	10		
PCB mixtures (total)	40		0.65
Pentachloroaniline		100	
Pentachlorobenzene		20	
OTHER NONCHLORINATED ORGANICS:			
2,4-Dinitrophenol	20		
4-Nitrophenol		7	
Acenaphthene	20		
Benzo(a)pyrene			12
Biphenyl	60		
Diethylphthalate	100		
Dimethylphthalate		200	
Di-n-butyl phthalate	200		
Fluorene		30	
Furan	600		
Nitrobenzene		40	
N-nitrosodiphenylamine		20	
Phenol	70	30	
Styrene	300		
Toluene	200		

[Editor's Note: Table 749-3 continues on the next page.]

Hazardous Substance[b]	Plants[c]	Soil Biota[d]	Wildlife[e]
PETROLEUM:			
Gasoline Range Organics		100	5,000 mg/kg except that the concentration shall not exceed residual saturation at the soil surface
Diesel Range Organics		200	6,000 mg/kg except that the concentration shall not exceed residual saturation at the soil surface

Footnotes:

a Caution on misusing ecological indicator concentrations. Exceedances of the values in this table do not necessarily trigger requirements for cleanup action under this chapter. Natural background concentrations may be substituted for ecological indicator concentrations provided in this table. The table is not intended for purposes such as evaluating sludges or wastes.
This list does not imply that sampling must be conducted for each of these chemicals at every site. Sampling should be conducted for those chemicals that might be present based on available information, such as current and past uses of chemicals at the site.

b For hazardous substances where a value is not provided, plant and soil biota indicator concentrations shall be based on a literature survey conducted in accordance with WAC 173-340-7493(4) and calculated using methods described in the publications listed below in footnotes c and d. Methods to be used for developing wildlife indicator concentrations are described in Tables 749-4 and 749-5.

c Based on benchmarks published in *Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Terrestrial Plants: 1997 Revision*, Oak Ridge National Laboratory, 1997.

d Based on benchmarks published in *Toxicological Benchmarks for Potential Contaminants of Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process*, Oak Ridge National Laboratory, 1997.

e Calculated using the exposure model provided in Table 749-4 and chemical-specific values provided in Table 749-5. Where both avian and mammalian values are available, the wildlife value is the lower of the two.

f For arsenic, use the valence state most likely to be appropriate for site conditions, unless laboratory information is available. Where soil conditions alternate between saturated, anaerobic and unsaturated, aerobic states, resulting in the alternating presence of arsenic III and arsenic V, the arsenic III concentrations shall apply.

g Benchmark replaced by Washington state natural background concentration.

Appendix G

Appendix G

The U.S. EPA Memorandum for Guidance on Developing Cleanup Goals and Identifying New Assessment Tools for Evaluating Asbestos at Cleanup Sites

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

AUG 10 2004

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

OSWER 9345.4-05

MEMORANDUM

SUBJECT: Clarifying Cleanup Goals and Identification of New Assessment Tools for Evaluating Asbestos at Superfund Cleanups

FROM: Michael B. Cook, Director
Office of Superfund Remediation and Technology Innovation

TO: Superfund National Policy Managers, Regions 1-10

Purpose

The purpose of this memo is twofold. The first purpose is to clarify that Regions should develop risk-based, site-specific action levels to determine if response actions should be taken when materials containing less than 1 percent asbestos (including chrysotile and amphibole asbestos) are found on a site. Regions should not assume that materials containing less than 1 percent asbestos do not pose an unreasonable risk to human health. The second purpose is to outline some activities underway to assist in the evaluation of asbestos risks at Superfund sites.

It is important to note that this memorandum is not a regulation itself, nor does it change or substitute for any regulations. Thus, it does not impose legally binding requirements on EPA, States, or the regulated community. This memorandum does not confer legal rights or impose legal obligations upon any member of the public. Interested parties are free to raise questions and objections about the substance of this memorandum and the appropriateness of the application of this memorandum in a particular situation. EPA and other decision makers retain the discretion to adopt approaches on a case-by-case basis that differ from those described in this memorandum. The use of the word "should" in this document means that something is suggested or recommended, but not required.

Background

The 1 percent threshold for asbestos-containing materials was first used in the 1973 National Emissions Standards for Hazardous Air Pollutants (NESHAP), where the intent of the threshold was:

... to ban the use of materials which contain significant quantities of asbestos, but to allow the use of materials which would: (1) contain trace amounts of asbestos which occur in numerous natural substances, and (2) include very small quantities of asbestos (less than 1 percent) added to enhance the material's effectiveness. (38 FR 8821)

All subsequent EPA regulations and the Asbestos Hazardous Emergency Response Act Statute included this 1 percent threshold. In the 1990 NESHAP revisions, EPA retained the threshold, stating that it was related to the phase contrast microscopy (PCM) analytical method detection limits. The Occupational Safety and Health Administration (OSHA) Standards also defined an asbestos-containing material as a material containing more than 1 percent of asbestos[1] (29 CFR Part 1910.1001 and 29 CFR Part 910.134). The wide use of the 1 percent threshold in regulations may have caused site managers to assume that levels below the threshold did not pose an unreasonable risk to human health. However, it is important to note that the 1 percent threshold concept was related to the limit of detection for the analytical methods available at the time and also to EPA's prioritization of resources on materials containing higher percentages of asbestos.

Issue

Currently, many site managers continue to employ the use of the 1 percent threshold to determine if response actions for asbestos should be undertaken. However, based upon scientific discussions and findings reported by EPA and ATSDR from the Libby, Montana Superfund site, as well as EPA's "Peer Consultation Workshop on a Proposed Asbestos Cancer Risk Assessment[2]," there may be confusion regarding the appropriate use of the 1 percent threshold at Superfund sites. This concern was discussed at EPA's "Asbestos Site Evaluation, Communication, and Cleanup Workshop[3]," and it was concluded that the 1 percent threshold for asbestos in soil/debris as an action level may not be protective of human health in all instances of site cleanups. The 1 percent threshold is not risk-based and an accurate exposure value could only be determined through site sampling techniques that generate fibers from soil and bulk samples. Therefore, we recommend the development of risk-based, site-specific action levels to determine if response actions for asbestos in soil/debris should be undertaken.

Recent data from the Libby site and other sites provide evidence that soil/debris containing significantly less than 1 percent asbestos can release unacceptable air concentrations of all types of asbestos fibers (i.e., serpentine/chrysotile and amphibole/tremolite). The most critical determining factors in the level of airborne concentrations are the degree of disturbance, which is associated with the level of activity occurring on the site, and the presence of complete exposure pathways. For example, activities such as excavation or plowing generate large amounts of dust that can result in the generation of airborne fibers that can be inhaled even from a complex soil matrix. To address this evolving issue, OSRTI will be hosting a review of methods for determining conversion of soil to air concentrations in 2004.

Future Action

OSRTI has formed three technical working groups to assist in developing guidance and policy relating to risk assessment, field sampling, and analytical methods. These working groups have already contributed to a new toolbox that is located on the EPA Intranet. The location of the tool box is http://intranet.epa.gov/osrtinet/hottopic.htm.

The toolbox will be continually updated as products are developed and will eventually contain information on risk assessments, generic site sampling, and analytical approaches for asbestos cleanup projects. In the interim, numerous site reports that discuss specific concerns and issues from current asbestos site actions are contained in the toolbox. Additionally, to facilitate the development of sampling plans, there are examples of approved site sampling plans with data quality objectives, and a list of asbestos analytical laboratories which have passed an EPA audit.

Our goal is to have the majority of the guidance and policy documents prepared by the end of this year. If you have any questions, please consult with Richard Troast of my staff, who is the lead scientist within OSRTI for asbestos. He can be reached at (703) 603-8805 or by e-mail at: troast.richard@epa.gov.

cc:

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Endnotes:

1. Pursuant to industry comments, the 1994 amendments to the OSHA Standards incorporated a definition of asbestos-containing material that included the 1 percent threshold to be consistent with EPA, and noted that the National Institute for

Occupational Safety and Health (NIOSH) had raised questions whether even one percent may be below the accuracy level for certain microscopic methods. However, OSHA's Hazard Communication Standard requires a Material Safety Data Sheet (MSDS) to be prepared by the manufacturer or importer of a chemical substance, mixture, or product containing more than 0.1 percent of any carcinogen, including asbestos. Additionally, OSHA has recently issued several letters stating that some of the requirements in the OSHA Asbestos Construction Standard (29 CFR 1926.1101) do cover materials containing less than one percent asbestos.

2. USEPA's *Peer Consultation Workshop on a Proposed Asbestos Cancer Risk Assessment* was held in San Francisco, California on February 25-27, 2003. The purpose of the workshop was to discuss the scientific merit of the proposed methodology developed for EPA by Dr. Wayne Berman and Dr. Kenny Crump. The proposed methodology distinguishes carcinogenic potency by asbestos fiber size and asbestos fiber type and advocates use of a new exposure index to characterize carcinogenic risk. Proceedings from this conference can be located at: http://www.epa.gov/superfund/programs/risk/asbestos/index.htm.

3. USEPA's *Asbestos Site Evaluation, Communication and Cleanup Workshop* was held in Keystone, Colorado on September 23-26, 2003. The purpose of the workshop was to provide an opportunity to share lessons learned from working on large sites contaminated with asbestos. The meeting was also used to identify key outstanding technical and policy issues, and to begin to develop a consistent approach to measuring "success", especially short-term impacts and long-term risk reduction. Proceedings from this conference can be located at: http://www.epa.gov/superfund/programs/risk/asbestos/workshop/index.htm.