Site Characterization and Risk Assessment Report

Plaid Pantries Store #324

10645 16th Avenue SW

White Center/King County, Washington

Washington Department of Ecology VCP Site ID NW2585
EES Project 1133-02

Prepared For

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May 30, 2014

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1 INTRODUCTION

On behalf of Plaid Pantries, Inc. (Plaid), EES Environmental Consulting, Inc. (EES) prepared this report to document site characterization activities conducted to date at the former Plaid Pantries, Inc. (Plaid) Store #324 located at 10645 16th Avenue SW in White Center/King County, Washington (Property, Figure 1).

1.1 PURPOSE AND SCOPE OF WORK

The purpose of this report is to document site characterization status including development of Model Toxics Control Act (MTCA) modified Method B soil cleanup levels and related risk assessment tasks for the Site.

In support of the project objectives, EES initiated supplemental site investigation tasks including (1) further evaluation of groundwater conditions at the Property, (2) collection of soil samples from the most contaminated area of the Property for additional chemical analytical data, (3) a Tier I Vapor Intrusion Assessment, and (4) a Terrestrial Ecological Evaluation (TEE) exemption determination. These activities were conducted in accordance with the EES work plan (EES 2013a, 2014), as approved by Plaid and the Washington Department of Ecology (Ecology).

2 BACKGROUND

2.1 PROPERTY AND SITE DESCRIPTION

The Property is located at the northwest corner of SW 107th Street and 16th Avenue SW in White Center/King County, Washington (Figure 1). The Property is owned by Louise Piacentini and includes a single commercial building occupied by a convenience store and restaurant (Figure 2). The facility identification number assigned to the Property for reference by Ecology is Voluntary Cleanup Program (VCP) Site Number NW2585.

No releases from the Plaid fueling system are known to have occurred during Plaid's period of operation between 1986 and 1990 (Section 2.1.2), and no releases from the UST system were reported by Plaid's sub-tenant until system decommissioning in 2006. The identified gasoline release (source) area is located on the Property and appears to be associated with historical fueling infrastructure that was removed by Plaid's sub-tenants in 2006. Soil impacts are present beyond the Property boundary to the east, extending beneath a limited portion of the adjacent sidewalk and 16th Avenue SW roadway. Collectively, the area affected by gasoline contamination originating at the subject Property is designated as the Site.

2.1.1 ZONING

The subject Property is zoned as Community Business Special Overlay (CB-SO). The Property is bounded to the north by an automotive repair shop facility zoned as Community Business (CB), to the east and south by public (King County) roadways, and to the west by an alley and beyond

the alley by a tax parcel zoned as Urban Residential (R-24). Vicinity properties are also zoned for commercial and urban residential purposes. The intent of these zoning types, as described in Title 21A of the King County Municipal Code, is listed below. A zoning map for the Property and vicinity is provided in Appendix A.

- Community Business and Community Business Special Overlay– The intent and function of these zones is to provide convenience and comparison retail and personal services. This zoning designation requires that buildings have a "minimum setback of 10 feet from the street right-of-way or the edge of a surface improvement which extends beyond a right-of-way, whichever is closer to the structure."
- Urban Residential – The R-24 zone provides for a mix of predominantly apartment and townhouse dwelling units, mixed-use and other development types, with a variety of densities and sizes in locations appropriate for urban densities.

2.1.2 PLAID FACILITY OPERATIONS

Plaid operated the Store #324 retail fueling station at the Property between September 1986 and November 30, 1990. Plaid then sub-leased the store building and sold the underground storage tank (UST) system fixtures and equipment to Young Kil Kim and Chae Yop Kim. Fuel storage at the Plaid facility was provided by three gasoline USTs (two 12,000-gallon capacity USTs and one 10,000 gallon capacity UST) which were decommissioned by the sub-tenants in 2006 (Figure 2). Plaid remained the primary lessee of the Property until August 31, 2006.

During the operations of Plaid and its sub-tenants, only gasoline is known to have been stored and dispensed at the Property. Leaded gasoline may have been dispensed at the Site during phase-out of that product in the 1980s. EES understands that neither Plaid nor their sub-tenants stored or dispensed other hydrocarbons such as diesel fuel, bulk motor oil, or bulk solvents at any time during site operations.

Plaid and its sub-tenants operated a leak detection system in accordance with Ecology requirements and no known system leaks were identified or reported to Plaid during the term of Plaid's lease. Tank decommissioning data provided to Plaid in 2007 by the property owner and subsequent investigations by Plaid indicate that gasoline constituents were identified in soil near the former UST system.

2.1.3 HISTORICAL PROPERTY OPERATIONS

No information was obtained by EES regarding use of the Property prior to Plaid's operations, which began in 1986.

2.2 PREVIOUS ENVIRONMENTAL SITE INVESTIGATION ACTIVITIES

Results of historic subsurface sampling and characterization tasks conducted by Plaid are summarized below and on Tables 1 and 2, illustrated on Figures 3 through 6, and detailed under separate cover.

2.2.1 General Subsurface Conditions

General subsurface conditions including Site stratigraphy and regional hydrogeology are described below. Additional Site-specific information is presented in Section 3.

- Stratigraphy:
  - The majority of the Property is paved with asphalt and concrete, with base fill extending to depths up to two feet below the paved surface. Subgrade fill is underlain by fine-grained native soil consisting of silt with variable sand and gravel to depths around 14 feet below ground surface (bgs). Beneath the shallow silt material, gravels with varying sand content have been encountered to depths up to 50 feet bgs, the total depth explored to date.
  - According to The Geologic Map of Seattle, USGS Open File Report 2005-1252 (Troost et al, 2005), the Property is located in an area mapped as Quaternary-aged Vashon Till. The Vashon Till is composed of silt, sand, and gravel that was glacially transported and deposited. The silty till unit is underlain by dense sandy gravel. This mapped alluvial unit is consistent with EES stratigraphic observations to date.
- Surface water is predominantly collected in the two on-site catch basins and routed into the public stormwater sewer network located beneath the adjacent 16th Avenue SW.
- Groundwater has not been encountered on the Property at maximum exploration depths up to 50 feet. To confirm local and regional groundwater conditions, EES also reviewed available well log information published by the Washington State Water Resources Department (WRD). Based on available literature and site-specific observations, groundwater is not anticipated within 60 to 100 feet bgs in the Site vicinity. Additional details are provided in Section 3.
  - The local water table is expected to flow generally west or southwestwards following local topography and towards the nearby Puget Sound. The primary local and regional drinking water supply is from two surface water sources (Cedar River system and South Fork Tolt Reservoir) and supplemented, if and when needed, by a small groundwater source (Seattle Well Fields). The water supply units are located more than 20 miles east to southeast from the Site.
  - The Seattle Well Fields consist of the Riverton and Boulevard well fields. Underlying the well field area are three water-bearing sand and gravel formations known as the Shallow, Intermediate, and Deep Aquifers. The aquifers are arranged in layers and separated by various aquitards. At the surface, over much the well field areas, is a highly compacted layer composed of glacial till. Three municipal production wells are tapped into the Intermediate Aquifer, which is typically encountered at depths below 100 feet.

2.2.2 Site Investigation Summary

Based on site investigation findings to date, subsurface conditions include a low-permeability silt unit with variable sand and gravel content, extending to approximately 14 feet bgs, underlain by sand and gravel. Soil contaminated with gasoline and related volatile constituents including

benzene is located north and northeast of the former UST cavity and extends east of the Property beneath the adjacent sidewalk and roadway, as shown on Figures 4 through 6. Extensive site investigation efforts indicate soil impacts attributed to historical fueling operations on the Property appear limited to within 14 feet of the ground surface, with the greatest gasoline impacts limited to the zone between approximately 4 and 10 feet depth. Groundwater has not been encountered on the Property at maximum drilling depths up to 50 feet, as confirmed during the March 2014 subsurface investigation (Section 3.3.1.1). Based on the limited vertical extent of soil contamination identified and groundwater depths at the Site of greater than 50 feet, groundwater is not expected to be impacted by the gasoline release originating at the Property.

2.2.3 Initial Remedial Action Planning

Because identified Site soil impacts greatly exceeded default MTCA Method A cleanup criteria, EES evaluated a broad range of remedial technology alternatives to address gasoline impacted soils at the Property (EES 2012). Many of the identified technologies were not recommended for further evaluation because of limited effectiveness and/or applicability at the Site, limited availability of the technology in the Pacific Northwest, cost, and potential risk to underground utility and public sidewalk/roadway infrastructure.

Based on multiple factors including the focused feasibility evaluation, technology screening, vapor extraction pilot testing, and discussions with Plaid, an alternative phased remedial approach was developed for the Property that incorporated in-situ chemical oxidation (ISCO) and focused excavation technologies. During 2013, EES conducted ISCO pilot testing to evaluate the effectiveness of this technology at the Site (EES 2013b). Pilot test results indicate that injection of ISCO reagent through vertical borings does not provide adequate subsurface distribution in the target treatment zone due to the low permeability of Site soils and therefore, does not result in measurable destruction of gasoline contaminants using this delivery approach.

Efforts to identify an effective, implementable, and practical approach to remedial action at this Site have been largely unsuccessful based on application of the default MTCA Method A soil cleanup levels. In consultation with Ecology, EES and Plaid have therefore developed an alternative approach to remedial action planning using Site-specific MTCA modified Method B considerations, as detailed in Section 4 of this report. In order to have sufficient representative data for use in the modified Method B calculations, supplemental site investigation tasks were conducted in March 2014 as described in Section 3.

3 SUPPLEMENTAL SITE INVESTIGATION (MARCH 2014)

In accordance with the EES work plan and follow-up discussions with Ecology (EES 2013a, 2014), the following investigation scope elements were completed in preparation for MTCA modified Method B cleanup level development:

- Obtained WRD records and reviewed published information regarding local depth to water and available well construction information.

- Determined whether the Site qualifies for an exemption from conducting a Terrestrial Ecological Evaluation.
- Updated the site Health and Safety Plan to guide field safety protocols, in accordance with rules established by the Occupational Safety and Health Administration (OSHA).
- Completed required public and private utility locating in an attempt to identify underground utility features and conduits located at each planned drilling location.
- Subcontracted a drilling company to advance a total of five Sonic soil borings (B-37 through B-41) to evaluate "worst case" soil impacts and determine whether groundwater is encountered within 50 feet of ground surface at the Site. Collected and submitted select soil samples from each boring for fractionated hydrocarbon (VPH/EPH) analyses.
- Conducted a Tier I Vapor Intrusion Assessment at developable portions of the Property, including vapor sampling and analysis at seven direct-push soil gas borings (SG-1 through SG-7).
- Coordinated characterization and disposal of investigation-derived-waste (IDW).

Site investigation activities are described below.

3.1 WATER WELL REVIEW

Ecology's Well Log Viewer online database was searched for wells located within an approximate 0.25-mile radius of the Property. The purpose of this effort was (1) to evaluate groundwater conditions in the Site vicinity, and (2) to identify wells that may serve beneficial uses in order to complete the Conceptual Site Model and exposure pathway evaluation as required by Ecology guidance (Section 4.1).

The water well search was intended to identify and locate wells as feasible based on information provided in the available well reports. Categories of wells searched include water wells and resource protection wells (which in many cases are exploratory borings where water was not encountered). Among 70 "wells" identified within approximately 0.25 miles of the Site, only one was a water well and the vast majority of others indicated no groundwater encountered.

The search included wells located in the southwest quarter and the southwest quarter of the northwest quarter of Section 6 of Township 23 North, Range 4 West of the Willamette Meridian. The search also included wells located in the southeast quarter and the southeast quarter of the northeast quarter of Section 1 of Township 23 North, Range 3 East of the Willamette Meridian. A list of identified wells is presented in Table 5 and illustrated on Figure 7. The data in Table 5 provides useful information supporting our assessment that shallow groundwater near the Site is relatively deep and is not used for drinking purposes.

- **Water Wells**: Only one water well (Well Log ID 518112) is registered near the search area. Note that although this water well is located greater than 0.25-mile from the Site (the well is located approximately 2,200 feet to the east), it may indicate similar regional hydrogeologic conditions for the general Site vicinity. The

well log indicates static water conditions were observed at approximately 135 feet bgs.

- **Other Wells**: A total of 69 resource protection wells are registered in the search area; well logs indicate the following:
  - Most of the well logs are for geotechnical borings, soil vapor wells, and/or well abandonments, which do not include groundwater information.
  - Ten monitoring wells (Well Log ID 755249, 755251, 755253, 755255, 755257, 755334, 755336, 755338, 755340, and 755342) are located approximately 950 feet south of the Site. The well logs indicate static water was present between nine and 14 feet bgs in borings advanced to terminal depths of 15 feet. However, subsequent well logs (Well Log ID 773771, 773773, and 773774) for the same property indicate static water was not encountered at depths up to 20 feet. In addition, the well logs indicate a shallow sand unit underlain by glacial till. Based on the till's hydraulic character as a likely aquitard and the occurrence of regional groundwater at significantly greater depths, water observed at this location is likely discontinuous and perched, and not representative of usable groundwater or reliable stable water table conditions.

Based on the results of the database review, wells in the Site vicinity appear to be rare and screened in the regional aquifer at depths below approximately 100 feet, with first water expected at similar depths. Findings of this well search are consistent with our observation that groundwater was not encountered within 50 feet of the Property ground surface, and no beneficial groundwater use appears likely within 0.25-mile of the Site.

3.2 TERRESTRIAL ECOLOGICAL EVALUATION

In accordance with Ecology's guidance, EES evaluated terrestrial ecological evaluation (TEE) criteria for the Site. A simplified terrestrial ecological evaluation process is outlined in WAC 173-340-7492, and is intended to identify those sites which do not have a substantial potential for posing a threat of significant adverse effects to terrestrial ecological receptors. Technical Assessment Services, Inc. completed an exposure analysis utilizing Table 749-1, which is referenced in WAC 173-340-7492(2)(a)(ii). A copy of this evaluation is included in Appendix B.

The first step of a TEE is an exclusion analysis, of which the Site met two of the four exclusion criteria. In addition, based upon the exposure analysis, we determined that land use at the Site and surrounding areas makes significant wildlife exposure unlikely. Therefore, no TEE is required. Documentation is provided in Appendix B.

3.3 SUBSURFACE INVESTIGATION

3.3.1 FIELD OBSERVATIONS AND SAMPLING ACTIVITIES

EES conducted field sampling activities on March 4 and 5, 2014. Four soil borings (B-38 through B-41) and seven soil gas borings (SG-1 through SG-7) were advanced to terminal depths of

approximately 15 and 5 feet bgs at the Property, respectively. A fifth soil boring (B-37) was advanced to 50 feet bgs to evaluate groundwater conditions as recommended by Ecology. Drilling activities were performed using roto-sonic and direct-push equipment owned and operated by Holt Services, Inc. (Holt) of Seattle, Washington. Related tasks, observations, and results are summarized below. Sample locations are shown on Figure 8. Soil boring logs and soil gas data sheets are included in Appendices C and D, respectively. Standard operating procedures for the specified logging and sampling tasks are available upon request.

3.3.1.1 Subsurface Conditions

Subsurface conditions observed during March 2014 were generally consistent with prior investigations. Beneath the Property asphalt and subgrade sandy gravel fill, fine-grained silts with variable sand and gravel were encountered to depths of approximately 14 feet bgs. The fine-grained material is underlain by gravels with varying sand content to a depth of 40 feet bgs. Sand with varying gravel content was encountered between 40 and 50 feet bgs at B-37, the maximum Site depth explored.

Groundwater was not encountered in any of the five borings (including 50 foot boring B-37). This observation is consistent with information indicating the local water table is not expected within 60 to 100 feet of ground surface.

3.3.1.2 Soil Sampling

Five soil borings (B-37 through B-41) were advanced on the Property using a roto-sonic drill rig in the area northeast of the former UST cavity where the most highly contaminated soil has been identified, as shown on Figure 8. Boring B-37 was also co-located with prior borings B-1 and B-5 to confirm whether isolated low-level petroleum impacts initially identified at B-1 at 23 feet bgs could be reproduced [see Section 3.3.2.1: no impacts have been identified in this zone at B-5 or B-37 and we therefore conclude that low concentrations of gasoline previously detected at B-1(23') are due to anomalous localized impacts or cross-contamination from surface debris during drilling in 2007].

Soil samples were collected on a continuous basis, logged, and observed for soil type, discoloration, odor, and/or the presence of organic vapors using a photoionization detector (PID). Consistent with previous investigations, obvious field indications of gasoline impacts (gray staining, moderate sheen, and strong petroleum odor) were observed in soil generally between 5 and 10 feet bgs. Although measureable VOCs are present in subsurface media, PID readings were only collected at select sample depths due to instrumentation problems caused by moisture and heavy rain during drilling on March 5, 2014. Based on soil conditions observed and known zones of greatest impact, one soil sample was collected from each boring targeting this highly contaminated zone for fractionated hydrocarbon (EPH/VPH) analysis. In addition, a soil sample was collected at 23 feet bgs from boring B-37 for analysis.

Soil samples were placed in laboratory prepared containers, sealed, labeled, and placed in a cooler with ice, and transported under chain-of-custody to Apex Laboratories, LLC of Tigard, Oregon. Analytical results are summarized in Section 3.3.2.

3.3.1.3 Soil Gas Sampling

Seven soil gas borings (SG-1 through SG-7) were advanced across the Property to evaluate possible vapor intrusion into current or future buildings. Soil gas samples were collected from five feet bgs using a direct-push drill rig equipped with dedicated post-run tubing (PRT) vapor sampling rods. After sealing the borehole annulus above the screened zone with hydrated bentonite and confirming an adequate seal using helium tracer gas and a direct-reading helium detector, EES purged the Teflon sample tubing and collected soil gas samples using laboratory certified 1-liter Summa canisters fitted with 0.7-micron in-line filters and 200 milliliter-per-minute flow controllers. Soil gas samples were shipped under chain-of-custody to Eurofins/Air Toxics Inc. of Folsom, California, for gasoline and related volatiles chemical analysis.

3.3.1.4 Investigation-Derived Waste

Investigation-derived wastes were temporarily containerized in sealed, labeled steel 55-gallon drums and stored on the Property, pending disposal. Disposal verification will be provided when available.

3.3.2 Analytical Results

Soil and soil gas laboratory analytical results are presented on Tables 1 through 4 and are summarized in the following sections. Laboratory analytical reports are provided in Appendix E.

3.3.2.1 Soil

Six soil samples (one shallow sample from contaminated soils at each boring and an additional sample at 23 feet bgs from boring B-37) were submitted to Apex Laboratories for one or more of the following analyses:

- Gasoline-range petroleum hydrocarbons by NWTPH-Gx;
- Fractionated extractable and volatile petroleum hydrocarbons (EPH/VPH) by Methods NWEPH/NWVPH;
- Volatile organic compounds (VOCs) by EPA Method 5035/8260B;
- Total organic carbon by EPA Method 5310B; and
- Moisture content by ASTM Method D-2216.

Shallow soil sample results are generally consistent with prior investigations. Gasoline-range petroleum hydrocarbons were detected at concentrations ranging from 22 to 5,970 milligrams per kilogram (mg/kg). Benzene was detected at concentrations ranging from 0.34 to 11 mg/kg. EPH/VPH results indicate the petroleum hydrocarbons are predominantly in the C8-C12 range, consistent with the gasoline source discovered at the Property in 2006. Total organic carbon

was measured at levels between 370 and 1,000 mg/kg. Moisture content was measured at levels of 9.9 to 12.9 percent by weight. These data were used to develop the MTCA modified Method B site-specific cleanup levels, as described in Section 4.

No gasoline-range petroleum hydrocarbons or VOCs were detected in soil sample, B-37A: 23, confirming that petroleum contaminants extremely localized or absent at that depth. This data and field observations are consistent with prior conclusions indicating gas impacts appear limited to the zone above 14 feet.

3.3.2.2 SOIL GAS

Seven soil gas samples were submitted to Eurofins/Air Toxics Laboratory for chemical analysis of gasoline and related volatiles by EPA Method TO-15. Gasoline-range hydrocarbon and benzene concentrations detected in soil gas are summarized on Table 2 and illustrated on Figure 9.

Gasoline-range hydrocarbons were detected in soil gas samples at concentrations ranging from 940 to 8,600,000 micrograms per cubic meter (ug/m^3). The greatest concentrations (700,000 to 8,600,000 ug/m^3) were detected in samples SG-4 and SG-5 collected from the core of the known contaminant source area and these values are similar to prior soil vapor samples collected during SVE pilot testing at this portion of the Site. Gasoline-range hydrocarbon vapors were detected at levels 1,000 times lower (940 to 1,500 ug/m^3) in samples collected near the current Property building (SG-1, SG-2, and SG-7). This data illustrates the general extent of gasoline contaminants in soil gas and demonstrates the significant decrease in concentrations laterally from the source area.

Benzene was detected in soil gas samples at concentrations ranging from 4.8 to 100,000 ug/m^3. Similar to the gasoline-range concentrations, benzene concentrations are greatest near the soil contaminant core (2,400 to 100,000 ug/m^3), and attenuate rapidly by up to five orders of magnitude (4.8 to 8.9 ug/m^3) near the Property building.

Benzene was also detected in soil gas sample SG-3, collected near the northern Property boundary and an adjacent automotive repair facility, at a concentration of 260 ug/m^3.

3.4 TIER I VAPOR INTRUSION ASSESSMENT FINDINGS

Site soil and soil gas sampling and analytical testing results are summarized in Section 3.3, above. In particular, the soil gas data are informative with respect to Ecology's "Tier I" Vapor Intrusion Assessment (VIA) criteria, as follows:

- Gasoline and related vapors are present in vadose-zone soils at the Site based on sampling in and around the contaminant core. The distribution of contaminant soil vapors at the Site (Figure 9) is consistent with Plaid-related impacts.
- Vapor concentrations within 100 feet of current and potential future buildings at the Site exceed default (MTCA standard Method B) Ecology screening criteria as well as Site-specific modified Method B soil gas screening criteria (described in Section 4 of this report). Therefore, these volatile gasoline chemicals indicate a potential vapor intrusion source and should be further evaluated.

- Current Site conditions suggest relatively low vapor intrusion risk because soil gas vapor concentrations attenuate rapidly away from the contaminant core, as indicated by samples collected near the Property building which exhibit low vapor concentrations (SG-1, -2, and -7) likely representing baseline conditions for a vapor migration scenario. The most significant potential vapor intrusion risk at the Site is if a future building were to be constructed immediately above the zone of soil contamination where much greater soil gas concentrations are observed. Developable portions of the Site are limited as summarized below.
- King County zoning criteria (Section 2.1.1) specifies a 10-foot building setback from the eastern (and southern) Property boundaries, and therefore future developable portions of the Site are limited by this setback (Figures 8 and 9). Although soil impacts extend east of the setback line and beneath a portion of the adjacent 16th Avenue ROW, the ROW is an active public roadway which is not considered to be a developable portion of the Site.
- One of seven soil gas samples (SG-3) was collected near contaminated soils on the northern portion of the subject Property, near a neighboring (off-Property) building currently used for automotive repairs. Gasoline and benzene vapor concentrations in the SG-3 sample exceed MTCA standard and modified Method B screening criteria. It is likely that workers in the automotive repair shop are routinely exposed to the same gasoline and related volatile chemicals (as are being addressed at the subject Property) during their normal job activities, and therefore vapor intrusion assessment into this neighboring building is not likely applicable in accordance with published guidance (Ecology 2009). Furthermore, since the chemicals used in such a workplace are likely to include the same gasoline substances identified at the subject Property, the source and significance of sub-slab vapors (if present) at the neighboring building would be difficult to establish reliably.

4 DEVELOPMENT OF MTCA MODIFIED METHOD B CLEANUP LEVELS AND RISK CHARACTERIZATION

In accordance with MTCA regulations (WAC 173-340) and published Ecology Guidance (2007, 2011), EES and Technical Assessment Services, Inc. (TAS) developed site-specific cleanup levels using MTCA modified Method B criteria, and evaluated human health risk issues as summarized below. Supporting details are provided in the Risk Assessment Technical Memorandum and related attachments (Appendix F).

4.1 CONCEPTUAL SITE MODEL

A Conceptual Site Model (CSM) is a required element of Site cleanup planning. The CSM evaluates current and reasonably likely future Site conditions, and identifies potential sources of hazardous substances, potentially affected media, and potential migration and exposure pathways for anticipated human and ecological receptors.

A diagram of the CSM is provided as Figure 10. Only complete contaminant migration pathways can result in exposure. Complete exposure pathways must include each of the following components:

- A source and mechanism of contaminant release.
- An exposure route by which contact with contaminants can occur.
- A receptor.

As a historic retail gasoline station, release(s) from the former USTs and fuel delivery system source (removed in 2006) are the primary mechanisms by which contaminants of interest (COIs) are transferred from the source to affected soil and soil vapor media. As indicated in Sections 2.2 and 3.1, groundwater is not known or suspected to be impacted by the Property's historic gasoline release(s).

Potential human receptors were identified for the Site based on current and reasonably likely future land use. It is anticipated that the on-Property portion of the Site under consideration will retain its commercial character and that future land uses will be consistent with the current commercial use. King County zoning does not allow residential use at the Site. Where COIs extend beyond Property boundaries to the east beneath the adjacent 16th Avenue, only roadway maintenance and excavation (non-residential) exposures are anticipated.

As further detailed in Section 4.2, MTCA modified Method B cleanup levels were developed based on current and reasonably likely future Site-specific occupational/retail, construction, and excavation exposure conditions. No residential exposures are anticipated.

Current and potential future human receptors include:

- Commercial/Occupational Workers at Site businesses: employees/workers.
- Retail Store Customers: periodic retail market shoppers and restaurant patrons.
- Construction Workers: personnel working at the Site during normal construction activities.
- Trench or Excavation Workers: personnel conducting Site activities that involve excavation and/or trenching for utility work.
- Highway Maintenance: personnel working during roadway maintenance activities at the adjacent 16th Avenue ROW (re-paving, short-term shallow excavations, etc.).

No ecological receptors are known or suspected at the Site. Although MTCA requires consideration of terrestrial plants and animals that may potentially be exposed to hazardous substances, the Site qualifies for exclusion from further terrestrial ecological evaluation under WAC 173340-7491(1)(b) because contaminated media are generally covered by buildings, paved roads, pavement, or other physical barriers that will prevent exposure. A terrestrial ecological evaluation exclusion assessment was conducted for the Site, as summarized in Section 3.2 and detailed in Appendix B.

Identified complete exposure pathways are limited to occupational/commercial scenarios, based on the following qualitative evaluation:

- Potential exposure of current and future commercial/occupational workers and retail store customers via inhalation of volatile compounds in indoor air originating from subsurface soil.
- Potential exposure of current and future commercial/occupational workers and retail customers via ingestion, dermal contact, and inhalation of fugitive dust in shallow soil. This exposure pathway is very unlikely due to pavement covering on-Property soils, and the lack of near-surface Site contaminants accessible for physical disturbance.
- Potential exposure of future construction workers via ingestion, dermal contact, and inhalation of fugitive dust in surface soil up to three to four feet in depth.
- Potential exposure of future trench and/or excavation workers via ingestion, dermal contact, and inhalation of fugitive dust from surface and subsurface soil extending to 15 feet depth.
- Potential exposure of highway maintenance workers via ingestion, dermal contact, and inhalation of fugitive dust in shallow soil up to three to four feet in depth.

These exposure pathways were considered in development of MTCA modified Method B cleanup levels as summarized below and detailed in a Site-specific human health risk assessment (Appendix F).

4.2 SITE-SPECIFIC MTCA MODIFIED METHOD B SOIL CLEANUP LEVELS

Based on our understanding of current and reasonably likely Site conditions and in accordance with the CSM, MTCA modified Method B soil cleanup levels were developed for the Site. The following lines of evidence support development of these Site-specific cleanup levels:

- Site gasoline impacts including TPH fraction have been delineated within vadose-zone soils extending between approximately four and 14 feet bgs.
- Groundwater at the Site is present at depths exceeding 50 feet and is not expected to be affected by gasoline release(s) originating at the Property.
- No residential use of the Site is anticipated. Current and reasonably likely future land use at the Property is commercial/occupational. Where soil impacts extend beneath the adjacent 16th Avenue ROW, occupational exposures are limited to future trenching, excavation, and short-term maintenance work.
- The vapor intrusion pathway is a consideration in these areas due to the presence of current buildings, and future developable portions of the Site where commercial buildings could be constructed have been evaluated.

Modified Method B CULs were calculated for current and reasonably likely future Site receptors and exposure scenarios for all contaminants of interest, as detailed in Appendix F and summarized on Table 6. For reference, Table 6 also provides MTCA standard Method B values.

4.3 RISK CHARACTERIZATION

When determining the potential for health impacts from Site-related chemicals it is assumed that receptors have equal access to the entire Site. Therefore, the concentration to which a person is most likely to be exposed should represent a reasonable exposure concentration (i.e., not an individual point exposure based on a single sample, for example). The preferred Exposure Point Concentration (EPC) as defined in MTCA guidance is the 95th percentile upper confidence limit on the arithmetic mean (95UCL) of both detected and non-detected analyte concentrations.

Exposure point concentrations calculated for each of the Site contaminants of interest were compared to the MTCA modified Method B CULs for contaminants of potential concern as detailed in the risk assessment. These screening results are provided in Table 7 and summarized below.

4.3.1 PROPERTY RECEPTORS

Potential contaminant exposures on the Property are attributed to incidental ingestion of soil and inhalation of volatiles intruding into indoor air from soil. Current and future occupational workers, retail customers, and future construction and excavation workers were identified as the potential Property receptors. The MTCA screening demonstrated that representative contaminant concentrations (EPCs) are below the modified Method B CULs and therefore no unacceptable human health impacts are anticipated for these receptors through the direct contact pathway, although vapor intrusion into indoor air (an indirect pathway) presents potential risks depending on which data set is used.

The Risk Characterization for current and future occupational workers and retail customers is summarized as follows:

- No unacceptable cancer or noncancer health effects are anticipated from incidental ingestion of soil. The ECRs of 2E-10 (occupational worker) and 5E-13 (retail customer) and the noncancer Hazard Indices (His) of 0.02 (occupational worker) and 0.01 (retail customer) did not exceed the regulatory standard of ECR ≤ 1E-06 and HI = 1, respectively.
- MTCA modified Method B CULs for soil gas were screened against all soil gas data collected on the Property in March 2014 (seven locations including “worst case” samples collected from zones of greatest contaminant concentrations) as well as a sub-set of three soil gas samples (SG-1, SG-2, and SG-7) collected nearest the existing Property building.
    - When the EPCs for the entire seven-sample soil gas data set (SG-1 through SG-7) were screened against MTCA modified Method B CULs, both the ECRs and the HIs for these receptors exceeded the regulatory standards. For the occupational worker the ECR was calculated to be 7E-03 and the HI 250, with all constituents exceeding their respective CULs. The ECR for the retail customer was calculated to be 8E-05 and the HI was 17, with benzene, ethyl benzene 1,2,4-Trimethylbenzene and gasoline (TPH-Gx) exceeding the MTCA

modified Method B CULs. This scenario represents potential vapor intrusion risks for the entire Property, including all "developable areas" and is unlikely to be representative of soil gas conditions beneath the current Property building.

- In order to better represent current Property building conditions, three of the seven soil gas samples (SG-1, SG-2, and SG-7) were collected adjacent to the existing retail store/restaurant building. Among these three samples, the maximum vapor concentration detected was screened against the MTCA Modified Method B CULs. Using this soil gas data, no unacceptable health risks are identified for vapor intrusion with regard to occupational workers or retail customers. Under these current building conditions, the ECRs of 5E-07 (occupational worker) and 7E-09 (retail customer) and the HIs of 0.009 (occupational worker) and 0.002 (retail customer) did not exceed the regulatory standard of ECR ≤ 1E-06 and HI = 1.
- One of the seven soil gas samples (SG-3) was collected on the northern portion of the Property, immediately adjacent to known soil gasoline contamination and approximately 10 feet south of a neighboring commercial building which is currently used as an automotive repair shop. Soil gas concentrations at SG-3 exceed modified Method B CULs for vapor intrusion. However, risk characterization was not conducted specifically for the adjacent (off-Property) auto repair building since similar gasoline-related chemicals are likely to be routinely used by workers at that auto repair facility, which should exempt that facility from Ecology's vapor intrusion assessment guidance (Section 4.3.2.2.).

The risk characterization for future Property Construction and Excavation/Trench Workers is summarized below.

- No unacceptable excess cancer risk or noncancer health impacts were identified for the future Construction Worker. The total ECR from exposure to site related surface soils was 2E-09 and the HI was calculated to be 0.01. Neither of these values exceed the regulatory standard of ECR ≤ 1E-06 and HI = 1, respectively.
- No unacceptable excess cancer risk or noncancer health impacts were identified for the future Excavation/ Trench Worker. The total ECR from exposure to site related surface soils was 2E-10 and the HI was calculated to be 0.00005. Neither of these values exceed the regulatory standard of ECR ≤ 1E-06 and HI = 1, respectively.

4.3.2 OFF-PROPERTY RECEPTORS

4.3.2.1 RIGHT OF WAY (16TH AVENUE)

Soil gasoline impacts originating at the Property extend beyond the Property boundary to the east, beneath a small portion of the adjacent 16th Avenue roadway. Potential contaminant exposures at the ROW are attributed to incidental ingestion and dermal contact with soil by (future) excavation/trench workers and roadway maintenance workers. The risk screening determined that none of the EPCs exceeded their respective MTCA modified Method B CULs for

these receptors. Therefore, no unacceptable human health impacts are anticipated for the ROW receptor.

The risk characterization for the future Right-of-Way Excavation/Trench Worker is summarized below.

- No unacceptable excess cancer risk or noncancer health impacts were identified for the future Excavation/Trench Worker. The total ECR from exposure to site related surface soils was 2E-12 and the HI was calculated to be 0.0000002. Neither of these values exceed the regulatory standard of ECR ≤ 1E-06 and HI = 1, respectively.
- No COIs were identified in the surface soil of the ROW (extending to three feet bgs). Therefore, the exposure pathway for the current and future highway maintenance worker is incomplete. No unacceptable excess cancer risks or noncancer health impacts are expected for this receptor.

4.3.2.2 Adjacent Automotive Repair Shop

Soil gas sampling at the SG-3 location identified gasoline and benzene concentrations exceeding modified Method B screening levels. It is likely that workers in the adjacent automotive repair shop building are routinely exposed to the same gasoline-related chemicals (as are being addressed at the subject Property) during their normal job activities. Since the chemicals used in such a workplace are likely to include the same gasoline substances identified as COIs at the subject Property, the source and significance of sub-slab vapors (if present) could be difficult to establish. Furthermore, Ecology's soil vapor intrusion guidance likely does not apply to such a facility where gasoline-related chemicals are routinely used (Ecology 2009).

4.4 POINTS OF COMPLIANCE

According to Ecology guidance, the soil point of compliance is the point or points where the Site soil cleanup levels (identified in Section 4.2 above) must be attained. A soil point of compliance has been determined in accordance with the regulatory requirements contained within WAC 173-340-740(6), as follows:

- Soil cleanup levels based on human exposure via occupational direct contact from soil are limited to the zone from the ground surface extending to a depth of 15 feet. Direct contact exposures based on MTCA modified Method B CULs do not present unacceptable risks according to the Site-specific risk assessment, and therefore no soil remedial action appears necessary to address the direct contact pathway. As a practical matter, limited soil removal may be appropriate for addressing the vapor intrusion pathway (see below).
- Soil cleanup levels based on human exposure to vapors migrating to indoor air will be limited to the uppermost five feet of soil since (1) groundwater is not involved and no vapor migration from groundwater is attributed to the Site gasoline source, and (2) shallow soil gas within this uppermost five foot zone is representative of upward-migrating vapors originating from Site-related soil contamination. This

upper five feet of the soil column is most appropriate for soil gas compliance sampling based on the vapor intrusion route of exposure.

- At the current Property building location, sub-slab vapor sampling (and possibly indoor/ambient outdoor vapor sampling if sub-slab vapor concentrations exceed MTCA modified Method B screening levels) is most appropriate if Ecology believes that compliance monitoring is necessary (no risks are anticipated for the current building based on risk characterization (Table 7)).
- At other developable portions of the Site where no buildings currently exist (limited to the parking lot west of the county setback line) but where potential vapor intrusion risks exist for a future building scenario, soil gas sampling at five foot depths is most appropriate for compliance monitoring.
- Deeper soils extending within some or all of the identified zone of Site contamination may require treatment or removal in order to achieve regulatory compliance, based on the soil vapor intrusion exposure pathway, since residual gasoline contamination in soils extending to depths of approximately 14 feet represents a continuing source of vapors. Compliance soil sampling is not required to address the MTCA modified Method B soil vapor CULs, although as a practical matter post-treatment/post-removal soil sampling may be a useful tool for evaluating the degree to which contaminated soils affecting the vapor CULs are likely to have been remediated.

- Soil cleanup levels based on leaching (protection of groundwater) do not apply because Site soil impacts are limited to within approximately 14 feet of the ground surface and are isolated from vicinity groundwater by over 35 feet of non-contaminated soils.
- Soil cleanup levels based on protection of ecological receptors (the "environment") do not apply because ecological receptors are unlikely to exist in significant numbers at the highly urbanized and paved Site and Site vicinity.

5 CONCLUSIONS AND RECOMMENDATIONS

Site characterization appears complete and indicates gasoline impacts are limited to soils located north and northeast of the former UST cavity, extending east of the Property boundary beneath a portion of the adjacent sidewalk and 16th Avenue roadway. The vertical extent of contaminants is limited to vadose-zone soils between approximately three and 14 feet bgs. Groundwater has not been encountered to maximum depths of 50 feet bgs at the Property, consistent with expectations for local water table conditions. Regionally, first-occurring groundwater is anticipated at depths near 100 feet bgs. Groundwater is not expected to be impacted by the gasoline release originating at the Property.

Soil gas data were also collected at developable portions of the Site, in accordance with Ecology's Tier I Vapor Intrusion Assessment guidance. Gasoline vapors exceeding screening criteria are located within 100 feet of current and possible future Site building locations.

As discussed with and approved by Ecology, the MTCA modified Method B approach was used for developing site-specific cleanup levels for Site soil and soil gas. Representative exposure point concentrations were calculated for functional portions of the Site, including the subject Property and the adjacent 16th Avenue ROW. These EPCs were screened against the MTCA modified Method B cleanup values, and risk characterization tasks were conducted to quantify human health risks for carcinogens and noncarcinogens. Potential human health risks were characterized for the following current and reasonably likely future Site receptors:

- Current and future occupational worker
- Current and future retail customer
- Future construction worker
- Future trenchworker (Property and 16th Avenue ROW)
- Future roadway maintenance worker

5.1 RISK CHARACTERIZATION AND CLEANUP IMPLICATIONS

Table 7 summarizes risk characterization conclusions, which indicate that gasoline and related contaminants in soil are below site-specific MTCA modified Method B CULs and therefore, no unacceptable risks were identified for Site soils based on anticipated non-residential direct-contact exposure scenarios. Soil gas vapor concentrations exceed the MTCA modified Method B CULs and potential vapor intrusion from gasoline impacts may therefore represent a cleanup requirement at the Site. This conclusion may not apply to current building conditions and is based on worst-case soil vapor data which is most applicable in the event that a future building is constructed over highly-contaminated Site soils. Developable areas at the Site where a future building could feasibly be located are limited to a portion of the subject Property west of the King County building setback line.

The risk characterization indicates that under current Site conditions, unacceptable vapor intrusion risks are not anticipated because:

- Soil gas concentrations adjacent to the current Property building are below MTCA modified Method B CULs and do not appear likely to cause unacceptable vapor intrusion conditions.
- The neighboring automotive repair facility, although located within 100 feet of Plaid-related soil impacts, is unlikely to be subject to Ecology's published vapor intrusion assessment criteria because of the nature of volatile chemicals (including but not limited to gasoline) typically used in similar facilities.
- No buildings are located or are anticipated at other portions of the Site, including the 16th Avenue ROW.

Although contaminated soil on the Property is the source of identified soil vapors and some portion of these Property soils may require treatment or removal to be protective of future Property use and redevelopment and to satisfy Ecology cleanup requirements, it is premature to

specify Site cleanup details at this time. Based on these conclusions, the area potentially requiring cleanup is illustrated schematically on Figure 11.

No other cleanup requirements have been identified based on the MTCA modified Method B CULs and Site-specific risk assessment.

We recommend the findings of this report be evaluated and discussed in consultation with Ecology.

6 LIMITATIONS

EES has prepared this report for use by Plaid Pantries and its agents. This report may be made available to other parties and to regulatory agencies at the discretion of Plaid. This report is not intended for use by others and the information contained herein is not applicable to other sites.

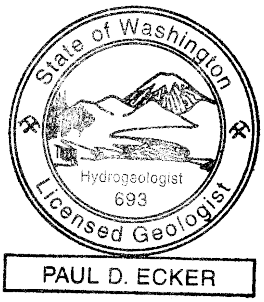
Our interpretation of subsurface conditions and risk criteria is based on field observations and chemical analytical data within the areas explored. Areas with contamination may exist in portions of the Site that were not explored or analyzed.

Within the limitations of scope, schedule, and budget, our services have been executed in accordance with generally accepted practices and laws, rules, and regulations at the time that the report was prepared. No other conditions, expressed or implied, should be understood.

EES ENVIRONMENTAL CONSULTING, INC.

Chris Rhea, LG
Geologist

Paul Ecker, LHG
President



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Tables

TABLE 1
Soil Analytical Results - Gasoline and Related Constituents (mg/Kg)
Plaid Pantry #324
White Center/King County, Washington

Sample Identification	Sample Depth (feet bgs)	Date Sampled	Gasoline Range Organics (GRO)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Methyl t-butyl ether	1,2-Dibromoethane	1,2-Dichloroethane	Naphthalene	Hexane	Total Lead
S-1	16	05/04/2006	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
S-2	16	05/04/2006	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
S-3	16	05/04/2006	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
S-4	8	05/04/2006	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
S-5	8	05/04/2006	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
S-6	8	05/04/2006	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
S-7	8	05/04/2006	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
S-8	8	05/04/2006	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
S-9	8	05/04/2006	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
S-10	4	05/04/2006	310	0.23	0.85	2.0	16	-	-	-	-	-	-
B1-5	5	11/12/2007	1,400	4.8	92	55	580	0.050 U	0.050 U	0.050 U	13	-	8.0
B1-8	8	11/12/2007	11	0.030 U	0.050 U	0.050 U	0.21	0.050 U	0.050 U	0.050 U	0.050 U	-	2.4
B1-23	23	11/12/2007	50	0.29	6.2	3.8	60	0.050 U	0.050 U	0.050 U	3.2	-	-
B2-9	9	11/12/2007	2.0 U	0.030 U	0.050 U	0.050 U	0.15 U	0.050 U	0.050 U	0.050 U	0.050 U	-	2.5
B3-8	8	11/12/2007	390	0.86	28	21	136	0.050 U	0.050 U	0.050 U	5.0 U	-	4.1
B4-5	5	11/12/2007	2.0	0.030 U	0.065	0.059	0.30	0.050 U	0.050 U	0.050 U	0.057	-	2.6
B4-8	8	11/12/2007	2.0 U	0.030 U	0.050 U	0.050 U	0.15 U	0.050 U	0.050 U	0.050 U	0.050 U	-	-
B-5@4	4	07/16/2008	1,300	0.80 U	4.2	12	120	-	-	-	-	-	-
B-5@7	7	07/16/2008	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
B-5@12	12	07/16/2008	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
B-5@17	17	07/16/2008	2.0 U	-	-	-	-	-	-	-	-	-	-
B-5@22	22	07/16/2008	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
B-5@28	28	07/16/2008	2.0 U	-	-	-	-	-	-	-	-	-	-
B-5@34	34	07/16/2008	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
B-5@39	39	07/16/2008	2.0 U	-	-	-	-	-	-	-	-	-	-
B6@4	4	07/17/2008	1,500	1.5	65	12	250	-	-	-	-	-	-
B6@9	4	07/17/2008	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
B7@4	4	07/16/2008	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
B-7@8	8	07/16/2008	580 U	0.50	6.1	9.2	38	-	-	-	-	-	-
B-7@11	11	07/16/2008	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
B-7@19	19	07/16/2008	2.0 U	-	-	-	-	-	-	-	-	-	-
B-7@21	21	07/16/2008	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
B-7@26	26	07/16/2008	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
B-7@34	34	07/16/2008	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
B-7@39	39	07/16/2008	2.0 U	-	-	-	-	-	-	-	-	-	-
B-8@6	6	07/17/2008	1,200	0.73	16	17	150	-	-	-	-	-	-
B-8@9	9	07/17/2008	18	0.03	1.0	0.50	0.78	-	-	-	-	-	-
B-9@5	5	07/17/2008	950	1.5	42	14	120	-	-	-	-	-	-
B-9@10	10	07/17/2008	2,100	9.9	99	31	200	-	-	-	-	-	-
B-9@12	12	07/17/2008	2.0 U	0.020 U	0.030	0.020 U	0.060 U	-	-	-	-	-	-
B-10@4	4	07/15/2008	8	0.060	0.22	0.17	0.92	-	-	-	-	-	-
B10@6	6	07/15/2008	6	0.070	0.40	0.24	0.74	-	-	-	-	-	-
B-10@10	10	07/15/2008	76	0.020 U	0.45	0.57	3.9	-	-	-	-	-	-
B-10@14.5	14.5	07/15/2008	19	0.020 U	0.17	0.15	0.97	-	-	-	-	-	-
B-10@19	19	07/15/2008	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
B-10@20-30	20-30	07/15/2008	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
B-10@31	31	07/16/2008	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
B-10@39.5	39.5	07/16/2008	2.0 U	-	-	-	-	-	-	-	-	-	-
B-12@4	4	07/17/2008	150	0.020 U	0.27	0.020 U	3.6	-	-	-	-	-	-
B-12@8	8	07/17/2008	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
B-13@5	5	07/17/2008	140	0.020 U	1.8	1.6	11	-	-	-	-	-	-
B-13@12	12	07/17/2008	3.0	0.12	0.26	0.060	0.3	-	-	-	-	-	-
B-15/4	4	04/22/2009	2.0 U	0.030 U	0.050 U	0.050 U	0.15 U	0.050 U	0.050 U	0.050 U	0.050 U	0.25 U	-
B-15/8	8	04/22/2009	2.0 U	0.030 U	0.050 U	0.050 U	0.15 U	0.050 U	0.050 U	0.050 U	0.050 U	0.25 U	-
B-15/12	12	04/22/2009	2.0 U	0.030 U	0.050 U	0.050 U	0.15 U	0.050 U	0.050 U	0.050 U	0.050 U	0.25 U	-
B-16/4	4	04/22/2009	2.0 U	0.030 U	0.050 U	0.050 U	0.15 U	-	-	-	0.050 U	0.25 U	-
B-16/8	8	04/22/2009	120	0.030 U	0.050 U	0.33	0.98	-	-	-	1.0	0.25 U	-

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White Center/King County, Washington

Sample Identification	Sample Depth (feet bgs)	Date Sampled	Gasoline Range Organics (GRO)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Methyl t-butyl ether	1,2-Dibromoethane	1,2-Dichloroethane	Naphthalene	Hexane	Total Lead
B-16/11	11	04/22/2009	2.0 U	0.030 U	0.050 U	0.050 U	0.15 U	-	-	-	0.050 U	0.25 U	-
B-17/4	4	04/22/2009	2.0 U	0.030 U	0.050 U	0.050 U	0.15 U	-	-	-	0.050 U	0.25 U	-
B-17/7	7	04/22/2009	46	0.030 U	0.050 U	0.060	0.15 U	-	-	-	0.32	0.25 U	-
B-17/10	10	04/22/2009	90	0.030 U	0.050 U	0.050 U	0.15 U	-	-	-	0.050 U	0.25 U	-
B-17/13	13	04/22/2009	2.0 U	0.030 U	0.050 U	0.050 U	0.15 U	-	-	-	0.050 U	0.25 U	-
B-18/4	4	04/22/2009	54	0.030 U	0.050 U	0.050 U	0.15 U	0.050 U	0.005 U	0.050 U	0.092	0.25 U	-
B-18/8	8	04/22/2009	2.0 U	0.030 U	0.050 U	0.050 U	0.15 U	0.050 U	0.050 U	0.050 U	0.050 U	0.25 U	-
B-18/12	12	04/22/2009	2.0 U	0.030 U	0.050 U	0.050 U	0.15 U	0.050 U	0.050 U	0.050 U	0.050 U	0.25 U	-
B-19/4	4	04/22/2009	2.0 U	0.030 U	0.050 U	0.050 U	0.15 U	0.050 U	0.050 U	0.050 U	0.050 U	0.25 U	-
B-19/8	8	04/22/2009	2.0 U	0.030 U	0.050 U	0.050 U	0.15 U	0.050 U	0.050 U	0.050 U	0.050 U	0.25 U	-
B-19/12	12	04/22/2009	2.0 U	0.030 U	0.050 U	0.050 U	0.15 U	0.050 U	0.050 U	0.050 U	0.050 U	0.25 U	-
B-20/4	4	04/22/2009	2.0 U	0.030 U	0.050 U	0.050 U	0.15 U	0.050 U	0.050 U	0.050 U	0.050 U	0.25 U	-
B-20/6	6	04/22/2009	93	0.030 U	0.050 U	0.050 U	0.15 U	0.050 U	0.005 U	0.050 U	0.050 U	0.25 U	-
B-20/10	10	04/22/2009	2.0 U	0.030 U	0.050 U	0.050 U	0.15 U	0.050 U	0.050 U	0.050 U	0.050 U	0.25 U	-
B-21/4	4	04/22/2009	2.0 U	0.030 U	0.050 U	0.050 U	0.15 U	0.050 U	0.050 U	0.050 U	0.050 U	0.25 U	-
B-21/9	9	04/22/2009	2.0 U	0.030 U	0.050 U	0.050 U	0.15 U	0.050 U	0.050 U	0.050 U	0.050 U	0.25 U	-
B-22/4	4	04/22/2009	2.0 U	0.030 U	0.050 U	0.050 U	0.15 U	-	-	-	0.050 U	0.25 U	-
B-22/7	7	04/22/2009	93	0.030 U	0.050 U	0.12	0.10	-	-	-	0.32	0.25 U	-
B-23/5	5	04/22/2009	2.0 U	0.030 U	0.050 U	0.050 U	0.15 U	0.050 U	0.050 U	0.050 U	0.050 U	0.25 U	-
B-23/10	10	04/22/2009	2.0 U	0.030 U	0.050 U	0.050 U	0.15 U	0.050 U	0.050 U	0.050 U	0.050 U	0.25 U	-
B-24/4	4	11/10/2009	2.0	0.020 U	0.020	0.020 U	0.060 U	-	-	-	-	-	-
B-24/8	8	11/10/2009	990	0.50	15	17	96	-	-	-	-	-	-
B25/4	4	11/10/2009	2.0	0.020 U	0.020	0.020 U	0.060 U	-	-	-	-	-	-
B-25/8	8	11/10/2009	2.0 U	0.020 U	0.020 U	0.020 U	0.060 U	-	-	-	-	-	-
B-26/4	4	11/10/2009	27	0.23	0.15	0.76	3.8	-	-	-	-	-	-
B-26/8	8	11/10/2009	130	0.25	4.4	2.0	13	-	-	-	-	-	-
B-26/12	12	11/10/2009	17	0.60	0.99	0.37	2.0	-	-	-	-	-	-
B-27/4	4	11/11/2009	1,000	0.90	24	20	100	-	-	-	-	-	-
B-27/8	8	11/11/2009	12	0.020 U	0.21	0.17	1.1	-	-	-	-	-	-
B-27/12	12	11/11/2009	5.0	0.020 U	0.26	0.080	0.45	-	-	-	-	-	-
B-28/8	8	05/18/2011	1,420	3.38 J	51	21	126	-	-	-	-	-	-
B-28/13	13	05/18/2011	14	0.88 J	1.3	0.23	1.4	-	-	-	-	-	-
B-29/8	8	05/18/2011	1,420	0.57	32	27	147	-	-	-	-	-	-
B-29/16	16	05/18/2011	3.5 U	0.0088 UJ	0.076	0.033	0.20	-	-	-	-	-	-
ROW-1/3	3	08/22/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-1/9	9	08/22/2012	67	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-1/10	10	08/22/2012	780	0.020 U	0.050 U	1.6	3.9	-	-	-	-	-	-
ROW-1/15	15	08/22/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-2/3	3	08/22/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-2/3 (duplicate)	3	08/22/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-2/10	10	08/22/2012	200	0.020 U	0.050 U	0.24	0.28	-	-	-	-	-	-
ROW-2/16	16	08/22/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-2/18	18	08/22/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-3/3	3	08/22/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-3/9	9	08/22/2012	35	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-3/12	12	08/22/2012	300	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-3/18	18	08/22/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-4/3	3	08/23/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-4/10	10	08/23/2012	260	0.020 U	0.050 U	0.070	0.15 U	-	-	-	-	-	-
ROW-4/11	11	08/23/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-4/15	15	08/23/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-5/3	3	08/23/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-5/10	10	08/23/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-5/15	15	08/23/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-5/15 (duplicate)	15	08/23/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-6/3	3	08/23/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-6/8.5	8.5	08/23/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-6/10	10	08/23/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-6/16	16	08/23/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-

TABLE 1
Soil Analytical Results - Gasoline and Related Constituents (mg/Kg)
Plaid Pantry #324
White Center/King County, Washington

Sample Identification	Sample Depth (feet bgs)	Date Sampled	Gasoline Range Organics (GRO)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Methyl t-butyl ether	1,2-Dibromoethane	1,2-Dichloroethane	Naphthalene	Hexane	Total Lead
ROW-7/3	3	08/24/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-7/8	8	08/24/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-7/10	10	08/24/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-7/14	14	08/24/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-8/3	3	08/24/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-8/7	7	08/24/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-8/10	10	08/24/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-8/14	14	08/24/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-8/14 (duplicate)	14	08/24/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-8/16	16	08/24/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-9/3	3	08/24/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-9/7	7	08/24/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-9/10	10	08/24/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-9/15	15	08/24/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-10/3	3	08/24/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-10/8	8	08/25/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-10/10	10	08/25/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-10/15	15	08/25/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
ROW-10/15 (duplicate)	15	08/25/2012	10 U	0.020 U	0.050 U	0.050 U	0.15 U	-	-	-	-	-	-
B-32/CS-1 (5-5.5)	5-5.5	07/11/2013	5.9 U	0.015 U	0.059 U	0.029 U	0.088 U	-	-	-	-	-	-
B-32/CS-1 (7-7.5)	7-7.5	07/11/2013	4,210	0.29 U	20	62	318	-	-	-	-	-	-
B-32/CS-1 (9-9.5)	9-9.5	07/11/2013	11	0.014	1.0	0.28	1.3	-	-	-	-	-	-
B-32/CS-1 (11-11.5)	11-11.5	07/11/2013	10	0.020	1.3	0.43	0.61	-	-	-	-	-	-
B-33/CS-2 (5-5.5)	5-5.5	07/11/2013	5.0 U	0.013 U	0.050 U	0.025 U	0.075 U	-	-	-	-	-	-
B-33/CS-2 (7-7.5)	7-7.5	07/11/2013	1,700	1.0	21	26	117	-	-	-	-	-	-
B-33/CS-2 (9-9.5)	9-9.5	07/11/2013	42	0.48	4.0	0.67	4.0	-	-	-	-	-	-
B-33/CS-2 (11-11.5)	11-11.5	07/11/2013	23	0.61	3.7	0.33	2.0	-	-	-	-	-	-
B-34/CS-3 (5-5.5)	5-5.5	07/11/2013	2,660	1.1	51	45	282	-	-	-	-	-	-
B-34/CS-3 (7-7.5)	7-7.5	07/11/2013	2,900	6.5	146	49	295	-	-	-	-	-	-
B-34/CS-3 (9-9.5)	9-9.5	07/11/2013	13	0.80	1.4	0.21	1.3	-	-	-	-	-	-
B-34/CS-3 (11-11.5)	11-11.5	07/11/2013	36	2.6	4.2	0.70	3.4	-	-	-	-	-	-
B-35/CS-4 (5-5.5)	5-5.5	07/11/2013	5,960	6.3	170	108	623	-	-	-	-	-	-
B-35/CS-4 (7-7.5)	7-7.5	07/11/2013	3,700	8.3	159	57	332	-	-	-	-	-	-
B-35/CS-4 (9-9.5)	9-9.5	07/11/2013	29	1.7	3.6	0.53	3.1	-	-	-	-	-	-
B-35/CS-4 (11-11.5)	11-11.5	07/11/2013	327	2.2	0.70	4.4	2.0	-	-	-	-	-	-
B-37 (4.5-5)	4-4.5	03/05/2014	2,120 J	1.6 J	14 J	18 J	160 J	0.40 U	0.40 U	0.20 U	6.2 J	-	-
B-37A (23-23.5)	23-23.5	03/05/2014	4.6 UJ	0.012 U	0.046 U	0.023 U	0.069 U	0.046 U	0.046 U	0.023 U	0.092 U	-	-
B-38 (4.5-5)	4.5-5	03/05/2014	22 J	0.34 J	0.73 J	0.32 J	1.9 J	0.040 U	0.040 U	0.020 U	0.095 J	-	-
B-39 (7-7.5)	7-7.5	03/05/2014	5,970 J	11 J	96	122 J	234	0.71 U	0.71 U	0.36 U	22 J	-	-
B-40 (8-8.5)	8-8.5	03/05/2014	2,520 J	6.6 J	115	37 J	232 J	0.49 U	0.49 U	0.25 U	9.0 J	-	-
B-41 (8-8.5)	8-8.5	03/05/2014	2,910 J	0.45 J	51 J	49 J	286 J	0.59 U	0.59 U	0.30 U	9.6 J	-	-

Notes:

Volatile organic compounds (VOCs) by EPA Method 8260B

Gasoline range organics (GRO) by Method NWTPH-Gx

Total lead by EPA Method 6010

mg/Kg = Milligrams per kilogram (parts per million)

bgs = Below ground surface

U = Not detected at method reporting limit shown

UJ = Data Validation Qualifier. The analyte was analyzed for, but not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise. See corresponding data validation report for further explanation.

J = Data Validation Qualifier. The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample. See corresponding data validation report for further explanation.

- = Not measured

NA = Not applicable

TABLE 2

Soil Gas Analytical Results - (ug/m^3)

Plaid Pantry #324

White Center/King County, Washington

Sample Identification	Date Sampled	Gasoline Range Organics	Benzene	Toluene	Ethylbenzene	Total Xylenes	Hexane	1,3,5-Trimethyl-benzene	1,2,4-Trimethyl-benzene
SG-1	03/04/2014	1,000	4.8	5.3	5.2 U	10 U	22	5.9 U	5.9 U
SG-2	03/04/2014	940	6.6	9.1	5.1 U	10 U	15	5.8 U	5.8 U
SG-3	03/04/2014	82,000	260	5,000	1,900	13,000	1,800	1,200	3,000
SG-4	03/04/2014	700,000	2,400	18,000	9,300	41,000	18,000	18,000	34,000
SG-5	03/04/2014	8,600,000	100,000	480,000	97,000	560,000	250,000	29,000	86,000
SG-6	03/04/2014	2,000	12	16	5.5	29	47	5.7 U	5.7 U
SG-7	03/04/2014	1,500	8.9	9.4	5.2 U	10 U	37	5.9 U	5.9 U

Notes:

Data reported by EPA Method TO-15.

ug/m^3 = Micrograms per cubic meter of air

TABLE 3

Soil Analytical Results - Conventionals (mg/Kg)

Plaid Pantry #324

White Center/King County, Washington

Sample Identification	Sample Depth (feet bgs)	Date Sampled	Total Organic Carbon
B-37 (4.5-5)	4-4.5	03/05/2014	1,000
B-38 (4.5-5)	4.5-5	03/05/2014	420
B-39 (7-7.5)	7-7.5	03/05/2014	460
B-40 (8-8.5)	8-8.5	03/05/2014	370
B-41 (8-8.5)	8-8.5	03/05/2014	500

Notes:

Total Organic Carbon analyzed by SM 5310B MOD

mg/Kg = Milligrams per kilogram (parts per million)

bgs = below ground surface

TABLE 4

Soil Analytical Results - VPH and EPH (mg/Kg)

Plaid Pantry #324

White Center/King County, Washington

Sample Identification	B-37: 4.5-5	B-38: 8-8.5	B-39: 7-7.5	B-40: 8-8.5	B-41: 8-8.5
Sample Depth (feet bgs)	4.5-5	8-8.5	7-7.5	8-8.5	8-8.5
Collection Date	03/05/2014	03/05/2014	03/05/2014	03/05/2014	03/05/2014
VPH					
Aliphatic Hydrocarbon (C5-C6)	134 J	2.2 UJ	26 J	332 J	98 J
Aliphatic Hydrocarbon (C6-C8)	256 J	2.2 UJ	64 J	392 J	10 J
Aliphatic Hydrocarbon (C8-C10)	20 J	2.2 UJ	61 J	15 J	23 J
Aliphatic Hydrocarbon (C10-C12)	830 J	2.2 UJ	73 J	118 J	156 J
Aromatic Hydrocarbon (C8-C10)	427 J	2.2 UJ	163 J	573 J	668 J
Aromatic Hydrocarbon (C10-C12)	563 J	2.2 UJ	144 J	378 J	511 J
Aromatic Hydrocarbon (C12-C13)	724 J	2.2 UJ	54 J	127 J	284 J
Benzene	4.8 J	0.56 UJ	0.56 J	11 J	2.9 J
Toluene	30 J	0.56 UJ	9.6 J	133 J	71 J
Ethylbenzene	28 J	0.56 UJ	14 J	40 J	61 J
m,p-Xylene	153 J	0.56 UJ	48 J	192 J	279 J
o-Xylene	52 J	0.56 UJ	24 J	73 J	90 J
Naphthalene	26 J	0.56 UJ	6.1 J	15 J	22 J
Methyl tert-butyl ether	13 J	0.56 UJ	0.46 UJ	17 J	9.0 J
EPH					
Aliphatic Hydrocarbon (C8-C10)	43 J	5.4 UJ	113 J	76 J	62 J
Aliphatic Hydrocarbon (C10-C12)	60	5.4 U	34	27	35
Aliphatic Hydrocarbon (C12-C16)	142	5.4 U	20	15	43
Aliphatic Hydrocarbon (C16-C21)	33	5.4 U	5.7	5.5 U	9.8
Aliphatic Hydrocarbon (C21-C34)	5.3 U	5.4 U	5.6 U	5.5 U	5.4 U
Aromatic Hydrocarbon (C8-C10)	16	5.4 U	65	63	30
Aromatic Hydrocarbon (C10-C12)	9.5	5.4 U	29	29	14
Aromatic Hydrocarbon (C12-C16)	23	5.4 U	12	11	9.4
Aromatic Hydrocarbon (C16-C21)	28	5.4 U	7.7	7.0	7.5
Aromatic Hydrocarbon (C21-C34)	5.3 U	5.4 U	5.6 U	5.5 U	5.4 U

Notes:

VPH = Volatile Petroleum Hydrocarbons by NWVPH Method

EPH = Extractable Petroleum Hydrocarbons by NWEPH Method

mg/Kg = Milligrams per kilogram (parts per million)

bgs = Below ground surface

U = Not detected at method reporting limit shown

J = Data Validation Qualifier. The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

TABLE 5
Water Well Search
Plaid Pantry #324
White Center/King County, Washington

Well Log ID	Notice of Intent ID	Well Depth (Feet)	Well Diameter (Inches)	Water Encountered?	Screened Interval (Feet)	Stable Water Depth (Feet)	Well Owner Name	Township	Range	Range Direction	Section	Quarter Section	Quarter-Quarter Section	Well Completion Date	County	Well Type
WATER WELL																
518112	WE07336	192	6	Yes	180-190	135	John Coleman	23	4	E	23	NE	SW	1/15/2008	King	W
RESOURCE PROTECTION WELLS																
816956	SE45967	14	2.25	No	--	--	King County	23	4	E	6	SW	NW	8/23/2012	KING	R
816958	SE45967	18	2.25	No	--	--	King County	23	4	E	6	SW	NW	8/23/2012	KING	R
816960	SE45967	18	2.25	No	--	--	King County	23	4	E	6	SW	NW	8/23/2012	KING	R
816961	SE45967	18	2.25	No	--	--	King County	23	4	E	6	SW	NW	8/23/2012	KING	R
816963	SE45967	18	2.25	No	--	--	King County	23	4	E	6	SW	NW	8/23/2012	KING	R
816964	SE45967	16	2.25	No	--	--	King County	23	4	E	6	SW	NW	8/23/2012	KING	R
816966	SE45967	14	2.25	No	--	--	King County	23	4	E	6	SW	NW	8/24/2012	KING	R
816968	SE45967	20	2.25	No	--	--	King County	23	4	E	6	SW	NW	8/24/2012	KING	R
816970	SE45967	19	2.25	No	--	--	King County	23	4	E	6	SW	NW	8/24/2012	KING	R
816971	SE45967	15	2.25	No	--	--	King County	23	4	E	6	SW	NW	8/25/2012	KING	R
889635	SE48791	15	2.25	No	--	--	Louise Piacentini	23	3	E	1	NE	SE	7/15/2013	KING	R
889637	SE48791	15	2.25	No	--	--	Louise Piacentini	23	3	E	1	NE	SE	7/15/2013	KING	R
889639	SE48791	20	2.25	No	--	--	Louise Piacentini	23	3	E	1	NE	SE	7/15/2013	KING	R
889641	SE48791	16.5	2.25	No	--	--	Louise Piacentini	23	3	E	1	NE	SE	7/15/2013	KING	R
290690		10		No	--	--	SUN OIL, INC.	23	3	E	1	NE	SE		KING	R
290691		23.5		No	--	--	SUN OIL, INC.	23	3	E	1	NE	SE		KING	R
290692		23.5		No	--	--	SUN OIL, INC.	23	3	E	1	NE	SE		KING	R
862911	RE08305	8	8	No	--	--	Louise Placentini | EES	23	3	E	1	SE	NE	4/11/2013	KING	R
862913	RE08305	8	8	No	--	--	Louise Placentini | EES	23	3	E	1	SE	NE	4/11/2013	KING	R
862915	RE08305	10	8	No	--	--	Louise Placentini | EES	23	3	E	1	SE	NE	4/11/2013	KING	R
862917	RE08305	10	8	No	--	--	Louise Placentini | EES	23	3	E	1	SE	NE	4/11/2013	KING	R
634151	RE04136	8	2	No	--	--	Plaid Pantry	23	3	E	1	SE	NE	12/18/2009	KING	R
585276	SE04227	8	2	No	--	--	Plaid Pantry | PNG Environmental	23	3	E	1	SE	NE	4/22/2009	KING	R
585277	SE04227	8	2	No	--	--	Plaid Pantry | PNG Environmental	23	3	E	1	SE	NE	4/22/2009	KING	R
585278	SE04227	12	2	No	--	--	Plaid Pantry | PNG Environmental	23	3	E	1	SE	NE	4/22/2009	KING	R
585279	SE04227	12	2	No	--	--	Plaid Pantry | PNG Environmental	23	3	E	1	SE	NE	4/22/2009	KING	R
585280	SE04227	12	2	No	--	--	Plaid Pantry | PNG Environmental	23	3	E	1	SE	NE	4/22/2009	KING	R
585281	SE04227	12	2	No	--	--	Plaid Pantry | PNG Environmental	23	3	E	1	SE	NE	4/22/2009	KING	R
585282	SE04227	12	2	No	--	--	Plaid Pantry | PNG Environmental	23	3	E	1	SE	NE	4/22/2009	KING	R
585283	SE04227	15	2	No	--	--	Plaid Pantry | PNG Environmental	23	3	E	1	SE	NE	4/22/2009	KING	R
585285	SE04227	15	2	No	--	--	Plaid Pantry | PNG Environmental	23	3	E	1	SE	NE	4/22/2009	KING	R
585287	SE04227	15	2	No	--	--	Plaid Pantry | PNG Environmental	23	3	E	1	SE	NE	4/22/2009	KING	R
661290	R071002	15		No	--	--	RICHARD PIACENTIN	23	3	E	1	SE	NE	7/17/2008	KING	R
661292	R071002	15		No	--	--	RICHARD PIACENTIN	23	3	E	1	SE	NE	7/17/2008	KING	R
661272	R070910	10		No	--	--	RICHARD PIACENTINI	23	3	E	1	SE	NE	7/17/2008	KING	R
661274	R070910	10		No	--	--	RICHARD PIACENTINI	23	3	E	1	SE	NE	7/17/2008	KING	R
661276	R070910	10		No	--	--	RICHARD PIACENTINI	23	3	E	1	SE	NE	7/17/2008	KING	R
661278	R070910	10		No	--	--	RICHARD PIACENTINI	23	3	E	1	SE	NE	7/17/2008	KING	R

TABLE 5
Water Well Search
Plaid Pantry #324
White Center/King County, Washington

Well Log ID	Notice of Intent ID	Well Depth (Feet)	Well Diameter (Inches)	Water Encountered?	Screened Interval (Feet)	Stable Water Depth (Feet)	Well Owner Name	Township	Range	Range Direction	Section	Quarter Section	Quarter-Quarter Section	Well Completion Date	County	Well Type
RESOURCE PROTECTION WELLS (cont'd)																
661280	R070910	3		No	--	--	RICHARD PIACENTINI	23	3	E	1	SE	NE	7/18/2008	KING	R
661282	R070910	8		No	--	--	RICHARD PIACENTINI	23	3	E	1	SE	NE	7/18/2008	KING	R
661284	R070910	8		No	--	--	RICHARD PIACENTINI	23	3	E	1	SE	NE	7/18/2008	KING	R
661286	R070910	8		No	--	--	RICHARD PIACENTINI	23	3	E	1	SE	NE	7/18/2008	KING	R
661288	R070910	8		No	--	--	RICHARD PIACENTINI	23	3	E	1	SE	NE	7/18/2008	KING	R
773771	RE06637	20	10	No	--	--	T C Buddy Investment LLC	23	3	E	1	SE	SE	1/3/2012	KING	R
773773	RE06637	20		No	--	--	T C Buddy Investment LLC	23	3	E	1	SE	SE	1/3/2012	KING	R
773774	RE06637	20	10	No	--	--	T C Buddy Investment LLC	23	3	E	1	SE	SE	1/3/2012	KING	R
755249	SE43463	5	2.25	No	--	--	TC Buddy Investments	23	3	E	1	SE	SE	8/23/2011	KING	R
755251	SE43463	15	2.25	No	--	--	TC Buddy Investments	23	3	E	1	SE	SE	8/23/2011	KING	R
755253	SE43463	14	2.25	No	--	--	TC Buddy Investments	23	3	E	1	SE	SE	8/23/2011	KING	R
755255	SE43463	15	2.25	No	--	--	TC Buddy Investments	23	3	E	1	SE	SE	8/23/2011	KING	R
755257	SE43463	12	2.25	No	--	--	TC Buddy Investments	23	3	E	1	SE	SE	8/23/2011	KING	R
755334	EE03565	15	2.25	Yes	14-15	14	TC Buddy Investments	23	3	E	1	SE	SE	8/23/2011	KING	R
755336	EE03565	15	2.25	Yes	13-15	13.1	TC Buddy Investments	23	3	E	1	SE	SE	8/23/2011	KING	R
755338	EE03565	15	2.25	Yes	11-15	9.3	TC Buddy Investments	23	3	E	1	SE	SE	8/23/2011	KING	R
755340	EE03565	15	2.25	Yes	12-15	12.4	TC Buddy Investments	23	3	E	1	SE	SE	8/23/2011	KING	R
755342	EE03565	12	2.25	Yes	10-12	--	TC Buddy Investments	23	3	E	1	SE	SE	8/23/2011	KING	R
730910	SE09857	3	6	No	--	--	King County	23	4	E	6	NW	SW	5/17/2011	KING	R
730912	SE09857	3	6	No	--	--	King County	23	4	E	6	NW	SW	5/17/2011	KING	R
730914	SE09857	3	6	No	--	--	King County	23	4	E	6	NW	SW	5/17/2011	KING	R
730916	SE09857	3	6	No	--	--	King County	23	4	E	6	NW	SW	5/17/2011	KING	R
730918	SE09857	3	6	No	--	--	King County	23	4	E	6	NW	SW	5/17/2011	KING	R
730920	SE09857	3	6	No	--	--	King County	23	4	E	6	NW	SW	5/17/2011	KING	R
730922	SE09857	3	6	No	--	--	King County	23	4	E	6	NW	SW	5/17/2011	KING	R
730924	SE09857	3	6	No	--	--	King County	23	4	E	6	NW	SW	5/17/2011	KING	R
110498	R027059	50		No	6-21/20-50*	--	TIME OIL CO	23	4	E	6	NW	SW	1/10/1996	KING	R
110499	R027059	30		No	20-30	--	TIME OIL CO	23	4	E	6	NW	SW	1/10/1996	KING	R
110500	R027059	30		No	20-30	--	TIME OIL CO	23	4	E	6	NW	SW	1/10/1996	KING	R
110501	R027059	10		No	5-10	--	TIME OIL CO	23	4	E	6	NW	SW	1/11/1996	KING	R
108603	R018099	10		No	5-10	--	WHITE CENTER (SHELL)	23	4	E	6	NW	SW		KING	R

Notes:
* = Borehole completed with two distinct wells screened at unique intervals, as reported.

TABLE 6
MTCA Modified Method B CULs
Former Plaid Pantry #324
White Center/King County, Washington

COPC	CASN	c/nc	COFi)	CPFo	IUR	CPFi	RfD	RfC	RfDi	Occupational Worker			Trenchworker			Retail Customer			Highway Maintenance			Construction Worker			**MTCA B DEFAULT**		
										Direct Contact	Vapor Intrusion Pathway		Direct Contact	Vapor Intrusion Pathway		Direct Contact	Vapor Intrusion Pathway		Direct Contact	Vapor Intrusion Pathway		Direct Contact	Vapor Intrusion Pathway		Direct Contact	Vapor Intrusion Pathway	
										Soil[3] (mg/Kg)	Indoor Air CUL[4] (ug/m^3)	Soil Gas CUL[5] (ug/m^3)	Soil (mg/Kg)	Indoor Air CUL (ug/m^3)	Soil Gas CUL (ug/m^3)	Soil (mg/Kg)	Indoor Air CUL (ug/m^3)	Soil Gas CUL (ug/m^3)	Soil (mg/Kg)	Indoor Air CUL (ug/m^3)	Soil Gas CUL (ug/m^3)	Soil (mg/Kg)	Indoor Air CUL (ug/m^3)	Soil Gas CUL (ug/m^3)	Soil (mg/Kg)	Indoor Air CUL (ug/m^3)	Soil Gas CUL (ug/m^3)
1,2-Dibromoethane (EDB)	106-93-4	c	2	2 0E+00	6.0E-04	2.1E+00	9.0E-03		2 6E-03	2.3E+02	2 2E-02	2.2E-01	7 0E+02	NA	NA	8.1E+04	1 8E+01	1.8E+02	7.0E+02	NA	NA	2.5E+01	NA	NA	5.0E-01	4.8E-03	4.8E-02
1,2-Dichloroethane	107-06-2	c	2	9.1E-02	2.6E-05	9.1E-02	2.0E-02	7 0E-03	2 0E-03	5.1E+03	5.1E-01	5.1E+00	1.5E+04	NA	NA	1 8E+06	8.1E+02	8.1E+03	1.5E+04	NA	NA	5.6E+02	NA	NA	1.1E+01	2.2E-01	2.2E+00
Benzene	71-43-2	c	2	5.5E-02	7.8E-06	2.7E-02	4.0E-03		8 6E-03	8.4E+03	1.7E+00	1.7E+01	3 5E+04	NA	NA	2 9E+06	2.7E+03	2.7E+04	3.5E+04	NA	NA	9.2E+02	NA	NA	1 8E+01	7.3E-01	7.3E+00
Ethylbenzene	100-41-4	c	2	1.1E-02	2.5E-06	8.8E-03	1.0E-01		2 9E-01	4.2E+04	5.3E+00	5 3E+01	1 8E+05	NA	NA	1 5E+07	8.4E+03	8.4E+04	1.8E+05	NA	NA	4.6E+03	NA	NA	8 0E+03	2.3E+00	2.3E+01
Hexane		nc					6.0E-02		2 0E-01	3.7E+05	3.1E+03	3.1E+04	1 5E+06	NA	NA	1 3E+08	2 2E+06	2.2E+07	1.5E+06	NA	NA	4.1E+04	NA	NA	4 8E+03	3.2E+02	3.2E+03
Methyl-tert-butyl ether	1634-04-4	c	2	1.8E-03	2.6E-07	9.1E-04			8 6E-01	2.6E+05	5.1E+01	5.1E+02	7 8E+05	NA	NA	9 0E+07	8.1E+04	8.1E+05	7.8E+05	NA	NA	NA	NA	NA	4.4E+02	2.2E+01	2.2E+02
Naphthalene	91-20-3	c	2		3.4E-05	1.2E-01	2.0E-02	3 0E-03	8 6E-04	1.2E+05	0.0E+00	1 3E+02	4 6E+05	NA	NA	4 3E+07	9 3E+03	9.3E+04	4.6E+05	NA	NA	1.4E+04	NA	NA	1 6E+03	1.4E+00	1.4E+01
Xylenes	95-47-6	nc	2				2.0E-01		2 9E-02	1.2E+06	4.4E+02	4.4E+03	5 2E+06	NA	NA	4 3E+08	3.1E+05	3.1E+06	5.2E+06	NA	NA	1.9E+05	NA	NA	1 6E+04	4.6E+01	4.6E+02
Toluene	108-88-3	nc	2				8.0E-02	5.0E+00	1.4E+00	4.9E+05	2.2E+04	2 2E+05	2.1E+06	NA	NA	1.7E+08	1 5E+07	1.5E+08	1.9E+06	NA	NA	5.4E+04	NA	NA	6.4E+03	2.3E+03	2.3E+04
1,2,4-Trimethylbenzene	95-63-6	nc	2						2 0E-03	NA	3.1E+01	3.07E+02	NA	NA	NA	NA	2 2E+04	2.2E+05	NA	NA	NA	NA	NA	NA	NA	3.2E+00	3.2E+01
1,3,5-Trimethylbenzene	108-67-8	nc	2				5.0E-02		1.7E-03	3.1E+05	2.6E+01	2 6E+02	1 3E+06	NA	NA	1.1E+08	1 8E+04	1.8E+05	1.2E+06	NA	NA	3.4E+04	NA	NA	4 0E+03	2.7E+00	2.7E+01
TPH-G[2]		na	2							2.8E+04	1.7E+04	1.7E+05	>MAX	NA	NA	4 8E+04	7 6E+05	7.6E+06	>MAX	NA	NA	6.5E+03	NA	NA	2 9E+03	2.6E+02	2.6E+03

NOTES:

COPC = Chemical of Potential Concern

CASN = Chemical Abstract Service (Registration) Number

IUR = Inhalation Unit Risk (ug/m^3)$^{-1}$

CPF = Inhalation Cancer Potency Factor (mg/kg-day)$^{-1}$

RfC = Inhalation Reference Concentration (ug/m^3)

RfDi = Inhalation Reference Dose (mg/kg-day)

ug/m^3 = Micrograms per cubic meter

mg/kg = Milligrams per kilogram

na = not applicable

>MAX = concentration exceeds maximum saturation level

[2] TPH calculations for soil done using MTCATPH 11.1; TPH calculations for air and soil gas done using RBDMTPH11a

[3] Soil Direct Contact calculated using Equations 740-1 (noncarcinogens) and 740-2 (carcinogens) for occupational workers and retail customers. Soil ingestion and dermal contact calculated using Equations 740-3 (noncarciongens) or 740-4 (carcinogens) for trenchworkers and highway maintenance workers as defined by MTCA

[4] Indoor Air CUL calculated using Equations 750-1(noncarcinogens) or 750-2 (carcinogens) defined by MTCA

[5] Soil Gas CUL = (Indoor Air CUL/0.1)

TABLE 7
Risk Characterization
Former Plaid Pantry #324
White Center/King County, Washington

COPC	Occupational Worker													
	Direct Contact with Surface Soil					Vapor Intrusion via soil gas[1]					Vapor Intrusion via soil gas[2]				
	EPC	MTCA modified B	COC?	Potential Risk	NOTE	EPC	MTCA modified B	COC?	Potential Risk	NOTE	EPC	MTCA modified B	COC?	Potential Risk	NOTE
Benzene	4.4E-01	8.4E+03	no	5E-11	ECR	1.0E+05	1.7E+01	**YES**	6E-03	ECR	8.9E+00	1.7E+01	no	5E-07	ECR
Ethylbenzene	5.6E+00	4.2E+04	no	1E-10	ECR	4.3E+04	5.3E+01	**YES**	8E-04	ECR	NA	5.3E+01	NA	NA	ECR
Hexane	NA	3.7E+05	NA	NA	HI	2.5E+05	6.1E+04	**YES**	4.1	HI	3.7E+01	6.1E+04	no	0.0	HI
Naphthalene	2.0E+00	1.2E+05	no	0.00002	HI	NA	2.6E+02	NA	NA	NA	NA	2.6E+02	NA	NA	NA
Xylenes	5.8E+01	1.2E+06	no	0.00005	HI	2.0E+05	8.9E+03	**YES**	22.6	HI	NA	8.9E+03	NA	NA	HI
Toluene	1.1E+01	4.9E+05	no	0.00002	HI	4.8E+05	4.4E+05	**YES**	1.1	HI	9.4E+00	4.4E+05	no	0.0	HI
1,2,4-Trimethylbenzene	NA	NA	NA	NA	HI	8.6E+04	6.1E+02	**YES**	140.2	HI	NA	6.1E+02	NA	NA	HI
1,3,5-Trimethylbenzene	NA	3.1E+05	NA	NA	HI	1.7E+04	5.2E+02	**YES**	31.9	HI	NA	5.2E+02	NA	NA	HI
TPH-G[2]	5.6E+02	2.8E+04	no	0.02	HI	8.6E+06	1.7E+05	**YES**	50.6	HI	1.5E+03	1.7E+05	no	0.0	HI

COPC	Retail Customer													
	Direct Contact with Surface Soil					Vapor Intrusion via soil gas[1]					Vapor Intrusion via soil gas[2]				
	EPC	MTCA modified B	COC?	Potential Risk	NOTE	EPC	MTCA modified B	COC?	Potential Risk	NOTE	EPC	MTCA modified B	COC?	Potential Risk	NOTE
Benzene	4.4E-01	2.9E+06	no	1E-13	ECR	1.0E+05	1.3E+03	**YES**	7E-05	ECR	8.9E+00	1.3E+03	no	7E-09	ECR
Ethylbenzene	5.6E+00	1.5E+07	no	4E-13	ECR	4.3E+04	4.2E+03	**YES**	1E-05	ECR	NA	4.2E+03	NA	NA	ECR
Hexane	NA	1.3E+08	NA	NA	HI	2.5E+05	2.2E+06	no	0.12	HI	3.7E+01	2.2E+06	no	0.00	HI
Naphthalene	2.0E+00	4.3E+07	no	5E-08	HI	NA	9.3E+03	NA	NA	HI	NA	9.3E+03	NA	NA	HI
Xylenes	5.8E+01	4.3E+08	no	1E-07	HI	2.0E+05	3.1E+05	no	0.64	HI	NA	3.1E+05	NA	NA	HI
Toluene	1.1E+01	1.7E+08	no	6E-08	HI	4.8E+05	1.5E+07	no	0.03	HI	9.4E+00	1.5E+07	no	0.00	HI
1,2,4-Trimethylbenzene	NA	NA	NA	NA	HI	8.6E+04	2.2E+04	**YES**	4.0	HI	NA	2.2E+04	NA	NA	HI
1,3,5-Trimethylbenzene	NA	1.1E+08	NA	NA	HI	1.7E+04	1.8E+04	no	0.91	HI	NA	1.8E+04	NA	NA	HI
TPH-G[2]	5.6E+02	4.8E+04	no	0.01	HI	8.6E+06	7.6E+05	**YES**	11.3	HI	1.5E+03	7.6E+05	no	0.0	HI

COPC	Construction Worker				
	Ingestion and Dermal Contact with Surface and Subsurface Soil				
	EPC	MTCA modified B	COC?	Potential Risk	NOTE
Benzene	4.4E-01	9.2E+02	no	4.74E-10	ECR
Ethylbenzene	5.6E+00	4.6E+03	no	1.22E-09	ECR
Naphthalene	2.0E+00	1.4E+04	no	0.000147	HI
Xylenes	5.8E+01	1.9E+05	no	0.000311	HI
Toluene	1.1E+01	5.4E+04	no	0.001068	HI
TPH-G[2]	5.6E+02	6.5E+03	no	0.008883	HI

TABLE 7
Risk Characterization
Former Plaid Pantry #324
White Center/King County, Washington

COPC	Property Trenchworker				
	Ingestion and Dermal Contact with Surface and Subsurface Soil				NOTE
	EPC	MTCA modified B	COC?	Potential Risk	
Benzene	1.2E+00	3.5E+04	no	4E-11	ECR
Ethylbenzene	2.3E+01	1.8E+05	no	1E-10	ECR
Naphthalene	3.1E+00	4.6E+05	no	7E-06	HI
Xylenes	1.3E+02	5.2E+06	no	3E-05	HI
Toluene	3.8E+01	2.1E+06	no	2E-05	HI
TPH-G[2]	1.3E+03	>MAX	no	NA	HI

COPC	ROW Trenchworker				
	Ingestion and Dermal Contact with ROW Surface and Subsurface Soil				NOTE
	EPC	MTCA modified B	COC?	Potential Risk	
Ethylbenzene	2.9E-01	1.8E+05	no	2E-12	ECR
Xylenes	1.2E+00	5.2E+06	no	2E-07	HI
TPH-G[2]	1.0E+02	>MAX	no	NA	HI

COPC	ROW Maintenance Worker				
	Ingestion and Dermal Contact with ROW Surface and Subsurface Soil				NOTE
	EPC	MTCA modified B	COC?	Potential Risk	
None	NA	Not Calculated	NA	NA	

NOTES:

COPC = Chemical of Potential Concern

EPC = Exposure Point Concentration

COC = Chemical of Concern

ROW = Right of Way

ECR = Excess Cancer Risk (carcinogens)

HI = Hazard Index (noncarcinogens)

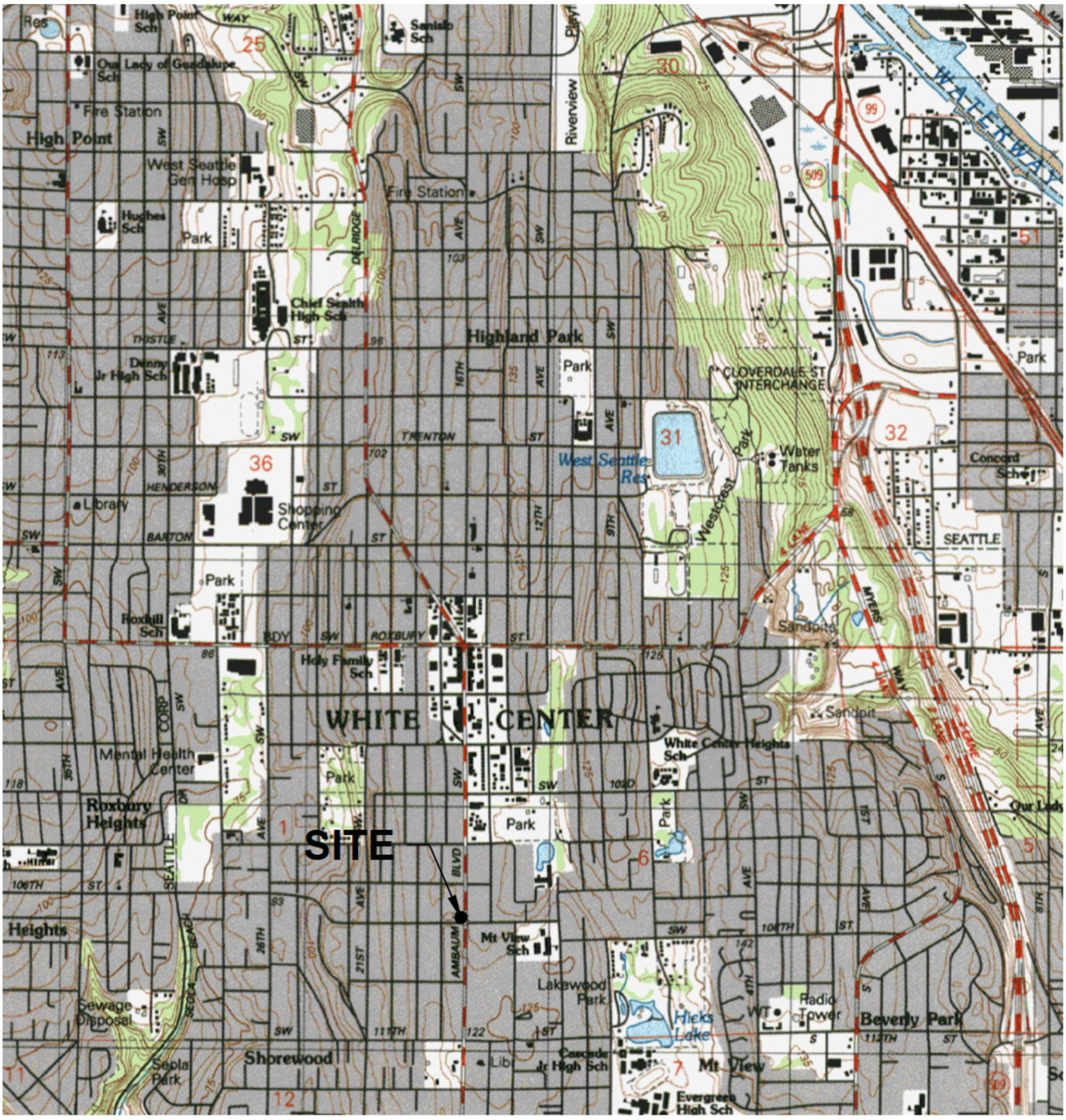
NA = Not available

>MAX = concentration exceeds maximum saturation limit

[1]Dataset consists of all soil gas data

[2]Dataset consists of soil gas samples near building (SG-1, SG-2, SG-7)

Figures



SOURCE:
USGS, SEATTLE SOUTH QUADRANGLE
WASHINGTON – SNOHOMISH CO.
7.5 X 15 MINUTE SERIES (TOPOGRAPHIC) 1983

N

APPROXIMATE SCALE IN FEET

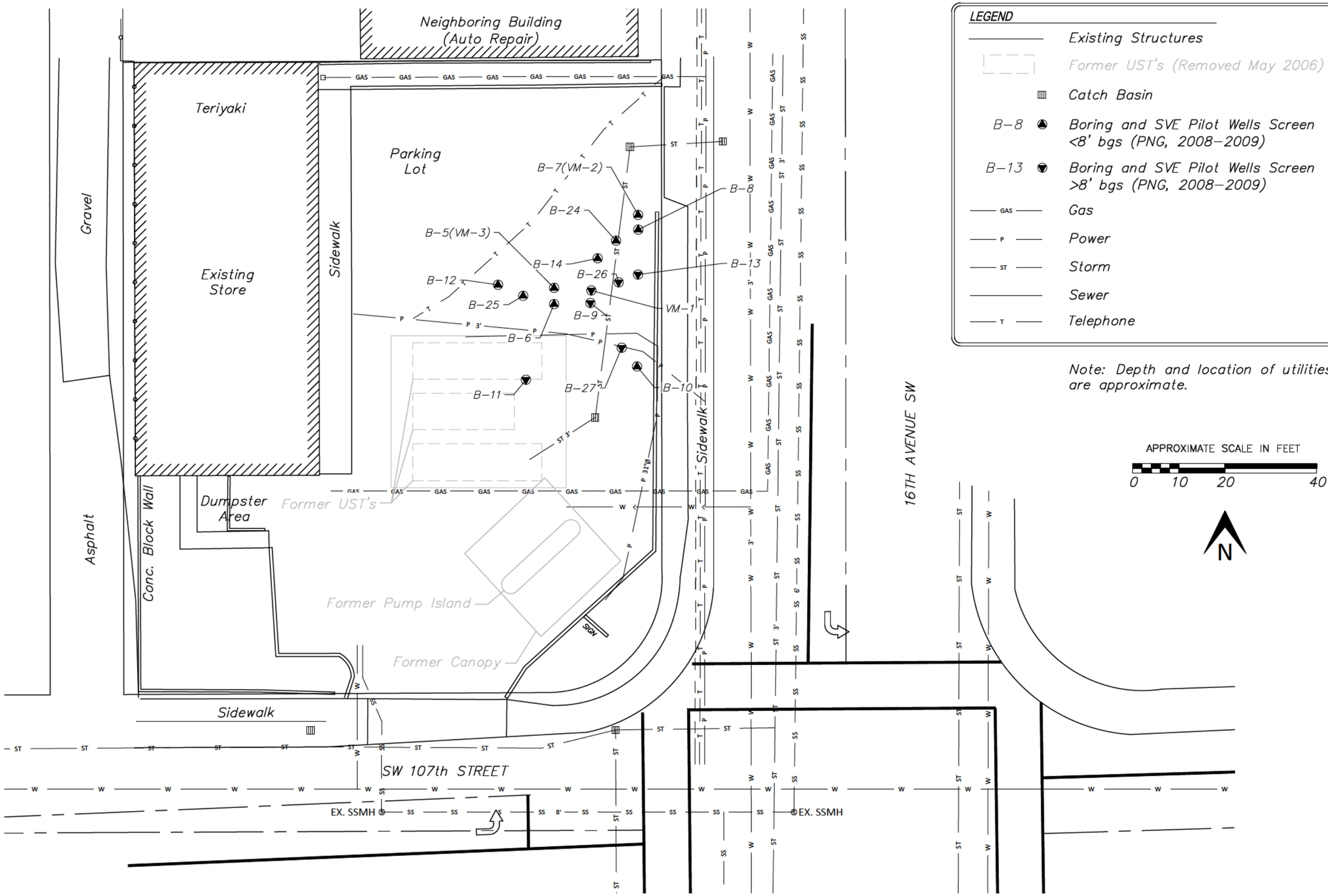
0 1000 2000 4000

EES
ENVIRONMENTAL CONSULTING, INC.
240 N Broadway #203, Portland, OR 97227
(503) 847-2740
www.ees-environmental.com

VICINITY MAP

PLAID PANTRY #324
10645 16TH AVE SW.
WHITE CENTER, KING CO., WA.

DATE:	9–23–13	PROJECT NO.	
FILE:	1133–01	1133–01	
DRAWN:	JJT	FIGURE NO.	
APPROVED:	DP	1	



LEGEND

- Existing Structures
- Former UST's (Removed May 2006)
- Catch Basin
- B-8 — Boring and SVE Pilot Wells Screen <8' bgs (PNG, 2008–2009)
- B-13 — Boring and SVE Pilot Wells Screen >8' bgs (PNG, 2008–2009)
- GAS — Gas
- P — Power
- ST — Storm
- Sewer
- T — Telephone

Note: Depth and location of utilities are approximate.

APPROXIMATE SCALE IN FEET

0 10 20 40

N

PROJECT NO.	1133-01
FIGURE NO.	2
DATE:	5-6-14
FILE:	1133-01
DRAWN:	JJT
APPROVED:	CR

SITE PLAN

PLAID PANTRY #324
10645 16TH AVE SW.
WHITE CENTER, KING COUNTY, WA.

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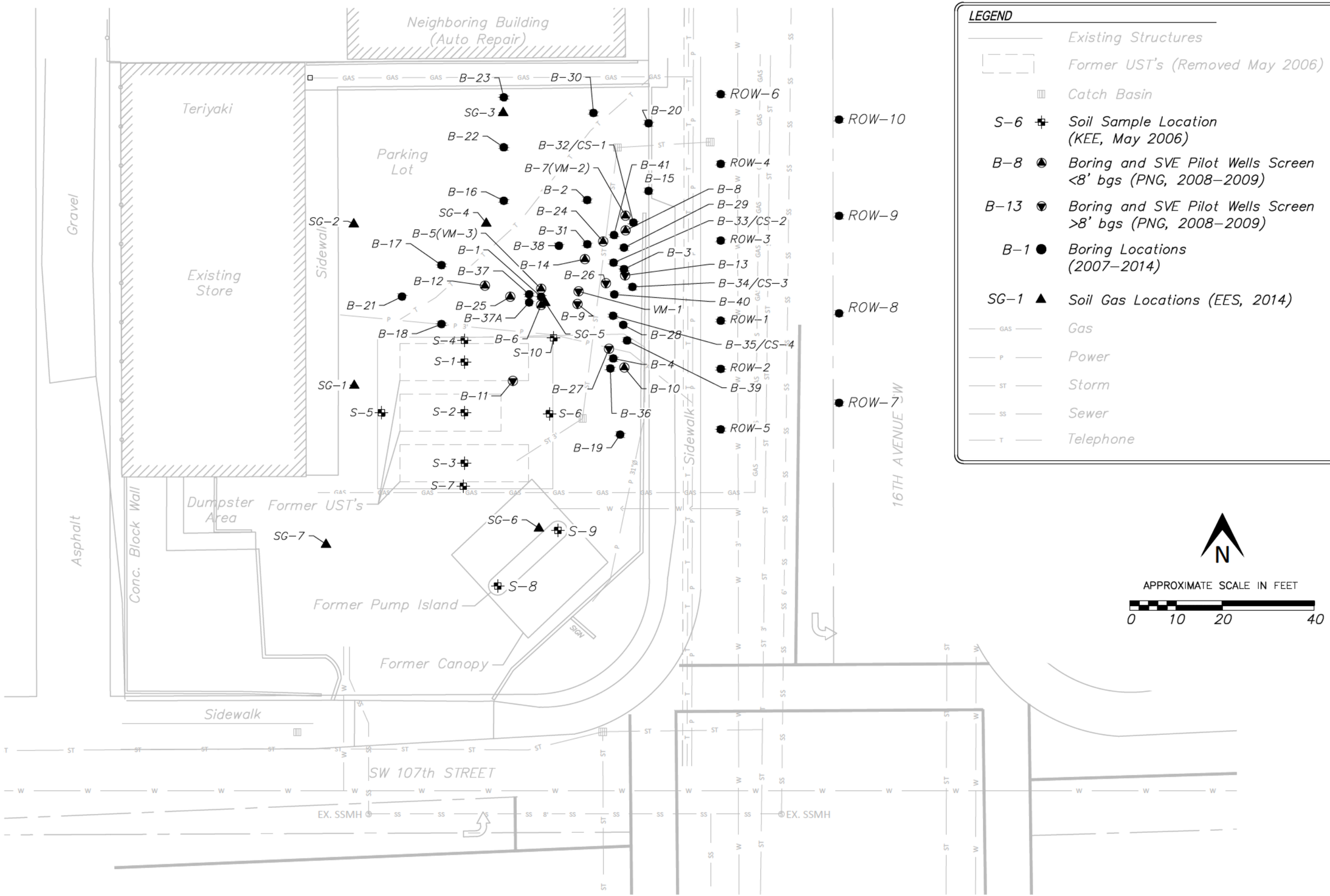
D:\Client Autocad\EES-Autocad\1133-01 Plaid Pantry #324\2014\April 2014\1133-01_BM-043014.dwg 2.17 2014



LEGEND

- Existing Structures
- Former UST's (Removed May 2006)
- Catch Basin
- S–6 — Soil Sample Location (KEE, May 2006)
- B–8 — Boring and SVE Pilot Wells Screen <8' bgs (PNG, 2008–2009)
- B–13 — Boring and SVE Pilot Wells Screen >8' bgs (PNG, 2008–2009)
- B–1 — Boring Locations (2007–2014)
- SG–1 — Soil Gas Locations (EES, 2014)
- GAS — Gas
- P — Power
- ST — Storm
- SS — Sewer
- T — Telephone

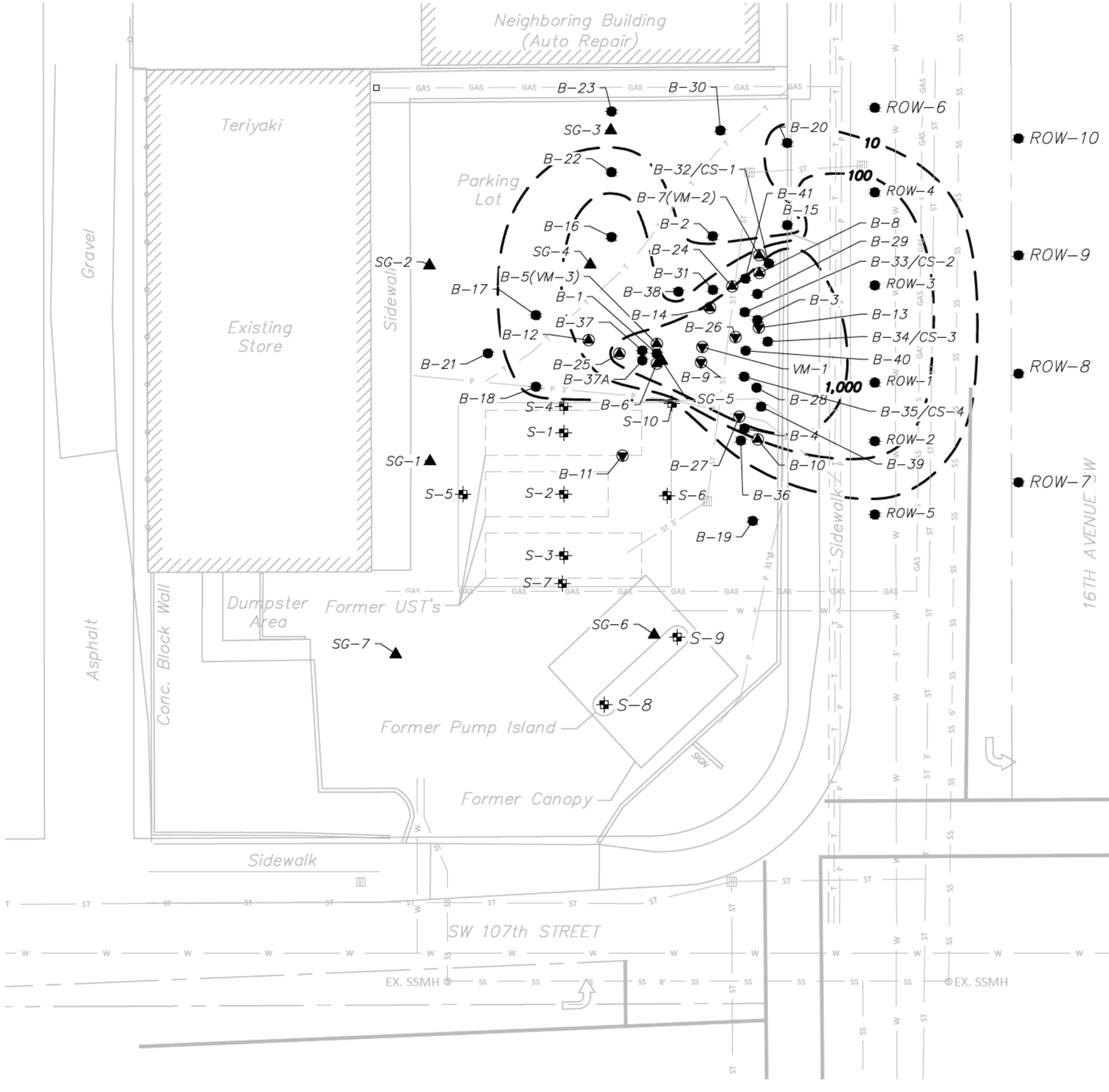
DATE:	5-6-14
FILE:	1133-01
DRAWN:	JJT
APPROVED:	CR
PROJECT NO.	1133-01
FIGURE NO.	3

SAMPLE LOCATIONS

PLAID PANTRY #324
10645 16TH AVE SW.
WHITE CENTER, KING COUNTY, WA.

EES
ENVIRONMENTAL CONSULTING, INC.
240 N Broadway #203, Portland, OR 97227
(503) 847-2740
www.ees-environmental.com

D:\Client Autocad\EES-Autocad\1133-01 Plaid Pantry #324\2014\April 2014\1133-01_BM-043014.dwg 2.17 2014



LEGEND

- Existing Structures
- Former UST's (Removed May 2006)
- Catch Basin
- S–6 — Soil Sample Location (KEE, May 2006)
- B–8 — Boring and SVE Pilot Wells Screen <8' bgs (PNG, 2008–2009)
- B–13 — Boring and SVE Pilot Wells Screen >8' bgs (PNG, 2008–2009)
- B–1 — Boring Locations (2007–2014)
- SG–1 — Soil Gas Locations (EES, 2014)
- GAS — Gas
- P — Power
- ST — Storm
- SS — Sewer
- T — Telephone
- 10 — Gasoline Isocontour in Soil (mg/kg)

N

APPROXIMATE SCALE IN FEET

0 10 20 40

PROJECT NO.	1133-01
FIGURE NO.	4
DATE:	5-6-14
FILE:	1133-01
DRAWN:	JJT
APPROVED:	CR

APPROXIMATE EXTENT OF PETROLEUM IMPACTS IN SOIL

PLAID PANTRY #324
10645 16TH AVE SW.
WHITE CENTER, KING COUNTY, WA.

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D:\Client Autocad\EES-Autocad\1133-01 Plaid Pantry #324\2014\April 2014\1133-01_BM-043014.dwg 2.17 2014

LEGEND

- Existing Structures
- Former UST's (Removed May 2006)
- Catch Basin
- S–6 Soil Sample Location (KEE, May 2006)
- B–8 Boring and SVE Pilot Wells Screen <8' bgs (PNG, 2008–2009)
- B–13 Boring and SVE Pilot Wells Screen >8' bgs (PNG, 2008–2009)
- B–1 Boring Locations (2007–2014)
- SG–1 Soil Gas Locations
- A — A' Cross Section Locations
- GAS Gas
- P Power
- ST Storm
- SS Sewer
- T Telephone

N

APPROXIMATE SCALE IN FEET

0 10 20 40

DATE:	5-6-14
FILE:	1133-01
DRAWN:	JJT
APPROVED:	DP
PROJECT NO.	1133-01
FIGURE NO.	5

CROSS SECTION A–A' LOCATION

PLAID PANTRY #324
10645 16TH AVE SW.
WHITE CENTER, KING COUNTY, WA.

EES
ENVIRONMENTAL CONSULTING, INC.
240 N Broadway #203, Portland, OR 97227
(503) 847-2740
www.ees-environmental.com

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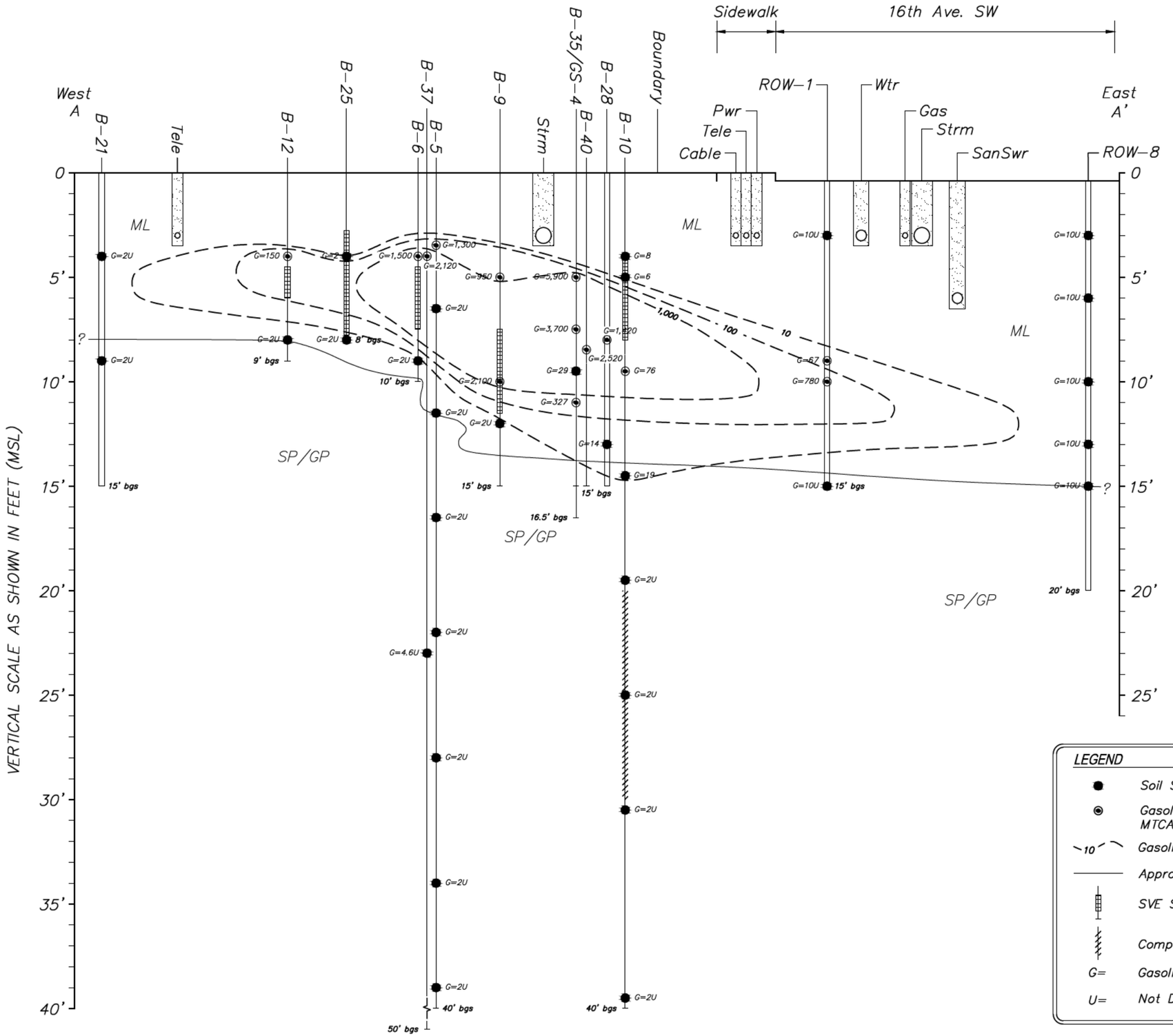

LEGEND

- Soil Sample
- Gasoline Concentration Exceeding MTCA Method A Cleanup Level
- 10 — Gasoline Concentration Isocontour (mg/kg)
- Approximate Fine/Coarse Grain Media Contact
- SVE Screened Interval
- Composite Sample Location
- G= Gasoline Concentration (mg/kg)
- U= Not Detected Above Method Reporting Limit

PROJECT NO.	1133-01
DATE:	5-6-14
FILE:	1133-01
FIGURE NO.	6
DRAWN:	JJT
APPROVED:	DP

WEST – EAST
CROSS SECTION A-A'

PLAID PANTRY #324
10645 16TH AVE SW.
WHITE CENTER, KING COUNTY, WA.

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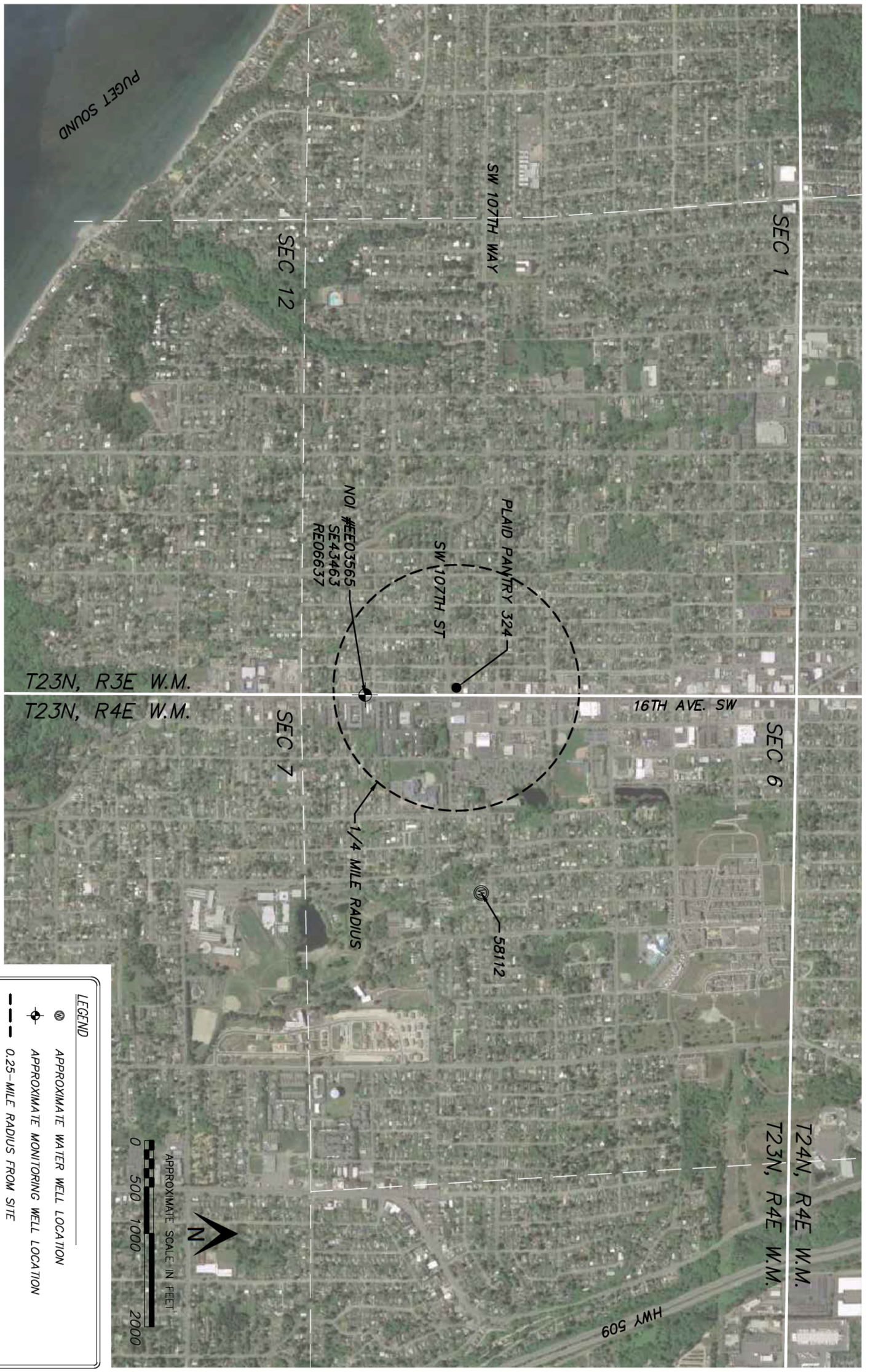

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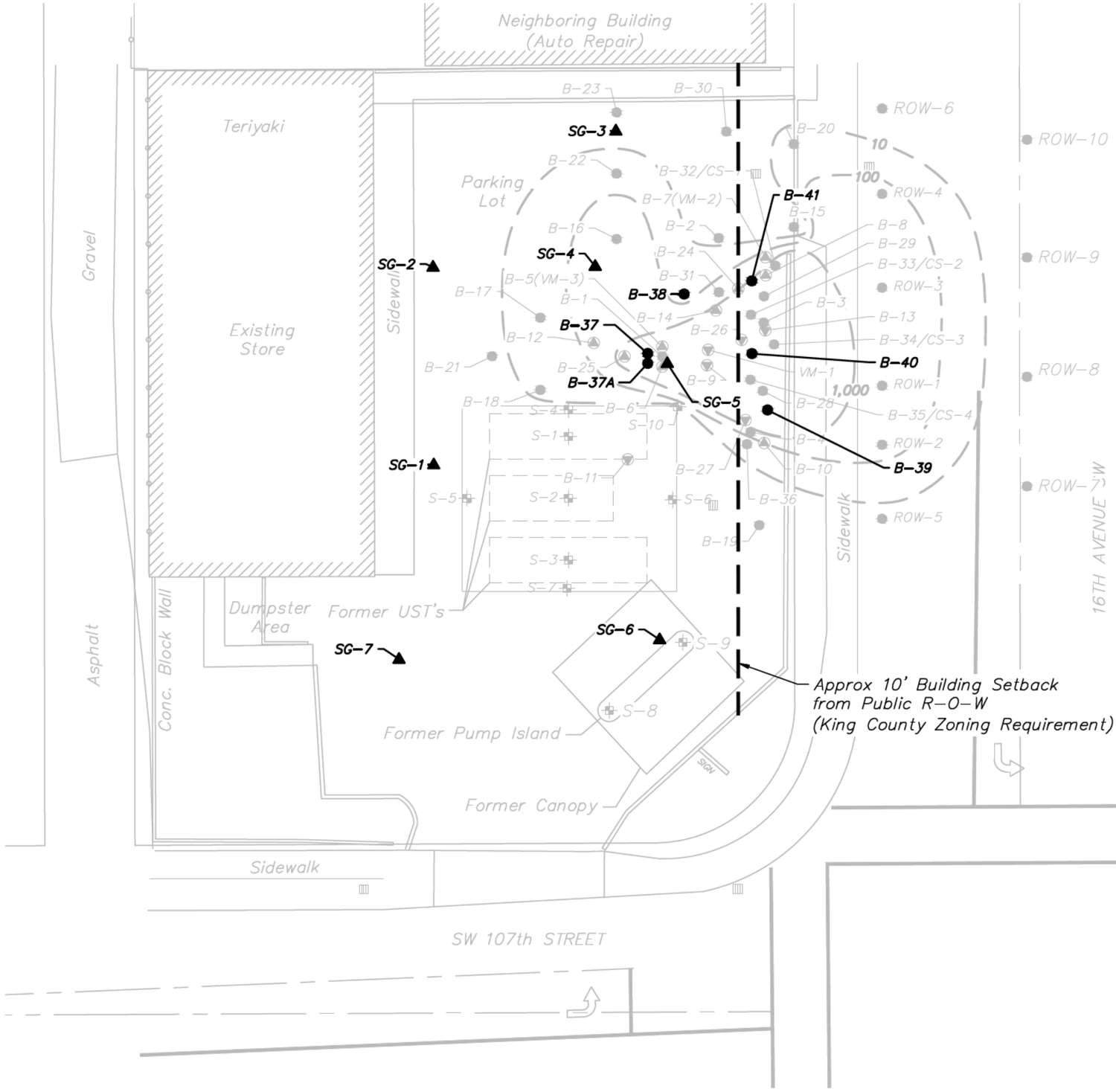
PLAID PANTRY #324
10645 16TH AVE SW.
WHITE CENTER, KING COUNTY, WA.

WELL LOCATIONS

DATE:	5-1-14	PROJECT NO.	
FILE:	1133-01	1133-01	
DRAWN:	JJT	FIGURE NO.	
APPROVED:	CR	7	



LEGEND

- Existing Structures
- Former UST's (Removed May 2006)
- Catch Basin
- S-6 Soil Sample Location (KEE, May 2006)
- B-8 Boring and SVE Pilot Wells Screen <8' bgs (PNG, 2008-2009)
- B-13 Boring and SVE Pilot Wells Screen >8' bgs (PNG, 2008-2009)
- B-1 Boring Locations (2007-2014)
- **B-38 Soil Boring Locations (EES, 2014)**
- **SG-1 Soil Gas Locations (EES, 2014)**
- 10 Gasoline Isocontour in Soil (mg/kg)

PROJECT NO.	1133-01
FIGURE NO.	8
DATE:	5-1-14
FILE:	1133-01
DRAWN:	JJT
APPROVED:	CR

SAMPLE LOCATIONS
(MARCH 2014)

PLAID PANTRY #324
10645 16TH AVE SW.
WHITE CENTER, KING COUNTY, WA.

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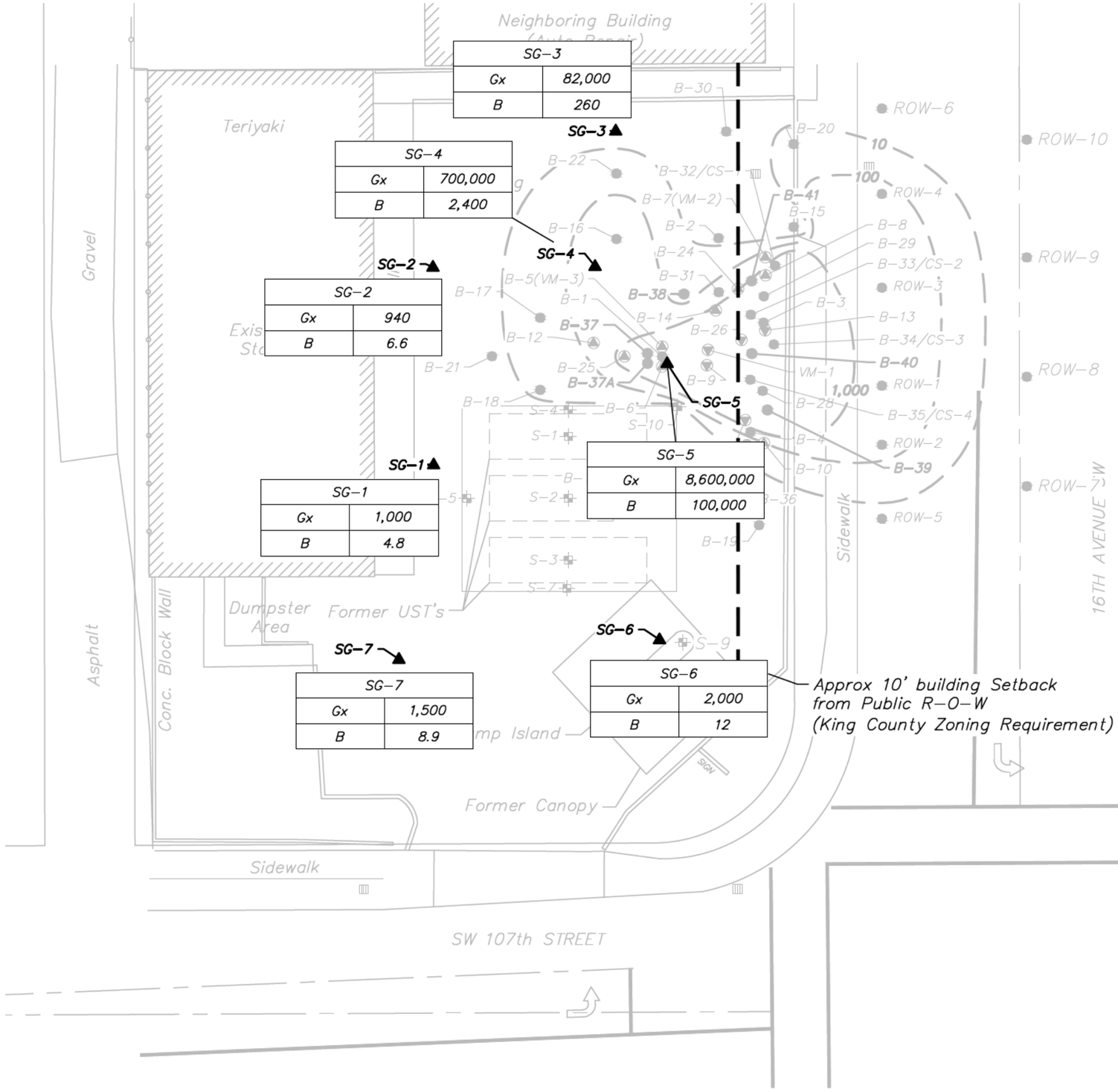
N

APPROXIMATE SCALE IN FEET

0 10 20 40



LEGEND

- Existing Structures
- Former UST's (Removed May 2006)
- Catch Basin
- S–6 — Soil Sample Location (KEE, May 2006)
- B–8 — Boring and SVE Pilot Wells Screen <8' bgs (PNG, 2008–2009)
- B–13 — Boring and SVE Pilot Wells Screen >8' bgs (PNG, 2008–2009)
- B–1 — Boring Locations (2007–2014)
- **SG–1 — Soil Gas Locations (EES, 2014)**
- 10 — Gasoline Isocontour in Soil (mg/kg)
- Gx = Gasoline Concentration in Soil Gas (ug/m³)
- B = Benzene Concentration in Soil Gas (ug/m³)

N

APPROXIMATE SCALE IN FEET

0 10 20 40

PROJECT NO.	1133–01
FIGURE NO.	9
DATE:	5–6–14
FILE:	1133–01
DRAWN:	JJT
APPROVED:	CR

GASOLINE AND BENZENE CONSTITUENTS IN SOIL GAS (MARCH 2014)

PLAID PANTRY #324
10645 16TH AVE SW.
WHITE CENTER, KING COUNTY, WA.

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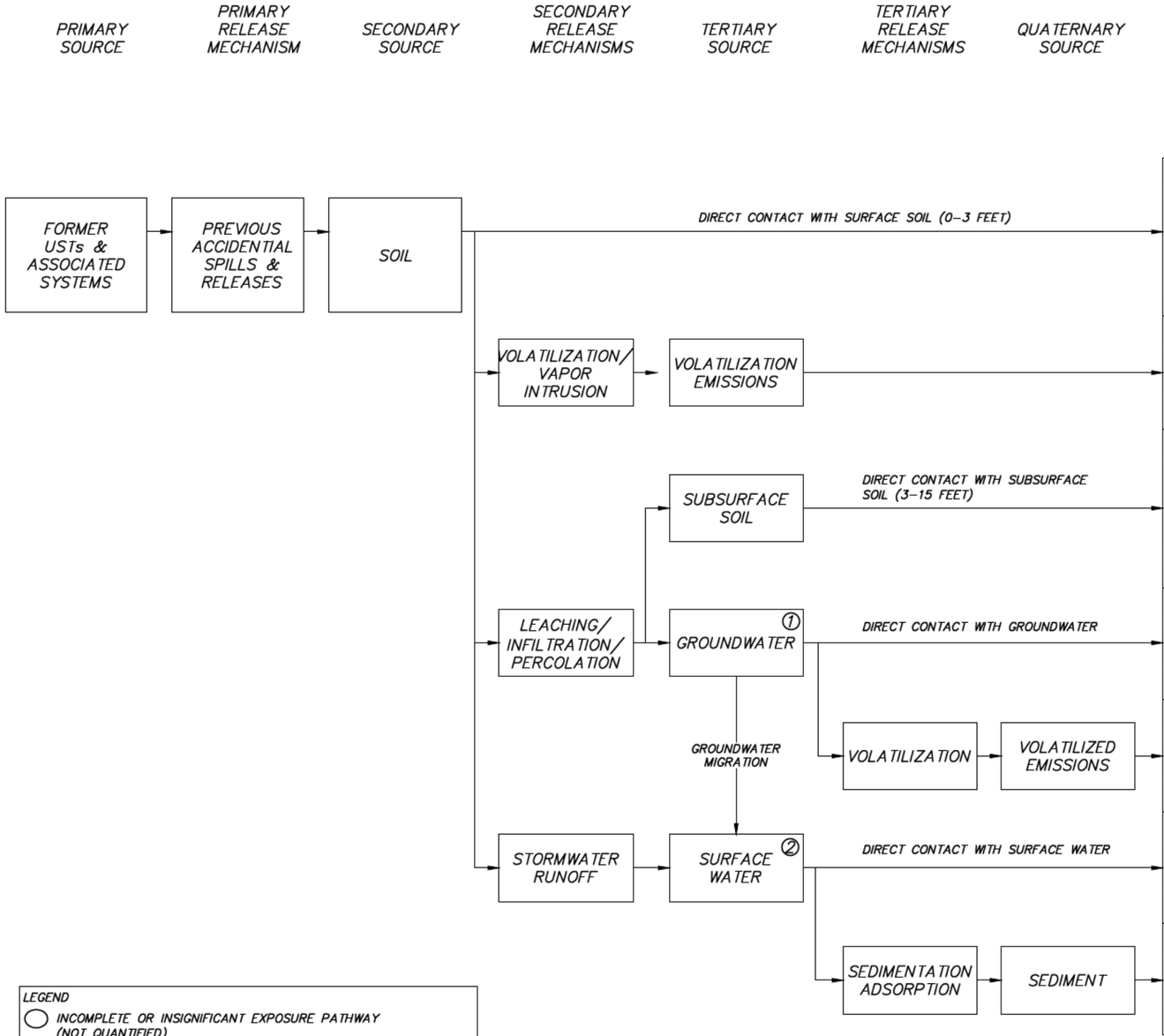
CONCEPTUAL SITE MODEL OF COMPLETE EXPOSURE PATHWAYS



EXPOSURE ROUTE	RETAIL CUSTOMER (0–3 FEET)	OCCUPATIONAL WORKERS (0–3 FEET)	CONSTRUCTION WORKERS (0–3 FEET)	EXCAVATION/ TRENCH WORKERS (0–15 FEET)	HIGHWAY MAINTENANCE WORKERS (0–3 FEET)
DERMAL ABSORPTION	▨	○	●	●	●
INGESTION	▨	▨	●	●	●
INHALATION OF FUGITIVE DUST PARTICLES	▨	▨	●	●	●
INHALATION OF INDOOR AIR	●	●	○	○	○
INHALATION OF OUTDOOR AIR	●	●	●	●	●
DERMAL ABSORPTION	○	○	○	●	○
INGESTION	○	○	○	●	○
INHALATION OF FUGITIVE DUST PARTICLES	○	○	○	●	○
DERMAL ABSORPTION	○	○	○	○	○
INGESTION	○	○	○	○	○
INHALATION OF INDOOR AIR	○	○	○	○	○
INHALATION OF OUTDOOR AIR	○	○	○	○	○
DERMAL ABSORPTION	○	○	○	○	○
INGESTION	○	○	○	○	○
DERMAL ABSORPTION	○	○	○	○	○
INGESTION	○	○	○	○	○

LEGEND

○ INCOMPLETE OR INSIGNIFICANT EXPOSURE PATHWAY (NOT QUANTIFIED)

▨ EXPOSURE PATHWAY POTENTIALLY COMPLETE BUT INSIGNIFICANT

● EXPOSURE PATHWAY COMPLETE

1. GROUNDWATER IS NOT AN AFFECTED MEDIA AT THIS SITE.
2. THE SITE IS PREDOMINANTLY PAVED. NO SURFACE WATER CONTACT WITH CONTAMINATED MEDIA IS ANTICIPATED.

PROJECT NO. 1133-01
FIGURE NO. 10
DATE: 5-6-14
FILE: 1133-01
DRAWN: JJT
APPROVED: CR

CONCEPTUAL SITE MODEL

PLAID PANTRY #324
10645 16TH AVE SW.
WHITE CENTER, KING COUNTY, WA.

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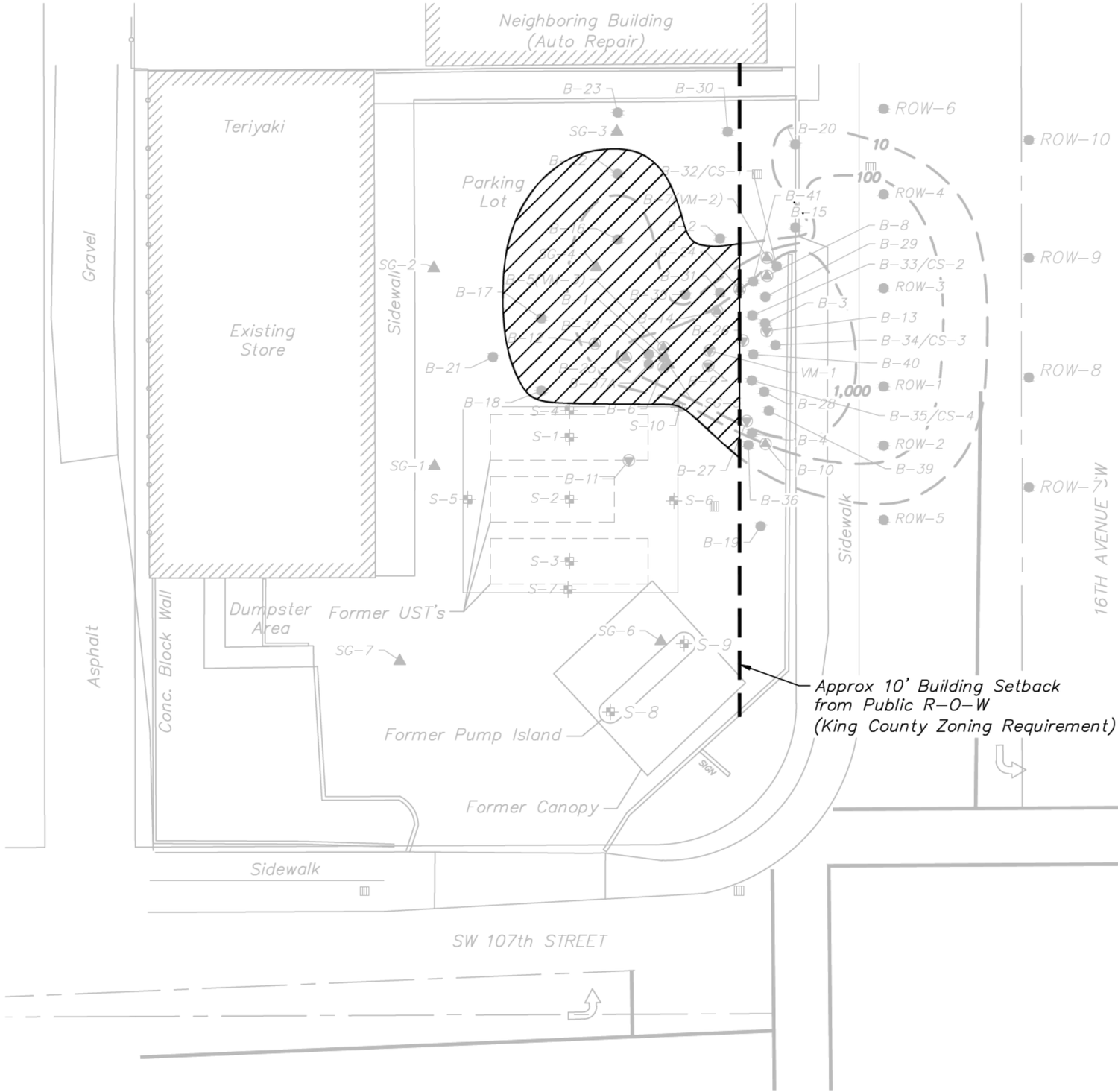

LEGEND

- Existing Structures
- Former UST's (Removed May 2006)
- Catch Basin
- S-6 — Soil Sample Location (KEE, May 2006)
- B-8 — Boring and SVE Pilot Wells Screen <8' bgs (PNG, 2008-2009)
- B-13 — Boring and SVE Pilot Wells Screen >8' bgs (PNG, 2008-2009)
- B-1 — Boring Locations (2007-2014)
- B-38 — Soil Boring Locations (EES, 2014)
- SG-1 — Soil Gas Locations (EES, 2014)
- 10 — Gasoline Isocontour in Soil (mg/kg)

Area Potentially Requiring Cleanup Based on MTCA Modified B CUL Development

N

APPROXIMATE SCALE IN FEET

0 10 20 40

DATE:	5-15-14
FILE:	1133-01
DRAWN:	JJT
APPROVED:	CR
PROJECT NO.	1133-01
FIGURE NO.	11

AREA POTENTIALLY REQUIRING CLEANUP

PLAID PANTRY #324
10645 16TH AVE SW.
WHITE CENTER, KING COUNTY, WA.

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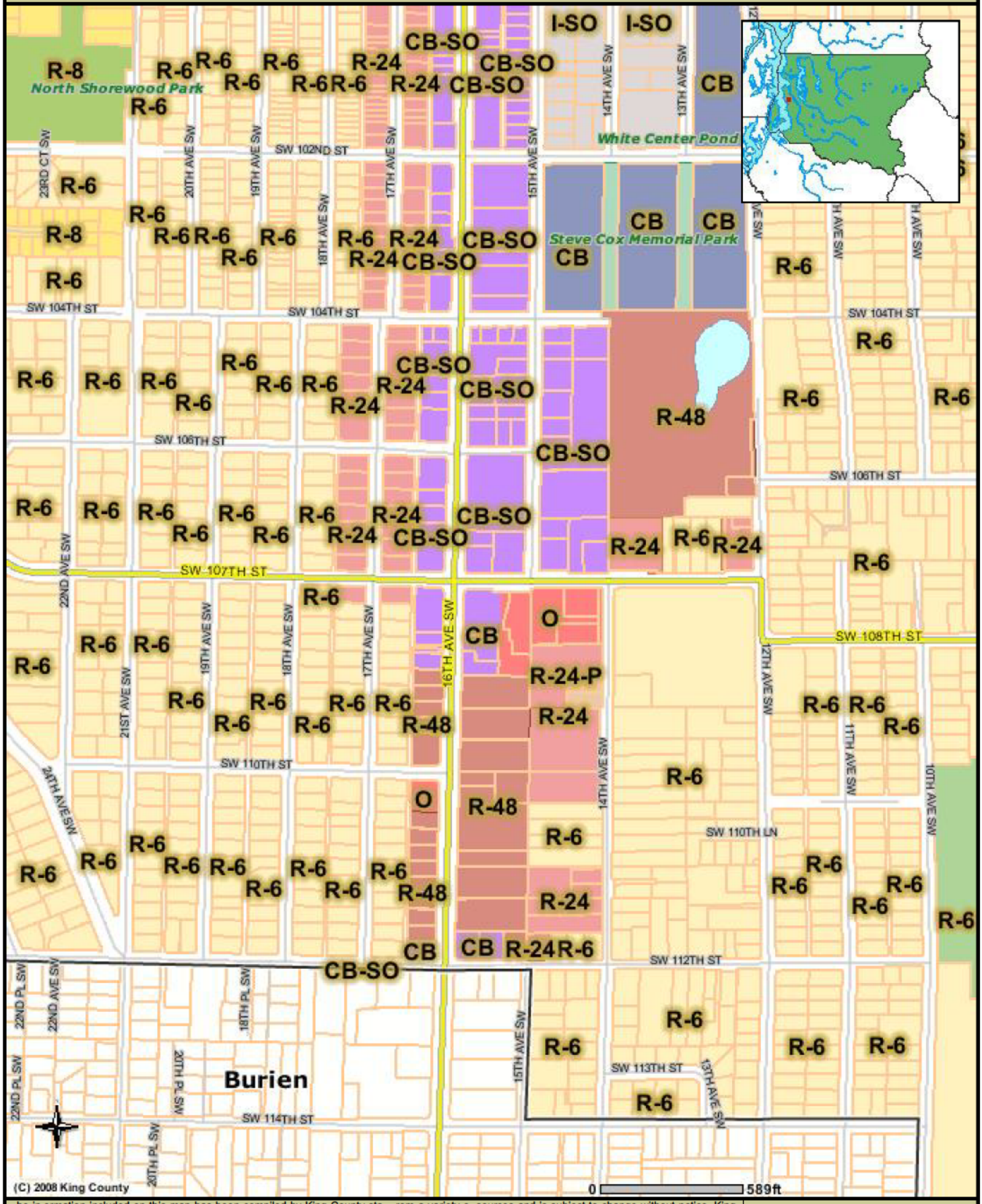
Appendix A

iMAP



Date 4/2/2014 Source King County iMAP - Property n ormation (http //www metrokc gov/G S/iMAP)

King County

iMAP

Legend

- County Boundary
- Mountain Peaks
- Highways
- Forest Production District Boundary
- Agricultural Production District Boundary
- Urban Growth Area Line
- Incorporated Area
- Streets
  - Highway
  - Arterials
  - Local
- Lakes and Large Rivers
- Streams
- Tribal Lands
- Parcels
- Parks

Unincorporated KC Zoning

- A-10 - Agricultural, one DU per 10 acres
- A-35 - Agricultural, one DU per 35 acres
- F - Forest
- M - Mineral
- RA-2.5 - Rural Area, one DU per 5 acres
- RA-5 - Rural Area, one DU per 5 acres
- RA-10 - Rural Area, one DU per 10 acres
- UR - Urban Reserve, one DU per 5 acres
- R-1 - Residential, one DU per acre
- R-4 - Residential, 4 DU per acre
- R-6 - Residential, 6 DU per acre
- R-8 - Residential, 8 DU per acre
- R-12 - Residential, 12 DU per acre
- R-18 - Residential, 18 DU per acre
- R-24 - Residential, 24 DU per acre
- R-48 - Residential, 48 DU per acre

(cont)

- NB - Neighborhood Business
- CB - Community Business
- RB - Regional Business
- O - Office
- I - Industrial
- Other

Date 4/2/2014 Source King County iMAP - Property n ormation (http //www metrokc gov/G S/iMAP)

King County

Appendix B

Technical Assessment Services, Inc.

MEMORANDUM

To: Chris Rhea, EES Environmental

From: Regina Skarzinskas, TAS

Date: 7 April 2014

Re: Terrestrial Ecological Evaluation (TEE) – Plaid 324

Technical Assessment Services, Inc (TAS) was tasked to perform a Terrestrial Ecological Evaluation (TEE) for the Former Plaid Pantry Store #324 retail gasoline station (Site) located in White Center/King County, Washington. The purpose of the TEE is to evaluate the potential for unacceptable impacts to land-based plants and animals from exposure to contaminated soil. For commercial properties, protectiveness is evaluated relative to terrestrial wildlife.

The first step in the TEE process is to determine if a terrestrial evaluation is needed or if the site qualifies for an exemption. The primary exclusions are based on the location and concentration of potentially hazardous substances and the potential for complete pathways of exposure on-site and off-site. The TEE Documentation Form is attached and discussed below.

Exclusion 1 – Contaminant Analysis – Location

A fueling station associated with Plaid Pantries, Inc. was located on the Site from September 1986 until the end of November 1990. The Site was subleased and the UST, fixtures and equipment were sold. In 2006, the three gasoline USTs were decommissioned. While an approved leak detection system was in place, no leaks were identified or reported. However, gasoline constituents were identified in soil near the former UST system during the decommissioning.

Of the eleven analytes tested, four (MTBE, 1,2-dibromoethane, 1,2-dichloroethane, hexane) were not detected. The method reporting limits (MRLs) were below applicable MTCA clean-up values for all but 1,2-dibromoethane. Statistically calculated exposure point concentrations (EPCs) for toluene, ethylbenzene and naphthalene were below applicable MTCA clean-up values. Concentrations of lead did not exceed the regional background standard of 17.9 mg/Kg.

The remaining constituents (TPH-G, benzene, xylene and 1,2-dibromoethane) are located in the default biologically active area (< 6ft bgs), however, the higher concentrations are generally confined to depths of 4 to 6 ft. bgs. This Site is an active commercial site, located off of a busy urban street. MTCA Guidance stipulates that for commercial and industrial sites, plants and biota need not be considered.

The ecological receptor of concern to be protected is wildlife. The Site is generally covered with a commercial building or asphalt parking lot. Although there are some landscaped

areas, these areas are too small to be considered suitable habitat for most wildlife. Therefore, for this site, it is unlikely that wildlife will come in contact with soil below 3 ft. bgs.

Based on the site-specific point of compliance, this site qualifies for this exclusion.

Exclusion 2 – Pathway Analysis – Complete pathways.

The Site is a retail location which contains a building and paved parking. Small areas of landscaping bound the Site. Planting area located on Site are neither sufficiently large enough to support significant ecological habitat, nor in a location where ecological receptors would congregate in large quantities or for an extended length of time.

The Site qualifies for this exclusion.

Exclusion 3 – Pathway Analysis – contiguous undeveloped land

Approximately 2 acres of undeveloped land is located about 370 ft. to the SW of the Site, therefore, this Site does not qualify for this exclusion.

Exclusion 4 – Contaminant Analysis – Natural Background

Lead was the only constituent present on site for which there is a natural background. The maximum concentration of lead detected (7.95 mg/Kg) did not exceed Washington's background concentration. (17.9 mg/Kg)[1]. None of the other constituents are naturally found in the environment.

Therefore, the Natural Background Exclusion does not apply.

Based on an evaluation of pathways and potential chemicals of concern, the Site qualifies for two of the four potential exclusions. Therefore, a TEE is not required for this Site. As concentrations of the chemicals of concern are low in the site-specific conditional point of compliance (0 – 3 ft.) and do not exceed wildlife criteria where applicable (See Table 2), no institutional controls are required.

[1]https://fortress.wa.gov/ecy/clarc/FocusSheets/Natural_Background_data html

ATTACHMENTS

TEE – Primary Exclusions

Site Photos

Data and Screening Table

SITE PHOTOS

Facing southwest, former Plaid Pantry #324

Facing south, former Plaid Pantry #324

Facing north, former Plaid Pantry #324

Facing east, former Plaid Pantry #324

Location of undeveloped land near former Plaid Pantry #324

Washington State Department of Ecology
Toxics Cleanup Program

Terrestrial Ecological Evaluation Process - Primary Exclusions

Documentation Form

FORMER PLAID PANTRY #324

Exclusion #	Exclusion Detail	Yes or No?	Are Institutional Controls Required If The Exclusion Applies?
1	Will soil contamination be located at least 6 feet beneath the ground surface and less than 15 feet?	Yes / (No)	Yes
	Will soil contamination located at least 15 feet beneath the ground surface?	Yes / (No)	No
	Will soil contamination located below the conditional point of compliance?	(Yes) / No	Yes
2	Will soil contamination be covered by buildings, paved roads, pavement, or other physical barriers that will prevent plants or wildlife from being exposed?	(Yes) / No	Yes
3	Is there less than 1.5 acres of contiguous undeveloped land on the site, or within 500 feet of any area of the site affected by hazardous substances **other than** those listed in the table of Hazardous Substances of Concern? And Is there less than 0.25 acres of contiguous undeveloped land on or within 500 feet of any area of the site affected by hazardous substances **listed in** the table of Hazardous Substances of Concern?	Yes / (No) Yes / (No)	Other factors determine
4	Are concentrations of hazardous substances in the soil less than or equal to natural background concentrations of those substances at the point of compliance	(Yes) / No for lead only	No

[Exclusions Main] [TEE Definitions] [Simplified or Site-Specific?] [Simplified Ecological Evaluation] [Site-Specific Ecological Evaluation] [WAC 173-340-7493]

[TEE Home]

Table 1
Soil data
Former Plaid pantry #324
White Center/King County, Washington

Sample ID	Location	Depth (feet)	Sampling Date	Gasoline Range Organics				Benzene				Toluene				Ethylbenzene				Total Xylenes				Methyl t-butyl ether				1,2-Dibromoethane				1,2-Dichlororethane				Naphthalene				Hexane				Total Lead			
				Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL
S-10	S-10	4	05/04/2006		310				0.23				0.85				2				16																									
B1-5	B1-5	5	11/12/2007		1400				4.8				92				55				580			<		U	0.05	<		U	0.05	<		U	0.05		13							7 95		
B4-5	B4-5	5	11/12/2007		2			<		U	0.03		0.065				0.059				0 303			<		U	0.05	<		U	0.05	<		U	0.05		0.057							2.61		
B-5@4	B-5@4	4	07/16/2008		1300			<		U	0.8		4.2				12				120																									
B6@4	B6@4	4	07/17/2008		1500				1.5				65				12				250																									
B6@9	B6@9	4	07/17/2008	<		U	2	<		U	0.02	<		U	0.02	<		U	0 02	<		U	0.06																							
B7@4	B7@4	4	07/16/2008	<		U	2	<		U	0.02	<		U	0.02	<		U	0 02	<		U	0.06																							
B-8@6	B-8@6	6	07/17/2008		1200				0.73				16				17				150																									
B-10@4	B-10@4	4	07/15/2008		8				0.06				0.22				0.17				0 92																									
B10@6	B10@6	6	07/15/2008		6				0.07				0.4				0.24				0.74																									
B-12@4	B-12@4	4	07/17/2008		150			<		U	0.02		0.27			<		U	0 02		3.6																									
B-13@5	B-13@5	5	07/17/2008		140			<		U	0.02		1.8				1.6				11																									
B-16/4	B-16/4	4	04/22/2009	<		U	2	<		U	0.03	<		U	0.05	<		U	0 05	<		U	0.15													<		U	0.05	<		U	0.25				
B-18/4	B-18/4	4	04/22/2009		54			<		U	0.03	<		U	0.05	<		U	0 05	<		U	0.15	<		U	0.05	<		U	0.05	<		U	0.05		0.092			<		U	0.25				
B-19/4	B-19/4	4	04/22/2009	<		U	2	<		U	0.03	<		U	0.05	<		U	0 05	<		U	0.15	<		U	0.05	<		U	0.05	<		U	0.05	<		U	0.05	<		U	0.25				
B-20/4	B-20/4	4	04/22/2009	<		U	2	<		U	0.03	<		U	0.05	<		U	0 05	<		U	0.15	<		U	0.05	<		U	0.05	<		U	0.05	<		U	0.05	<		U	0.25				
B-20/6	B-20/6	6	04/22/2009		93			<		U	0.03	<		U	0.05	<		U	0 05	<		U	0.15	<		U	0.05	<		U	0.05	<		U	0.05	<		U	0.05	<		U	0.25				
B-21/4	B-21/4	4	04/22/2009	<		U	2	<		U	0.03	<		U	0.05	<		U	0 05	<		U	0.15	<		U	0.05	<		U	0.05	<		U	0.05	<		U	0.05	<		U	0.25				
B-22/4	B-22/4	4	04/22/2009	<		U	2	<		U	0.03	<		U	0.05	<		U	0 05	<		U	0.15													<		U	0.05	<		U	0.25				
B-23/5	B-23/5	5	04/22/2009	<		U	2	<		U	0.03	<		U	0.05	<		U	0 05	<		U	0.15	<		U	0.05	<		U	0.05	<		U	0.05	<		U	0.05	<		U	0.25				
B-24/4	B-24/4	4	11/10/2009		2			<		U	0.02	<		U	0.02	<		U	0 02	<		U	0.06																							
B25/4	B25/4	4	11/10/2009		2			<		U	0.02	<		U	0.02	<		U	0 02	<		U	0.06																							
B-26/4	B-26/4	4	11/10/2009		27				0.23				0.15				0.76				3 8																									
B-27/4	B-27/4	4	11/11/2009		1000				0.9				24				20				100																									
ROW-1/3	ROW-1/3	3	08/22/2012	<		U	10	<		U	0.02	<		U	0.05	<		U	0 05	<		U	0.15																							
ROW-2/3	ROW-2/3	3	08/22/2012	<		U	10	<		U	0.02	<		U	0.05	<		U	0 05	<		U	0.15																							
ROW-2/3 (duplicate)	ROW-2/3 (duplicate)	3	08/22/2012	<		U	10	<		U	0.02	<		U	0.05	<		U	0 05	<		U	0.15																							
ROW-3/3	ROW-3/3	3	08/22/2012	<		U	10	<		U	0.02	<		U	0.05	<		U	0 05	<		U	0.15																							
ROW-4/3	ROW-4/3	3	08/23/2012	<		U	10	<		U	0.02	<		U	0.05	<		U	0 05	<		U	0.15																							
ROW-5/3	ROW-5/3	3	08/23/2012	<		U	10	<		U	0.02	<		U	0.05	<		U	0 05	<		U	0.15																							
ROW-6/3	ROW-6/3	3	08/23/2012	<		U	10	<		U	0.02	<		U	0.05	<		U	0 05	<		U	0.15																							
ROW-7/3	ROW-7/3	3	08/24/2012	<		U	10	<		U	0.02	<		U	0.05	<		U	0 05	<		U	0.15																							
ROW-8/3	ROW-8/3	3	08/24/2012	<		U	10	<		U	0.02	<		U	0.05	<		U	0 05	<		U	0.15																							
ROW-9/3	ROW-9/3	3	08/24/2012	<		U	10	<		U	0.02	<		U	0.05	<		U	0 05	<		U	0.15																							
ROW-10/3	ROW-10/3	3	08/24/2012	<		U	10	<		U	0.02	<		U	0.05	<		U	0 05	<		U	0.15																							
B-32/CS-1 (5-5.5)	B-32/CS-1 (5-5 5)	5-5.5	07/11/2013	<	2.94	U	5.9	<	0.00823	U	0.02	<	0.0294	U	0.059	<	0.0147	U	0.029	<	0 0441	U	0.088																							
B-33/CS-2 (5-5.5)	B-33/CS-2 (5-5 5)	5-5.5	07/11/2013	<	2.5	U	5.01	<	0.00701	U	0.01	<	0.025	U	0 0501	<	0.0125	U	0.025	<	0 0376	U	0.0751																							
B-34/CS-3 (5-5.5)	B-34/CS-3 (5-5 5)	5-5.5	07/11/2013		2660				1.1				51				45				282																									
B-35/CS-4 (5-5.5)	B-35/CS-4 (5-5 5)	5-5.5	07/11/2013		5960				6.3				170				108				623																									
B-37 (4 5-5)	B-37 (4.5-5)	4-4.5	03/05/2014		2120				1.6				14				18				160			<		U	0.4	<		U	0.4	<		U	0.2		6.2										
B-38 (4 5-5)	B-38 (4.5-5)	4.5-5	03/05/2014		22				0.34				0.73				0.32				1 9			<		U	0.4	<		U	0.4	<		U	0.2		0.095										
N					42				42				42				42				42				10				10				10				12				8				2			
detects					20				12				16				15				16				0				0				0				5				0				2			
% detects					48%				29%				38%				36%				38%				0%				0%				0%				42%				0%				100%			
min DL					2				0.0125				0.02				0.02				0.06				0 05				0.05				0.05				0 05				0.25				NA			
max DL					10				6.3				0.059				0.05				0.15				0.4				0.4				0.2				0 05				0.25				NA			
MTCA																																															
industrial					3E+01				3E-02				7E+00				6E+00				9E+00				1E-01				5E-03				No data				5E+00				No data				1E+03			
unrestricted					3E+01				3E-02				7E+00				6E+00				9E+00				1E-01				5E-03				No data				5E+00				No data				2.5E+02			
MTCA B					NA				1.8E+01				NA				NA				NA				No data				5E-01				1.1E+01				NA				NA				No data			
noncancer					NA				3.2E+02				6.4E+03				8.0E+03				1.6E+04				No data				7.2E+02				1.6E+03				1.6E+03				4.8E+03				No data			
MTCA C					NA				2.4E+03				NA				NA				NA				No data				6.6E+01				1.4E+03				na				NA				No data			
noncancer					NA				1.4E+04				2 9E+06				3.5E+05				7.0E+05				No data				3.2E+04				7E+04				7E+04				2.1E+05				No data			

MDLs for ND analytes are listed in the value column - not all MDL results were available

values in blue are nondetects

results are in mg/kg

TABLE 2
Surface Soil (0 - 6 ft bgs) Statistics
Former Plaid Pantry #324
White Center/King County, Washington

Sample ID	Gasoline Range Organics		Benzene		Toluene		Ethylbenzene		Total Xylenes		1,2-Dibromoethane		Naphthalene		Lead	
	value	C	value	C	value	C	value	C	value	C	value	C	value	C	value	C
S-10	310	1	0.23	1	0.85	1	2	1	16	1						
B1-5	1400	1	4.8	1	92	1	55	1	580	1	0.025	0	13	1	7 95	1
B4-5	2	1	0.015	0	0.065	1	0.059	1	0.303	1	0.025	0	0.057	1	2.61	1
B-5@4	1300	1	0.4	0	4.2	1	12	1	120	1						
B6@4	1500	1	1.5	1	65	1	12	1	250	1						
B6@9	1	0	0.01	0	0.01	0	0.01	0	0.03	0						
B7@4	1	0	0.01	0	0.01	0	0.01	0	0.03	0						
B-8@6	1200	1	0.73	1	16	1	17	1	150	1						
B-10@4	8	1	0.06	1	0.22	1	0.17	1	0.92	1						
B10@6	6	1	0.07	1	0.4	1	0.24	1	0.74	1						
B-12@4	150	1	0.01	0	0.27	1	0.01	0	3.6	1						
B-13@5	140	1	0.01	0	1.8	1	1.6	1	11	1						
B-16/4	1	0	0.015	0	0.025	0	0.025	0	0.075	0			0.025	0		
B-18/4	54	1	0.015	0	0.025	0	0.025	0	0.075	0	0.025	0	0.092	1		
B-19/4	1	0	0.015	0	0.025	0	0.025	0	0.075	0	0.025	0	0.025	0		
B-20/4	1	0	0.015	0	0.025	0	0.025	0	0.075	0	0.025	0	0.025	0		
B-20/6	93	1	0.015	0	0.025	0	0.025	0	0.075	0	0.025	0	0.025	0		
B-21/4	1	0	0.015	0	0.025	0	0.025	0	0.075	0	0.025	0	0.025	0		
B-22/4	1	0	0.015	0	0.025	0	0.025	0	0.075	0			0.025	0		
B-23/5	1	0	0.015	0	0.025	0	0.025	0	0.075	0	0.025	0	0.025	0		
B-24/4	2	1	0.01	0	0.01	0	0.01	0	0.03	0						
B25/4	2	1	0.01	0	0.01	0	0.01	0	0.03	0						
B-26/4	27	1	0.23	1	0.15	1	0.76	1	3.8	1						
B-27/4	1000	1	0.9	1	24	1	20	1	100	1						
ROW-1/3	5	0	0.01	0	0.025	0	0.025	0	0.075	0						
ROW-2/3	5	0	0.01	0	0.025	0	0.025	0	0.075	0						
ROW-2/3 (duplicate)	5	0	0.01	0	0.025	0	0.025	0	0.075	0						
ROW-3/3	5	0	0.01	0	0.025	0	0.025	0	0.075	0						
ROW-4/3	5	0	0.01	0	0.025	0	0.025	0	0.075	0						
ROW-5/3	5	0	0.01	0	0.025	0	0.025	0	0.075	0						
ROW-6/3	5	0	0.01	0	0.025	0	0.025	0	0.075	0						
ROW-7/3	5	0	0.01	0	0.025	0	0.025	0	0.075	0						
ROW-8/3	5	0	0.01	0	0.025	0	0.025	0	0.075	0						
ROW-9/3	5	0	0.01	0	0.025	0	0.025	0	0.075	0						
ROW-10/3	5	0	0.01	0	0.025	0	0.025	0	0.075	0						
B-32/CS-1 (5-5.5)	1.47	0	0.004115	0	0.0147	0	0.00735	0	0 02205	0						
B-33/CS-2 (5-5.5)	1.25	0	0.003505	0	0.0125	0	0.00625	0	0.0188	0						
B-34/CS-3 (5-5.5)	2660	1	1.1	1	51	1	45	1	282	1						
B-35/CS-4 (5-5.5)	5960	1	6.3	1	170	1	108	1	623	1						
B-37 (4 5-5)	2120	1	1.6	1	14	1	18	1	160	1	0.2	0	6.2	1		
B-38 (4 5-5)	22	1	0.34	1	0.73	1	0.32	1	1.9	1	0.2	0	0.095	1		
N	41		41		41		41		41		10		12		2	
detects	20		12		16		15		16		0		5		2	
% detects	49%		29%		39%		37%		39%		0%		42%		100%	
Max	5960.000		6.3		170		108		623		0.2		13		7 95	
Mean	897.8		1.488		27.54		19.48		144				3.889			
95 UCL	729.5		0.778		19.29		12.5		94.38		0.2		3.851		7 95	
Basis	KM(t)		KM(t)		KM(t)		KM(t)		KM(t)		MAX		KM(t)		MAX	
SCREENING VALUE	5,000		3300		1440		50		120		0.4		3900		118	
target organism	wildlife		mammal		mammal		terrestrial		mammal		terrestrial		mammal		wildlife	
Source	A		B		B		C		B		C		B		A	

MDLs for ND analytes are listed in the value column - not all MDL results were available

Values in blue are nondetects

results are in mg/kg

C ProUCL code (1 detect; 2 not detected)

A MTCA Table 749-3

B Oregon DEQ Ecological Screening Tables

C RAIS (Risk Assessment Information System - ORNL)

Appendix C

EES Environmental Consulting Inc.
240 N. Broadway #203
Portland, OR 97227
Telephone: 503.847.2740

BORING NO. **B-37/B-37A**
PROJECT **Plaid #324**
LOCATION **Seattle, WA**
PROJECT NO. **1133-01**
LOGGED BY **RR**

START CARD
COORDINATES
SURFACE ELEVATION
WELL ID
DATUM

SAMPLE INFORMATION						STRATA	DESCRIPTION	CONSTRUCTION DETAIL/ COMMENTS	ELEVATION FEET
DEPTH FEET	LAB SAMPLE ID	SAMPLE TYPE	PID (ppmV)	SHEEN	RECOVERY %				
							ASPHALT (AC).		
			19	No			Grayish brown SILTY GRAVEL (GP); moist.		
					100		Brown SANDY SILT (ML) with gravel; moist. Becomes gray.		
5	B-37: 4.5-5	Grab	2380	No			Obvious petroleum odor between 4.5 and 10 feet bgs.		
			179.5	No	100				
10			40.4	No					
			296	No	100		Brown SAND (SP) with gravel, sand is medium; moist.		
			11.5	No					
15							Brown SANDY GRAVEL (GP) with occasional cobbles; moist.		
			11.6	No	100				
			10.9	No					
20			26.2	No					
	B-37A: 23-23.5	Grab	24.7	No	100				

DRILLING CONTRACTOR **Holt Services, Inc.**
DRILLING METHOD **Sonic**
DRILLING EQUIPMENT **TSI 150 CC**
DRILLING STARTED **3/5/14** ENDED **3/5/14**

REMARKS **PID malfunction due to high ambient moisture, PID readings provided for qualitative purposes only.**

See key sheet for symbols and abbreviations used above.

EES LOG W H WELL & SHEEN - LOG A EWNN03 GD - 3/14/14 15 54 - C \USERS\PUBL C\DOCUMEN S\BEN LEY\G N \PROJEC S\PLA D 324 BOR NG LOGS 031314 GPJ

EES Environmental Consulting Inc.
240 N. Broadway #203
Portland, OR 97227
Telephone: 503.847.2740

BORING NO. **B-37/B-37A**
PROJECT **Plaid #324**
LOCATION **Seattle, WA**
PROJECT NO. **1133-01**
LOGGED BY **RR**

START CARD
COORDINATES
SURFACE ELEVATION
WELL ID
DATUM

SAMPLE INFORMATION						STRATA	DESCRIPTION	CONSTRUCTION DETAIL/ COMMENTS	ELEVATION FEET
DEPTH FEET	LAB SAMPLE ID	SAMPLE TYPE	PID (ppmV)	SHEEN	RECOVERY %				
			22.0	No			Brown SANDY GRAVEL (GP) with occasional cobbles; moist. *(continued)*		
			23.5	No	100				
			19.0	No					
30			10.9	No					
					100				
35			16.4	No					
					100				
			12.2	No					
40			12.0	No			Brown SAND with gravel (SP); moist.		
					100				
45			12.3	No					
					100				
			11.2	No					
50							Boring completed at 50 feet bgs. Borehole backfilled with hydrated bentonite and sealed at the surface with concrete.		

EES Environmental Consulting Inc.
240 N. Broadway #203
Portland, OR 97227
Telephone: 503.847.2740

BORING NO. **B-38**
PROJECT **Plaid #324**
LOCATION **Seattle, WA**
PROJECT NO. **1133-01**
LOGGED BY **RR**

START CARD
COORDINATES
SURFACE ELEVATION
WELL ID
DATUM

SAMPLE INFORMATION						STRATA	DESCRIPTION	CONSTRUCTION DETAIL/ COMMENTS	ELEVATION FEET
DEPTH FEET	LAB SAMPLE ID	SAMPLE TYPE	PID (ppmV)	SHEEN	RECOVERY %				
				No			ASPHALT (AC).		
							Grayish brown SILTY GRAVEL (GP); moist.		
				No	100		Brown SANDY SILT (ML) with gravel; moist. Becomes gray.		
5	B-38: 4.5-5	Grab		No					
				No	100				
				No					
10				No					
				No	100		Brown SAND (SP) with gravel, sand is medium; moist.		
				No					
15							Boring completed at 15 feet bgs. No obvious petroleum odor observed. Borehole backfilled with hydrated bentonite and sealed at the surface with concrete.		

DRILLING CONTRACTOR **Holt Services, Inc.**
DRILLING METHOD **Sonic**
DRILLING EQUIPMENT **TSI 150 CC**
DRILLING STARTED **3/5/14** ENDED **3/5/14**

REMARKS **PID malfunction during sampling due to high ambient moisture.**

See key sheet for symbols and abbreviations used above.

EES Environmental Consulting Inc.
240 N. Broadway #203
Portland, OR 97227
Telephone: 503.847.2740

BORING NO. **B-39**
PROJECT **Plaid #324**
LOCATION **Seattle, WA**
PROJECT NO. **1133-01**
LOGGED BY **RR**

START CARD
COORDINATES
SURFACE ELEVATION
WELL ID
DATUM

SAMPLE INFORMATION						STRATA	DESCRIPTION	CONSTRUCTION DETAIL/ COMMENTS	ELEVATION FEET
DEPTH FEET	LAB SAMPLE ID	SAMPLE TYPE	PID (ppmV)	SHEEN	RECOVERY %				
							ASPHALT (AC).		
				No			Grayish brown SILTY GRAVEL (GP); moist.		
					100		Brown SANDY SILT (ML) with gravel; moist.		
				No					
5				Slight			Becomes gray.		
	B-39: 7-7.5	Grab		Heavy	100		Obvious petroleum odor between 5 and 8 feet bgs.		
10				No					
				No					
					100		Brown SAND (SP) with gravel, sand is medium; moist.		
				No					
15							Boring completed at 15 feet bgs. Borehole backfilled with hydrated bentonite and sealed at the surface with concrete.		

DRILLING CONTRACTOR **Holt Services, Inc.**
DRILLING METHOD **Sonic**
DRILLING EQUIPMENT **TSI 150 CC**
DRILLING STARTED **3/5/14** ENDED **3/5/14**

REMARKS **PID malfunction during sampling due to high ambient moisture.**

See key sheet for symbols and abbreviations used above.

EES Environmental Consulting Inc.
240 N. Broadway #203
Portland, OR 97227
Telephone: 503.847.2740

BORING NO. **B-40**
PROJECT **Plaid #324**
LOCATION **Seattle, WA**
PROJECT NO. **1133-01**
LOGGED BY **RR**

START CARD
COORDINATES
SURFACE ELEVATION
WELL ID
DATUM

SAMPLE INFORMATION						STRATA	DESCRIPTION	CONSTRUCTION DETAIL/ COMMENTS	ELEVATION FEET
DEPTH FEET	LAB SAMPLE ID	SAMPLE TYPE	PID (ppmV)	SHEEN	RECOVERY %				
							ASPHALT (AC).		
				No			Grayish brown SILTY GRAVEL (GP); moist.		
					100		Brown SANDY SILT (ML) with gravel; moist.		
							Becomes gray. Obvious petroleum odor between 4.5 and 8 feet bgs.		
5				Slight					
				Slight					
	B-40: 8-8.5	Grab		Heavy	100				
10				No					
					100				
							Brown SAND (SP) with gravel, sand is medium; moist.		
				No					
15							Boring completed at 15 feet bgs. Borehole backfilled with hydrated bentonite and sealed at the surface with concrete.		

DRILLING CONTRACTOR **Holt Services, Inc.**
DRILLING METHOD **Sonic**
DRILLING EQUIPMENT **TSI 150 CC**
DRILLING STARTED **3/5/14** ENDED **3/5/14**

REMARKS **PID malfunction during sampling due to high ambient moisture.**

See key sheet for symbols and abbreviations used above.

EES Environmental Consulting Inc.
240 N. Broadway #203
Portland, OR 97227
Telephone: 503.847.2740

BORING NO. **B-41**
PROJECT **Plaid #324**
LOCATION **Seattle, WA**
PROJECT NO. **1133-01**
LOGGED BY **RR**

START CARD
COORDINATES
SURFACE ELEVATION
WELL ID
DATUM

SAMPLE INFORMATION						STRATA	DESCRIPTION	CONSTRUCTION DETAIL/ COMMENTS	ELEVATION FEET
DEPTH FEET	LAB SAMPLE ID	SAMPLE TYPE	PID (ppmV)	SHEEN	RECOVERY %				
							ASPHALT (AC).		
				No			Grayish brown SILTY GRAVEL (GP); moist.		
				No	100		Brown SANDY SILT (ML) with gravel; moist.		
5				No			Becomes gray.		
	B-41: 8-8.5	Grab		Heavy	100		Obvious petroleum odor at 8 feet bgs.		
10				No					
				No	100		Brown SAND (SP) with gravel, sand is medium; moist.		
				No					
15							Boring completed at 15 feet bgs. Borehole backfilled with hydrated bentonite and sealed at the surface with concrete.		

DRILLING CONTRACTOR **Holt Services, Inc.**
DRILLING METHOD **Sonic**
DRILLING EQUIPMENT **TSI 150 CC**
DRILLING STARTED **3/5/14** ENDED **3/5/14**

REMARKS **PID malfunction during sampling due to high ambient moisture.**

See key sheet for symbols and abbreviations used above.

Appendix D

EES Environmental Consulting, Inc.

Soil Vapor & Subslab Vapor Sampling Sheet

EES Project No. 433-01 | Location: White Center, WA

Site Name: Plaid Pantry 324 | Install Date: 3-4-14 | Sample Date: 3-4-14

Vapor Probe Construction

- Probe or Sample I.D.: SG-1
- Screen Material:
- Tube or Piping Material: Teflon
- Tube or Piping Diameter (Nom.): 1/4 Inches
- Slab Thickness: ____ Inches
- Probe Intake Depth: 60 Inches bgs
- Sub-Grade Aggregate Material:

Indoor Air Information

- Temperature: ____ °F
- Barometric Pressure: ____ ( )
- GEM Readings: ____ % O_2
- ____ % CO_2
- PID Reading: ____ ppm VOCs

Purge Volume Calculation:

- Sand Pack Dead Volume = ____ mL
- 3/8" Probe Length = ____ In (1.0 mL/in) = ____ mL
- 1/4" Tubing Length = 120 In (0.37 mL/in) = 44.4 mL
- Total Dead Volume: ____ mL
- Volumes Purged: 2 · 44.4 = 88.8 mL
- 24 seconds purge

Outdoor Air Information

- Temperature: 45 °F
- Barometric Pressure: ____ ( )

Leak Testing:

- Tracer Material: Helium
- Gas or Liquid? Gas
- Shroud Used? Yes
- Concentration in Shroud: 20.5 %
- Summa Train Tight? Yes - Tightness test for 1 min

Purge Equipment

- Peristaltic Pump / Purge Canister / Syringe
- Purge Rate: 200 mL/min
- Flow Controller Used? yes / no Rate: 200

Subslab Vapor Measurements (During/After Purging)

- Temperature: ____ °F
- Pressure: ____ ( )
- GEM Readings: ____ % O_2
- ____ % CO_2
- PID Reading (Stable): 0.6 ppm VOCs
- Tracer Detected? yes / (no)
- Concentration: 0 ppm

Sample Information

- Sample I.D.: SG-1
- Canister I.D.: A-9764
- Begin Vacuum: 29 In. Hg
- End Vacuum: 6 In. Hg
- Begin Sample Time: 0940
- End Sample Time: 0947
- Vacuum Gauge I.D. ____
- Flow Regulator I.D.: 30968
- Particulate Filter I.D.: ____

Notes:

Volume Calcs: (1 in^3 = 16.39 mL)
1/4-inch O.D. (0.170-inch I.D.) Tubing: 0.37 mL per linear inch of tubing
3/8-inch O.D. (0.277-inch I.D.) Tubing/Pipe: 1.0 mL per linear inch of tubing/piping

Handheld Meters:
RAE 2000 PID: Flow rate = 550 mL/min
Gas-Check Helium Meter: Flow rate = 2 mL/min

EES Environmental Consulting, Inc.

Soil Vapor & Subslab Vapor Sampling Sheet

EES Project No. 14-33-01 | Location: White Center, WA

Site Name: Plaid Pantry 324 | Install Date: 3-4-14 | Sample Date: 3-7-14

Vapor Probe Construction

Probe or Sample I.D.: SG-2

Screen Material:

Tube or Piping Material: Teflon

Tube or Piping Diameter (Nom.): 1/4 Inches

Slab Thickness: Inches

Probe Intake Depth: 60 Inches bgs

Sub-Grade Aggregate Material:

Indoor Air Information

Temperature: 45 °F

Barometric Pressure: — ( )

GEM Readings: — % O_2

% CO_2

PID Reading: — ppm VOCs

Purge Volume Calculation:

Sand Pack Dead Volume = mL

3/8" Probe Length = in (1.0 mL/in) = mL

1/4" Tubing Length = 120 in (0.37 mL/in) = 44.4 mL

Total Dead Volume: mL

Volumes Purged: 3 × 44.4 = 132 mL

40 seconds purge

Outdoor Air Information

Temperature: 45 °F

Barometric Pressure: — ( )

Leak Testing:

Tracer Material: Helium

Gas or Liquid? Gas

Shroud Used? Yes

Concentration in Shroud: 17.7 %

Summa Train Tight? Yes - Tightness test for 1 minute

Purge Equipment

Peristaltic Pump / Purge Canister / Syringe

Purge Rate: mL/min

Flow Controller Used? (yes) / no Rate: 200 mL/min

Subslab Vapor Measurements (During/After Purging)

Temperature: °F

Pressure: ( )

GEM Readings: — % O_2

% CO_2

PID Reading (Stable): 0.7 ppm VOCs

Tracer Detected? yes / (no)

Concentration: 0 ppm

Sample Information

Sample I.D.: SG-2

Canister I.D.: 34572

Begin Vacuum: 29 in. Hg

End Vacuum: 6 in. Hg

Begin Sample Time: 0852

End Sample Time: 0859

Vacuum Gauge I.D.: [illegible]

Flow Regulator I.D.: 30566

Particulate Filter I.D.: —

Notes:

Volume Calcs: (1 in^3 = 16.39 mL)

1/4-inch O.D. (0.170-inch I.D.) Tubing: 0.37 mL per linear inch of tubing

3/8-inch O.D. (0.277-inch I.D.) Tubing/Pipe: 1.0 mL per linear inch of tubing/piping

Handheld Meters:

RAE 2000 PID: Flow rate = 550 mL/min

Gas-Check Helium Meter: Flow rate = 2 mL/min

EES Environmental Consulting, Inc.

Soil Vapor & Subslab Vapor Sampling Sheet

EES Project No. 433-01 | Location: White Center, WA

Site Name: Plaid Pantry 324 | Install Date: 3-4-14 | Sample Date: 3-4-14

Vapor Probe Construction

Probe or Sample I.D.: SG-3

Screen Material:

Tube or Piping Material: Teflon lined polyethylene

Tube or Piping Diameter (Nom.): 1/4 Inches

Slab Thickness: Inches

Probe Intake Depth: 12.0 Inches bgs

Sub-Grade Aggregate Material:

Indoor Air Information

Temperature: °F

Barometric Pressure: ( )

GEM Readings: % O_2

% CO_2

PID Reading: ppm VOCs

Purge Volume Calculation:

Sand Pack Dead Volume = mL

3/8" Probe Length = In (1.0 mL/In) = mL

1/4" Tubing Length = 12.0 In (0.37 mL/In) = 4.44 mL

Total Dead Volume: 4.44 mL

Volumes Purged: 4.44 x 88.8 mL

24 seconds purge

Outdoor Air Information

Temperature: 50 °F

Barometric Pressure: ( )

Leak Testing:

Tracer Material: Helium

Gas or Liquid? Gas

Shroud Used? Yes

Concentration in Shroud:

Summa Train Tight? Yes- Tightness test for 1 min

Purge Equipment

(Peristaltic Pump) / Purge Canister / Syringe

Purge Rate: 200 mL/min

Flow Controller Used? (yes) / no Rate: 200

Subslab Vapor Measurements (During/After Purging)

Temperature: °F

Pressure: ( )

GEM Readings: % O_2

% CO_2

PID Reading (Stable): 0.6 ppm VOCs

Tracer Detected? yes / (no)

Concentration: 0 ppm

Sample Information

Sample I.D.: SG-3

Canister I.D.: 37108

Begin Vacuum: 28 In. Hg

End Vacuum: 6 In. Hg

Begin Sample Time: 1401

End Sample Time: 1408

Vacuum Gauge I.D.:

Flow Regulator I.D.: 30538

Particulate Filter I.D.:

Notes:

Volume Calcs: (1 in^3 = 16.39 mL)

1/4-Inch O.D. (0.170-Inch I.D.) Tubing: 0.37 mL per linear inch of tubing

3/8-Inch O.D. (0.277-Inch I.D.) Tubing/Pipe: 1.0 mL per linear inch of tubing/piping

Handheld Meters:

RAE 2000 PID: Flow rate = 550 mL/min

Gas-Check Helium Meter: Flow rate = 2 mL/min

EES Environmental Consulting, Inc.

Soil Vapor & Subslab Vapor Sampling Sheet

EES Project No. 1433-01 Location: White Center, WA

Site Name: Plaid Pantry 324 Install Date: 3-4-14 Sample Date: 3-4-14

Vapor Probe Construction

Probe or Sample I.D.: SG-4

Screen Material:

Tube or Piping Material: Teflon lined polyethylene

Tube or Piping Diameter (Nom.): 1/4" Inches

Slab Thickness: Inches

Probe Intake Depth: 120 Inches bgs

Sub-Grade Aggregate Material:

Indoor Air Information

Temperature: °F

Barometric Pressure: ( )

GEM Readings: % O_2

% CO_2

PID Reading: ppm VOCs

Purge Volume Calculation:

Sand Pack Dead Volume = mL

3/8" Probe Length = In (1.0 mL/in) = mL

1/4" Tubing Length = 120 In (0.37 mL/in) = 44.4 mL

Total Dead Volume: 44.4 mL

Volumes Purged: 2 × 44.4 = 88.8 mL

2 Sec Purge

Outdoor Air Information

Temperature: 50 °F

Barometric Pressure: ( )

Leak Testing:

Tracer Material: Helium

Gas or Liquid? Gas

Shroud Used? Yes

Concentration in Shroud:

Summa Train Tight? Yes - Tightness test for 1 min

Purge Equipment

Peristaltic Pump / Purge Canister / Syringe

Purge Rate: 200 mL/min

Flow Controller Used? (yes) / no Rate: 200

Subslab Vapor Measurements (During/After Purging)

Temperature: °F

Pressure: ( )

GEM Readings: % O_2

% CO_2

PID Reading (Stable): 0.3 ppm VOCs

Tracer Detected? yes / (no)

Concentration: 0 ppm

Sample Information

Sample I.D.: SG-4

Canister I.D.: 3-1738

Begin Vacuum: 29 In. Hg

End Vacuum: 6 In. Hg

Begin Sample Time: 1320

End Sample Time: 1332

Vacuum Gauge I.D.:

Flow Regulator I.D.: 30572

Particulate Filter I.D.:

Notes:

Volume Calcs: (1 in^3 = 16.39 mL)

1/4-inch O.D. (0.170-inch I.D.) Tubing: 0.37 mL per linear inch of tubing

3/8-inch O.D. (0.277-inch I.D.) Tubing/Pipe: 1.0 mL per linear inch of tubing/piping

Handheld Meters:

RAE 2000 PID: Flow rate = 550 mL/min

Gas-Check Helium Meter: Flow rate = 2 mL/min

EES Environmental Consulting, Inc.

Soil Vapor & Subslab Vapor Sampling Sheet

EES Project No. 433-01 | Location: White Center, WA

Site Name: Plaid Pantry 324 | Install Date: | Sample Date:

Vapor Probe Construction

Probe or Sample I.D.: SG-5

Screen Material: —

Tube or Piping Material: Teflon lined polyethylene

Tube or Piping Diameter (Nom.): 1/4 Inches

Slab Thickness: — Inches

Probe Intake Depth: 120 Inches bgs

Sub-Grade Aggregate Material: —

Indoor Air Information

Temperature: — °F

Barometric Pressure: — ( )

GEM Readings: — % O_2

— % CO_2

PID Reading: — ppm VOCs

Purge Volume Calculation:

Sand Pack Dead Volume = mL

3/8" Probe Length = In (1.0 mL/in) = mL

1/4" Tubing Length = 120 In (0.37 mL/in) = 44.4 mL

Total Dead Volume: 44.4 mL

Volumes Purged: 2 x 44.4 = 88.8 mL

2L see purge

Outdoor Air Information

Temperature: 50 °F

Barometric Pressure: ( )

Leak Testing:

Tracer Material: Helium

Gas or Liquid? Gas

Shroud Used? Yes

Concentration in Shroud:

Summa Train Tight? Yes. Tightness test for 1 min

Purge Equipment

Peristaltic Pump / Purge Canister / Syringe

Purge Rate: 200 mL/min

Flow Controller Used? (yes) / no Rate: 200

Subslab Vapor Measurements (During/After Purging)

Temperature: — °F

Pressure: — ( )

GEM Readings: — % O_2

— % CO_2

PID Reading (Stable): 0 ppm VOCs

Tracer Detected? yes / (no)

Concentration: 0 ppm

Sample Information

Sample I.D.: SG-5

Canister I.D.: 30,56

Begin Vacuum: 29 in. Hg

End Vacuum: 12.5 in. Hg

Begin Sample Time: 1415

End Sample Time: 1645

Vacuum Gauge I.D. 30

Flow Regulator I.D.: 304602

Particulate Filter I.D.: —

Notes:

Second try, 5 feet South of first attempt.

Volume Calcs: ($1\ in^3 = 16.39$ mL)

1/4-inch O.D. (0.170-inch I.D.) Tubing: 0.37 mL per linear inch of tubing

3/8-inch O.D. (0.277-inch I.D.) Tubing/Pipe: 1.0 mL per linear inch of tubing/piping

Handheld Meters:

RAE 2000 PID: Flow rate = 550 mL/min

Gas-Check Helium Meter: Flow rate = 2 mL/min

EES Environmental Consulting, Inc.

Soil Vapor & Subslab Vapor Sampling Sheet

EES Project No. 433-01 | Location: White Center, WA

Site Name: Plaid Pantry 324 | Install Date: 3-4-14 | Sample Date: 3-4-14

Vapor Probe Construction

Probe or Sample I.D.: SG-5

Screen Material:

Tube or Piping Material: Teflon

Tube or Piping Diameter (Nom.): 1/4" Inches

Slab Thickness: Inches

Probe Intake Depth: 120 Inches bgs

Sub-Grade Aggregate Material:

Indoor Air Information

Temperature: °F

Barometric Pressure: ( )

GEM Readings: % O_2

% CO_2

PID Reading: ppm VOCs

Purge Volume Calculation:

Sand Pack Dead Volume = mL

3/8" Probe Length = 120 in (1.0 mL/in) = mL

1/4" Tubing Length = ~~444~~ in (0.37 mL/in) = 44.4 mL

Total Dead Volume: 44.4 mL

Volumes Purged: 44.4 x 2 = 88.8 mL

20 seconds purge

Outdoor Air Information

Temperature: 45 °F

Barometric Pressure: ( )

Leak Testing:

Tracer Material: Helium

Gas or Liquid? Gas

Shroud Used? Yes

Concentration In Shroud: 13.7 %

Summa Train Tight? Yes - tightness test for 1min

Purge Equipment

Peristaltic Pump / Purge Canister / Syringe

Purge Rate: 200 mL/min

Flow Controller Used? (yes) / no Rate: 200

Subslab Vapor Measurements (During/After Purging)

Temperature: °F

Pressure: ( )

GEM Readings: % O_2

% CO_2

PID Reading (Stable): 0.5 ppm VOCs

Tracer Detected? yes / (no)

Concentration: 1.25 ppb

Sample Information

Sample I.D.: SG-5

Canister I.D.: A9718

Begin Vacuum: 29 In. Hg

End Vacuum: 23.5 In. Hg

Begin Sample Time: 1223

End Sample Time: 1245

Vacuum Gauge I.D. 40919

Flow Regulator I.D.:

Particulate Filter I.D.:

Notes:

Volume Calcs: (1 in^3 = 16.39 mL)

1/4-inch O.D. (0.170-inch I.D.) Tubing: 0.37 mL per linear inch of tubing

3/8-inch O.D. (0.277-inch I.D.) Tubing/Pipe: 1.0 mL per linear inch of tubing/piping

Handheld Meters:

RAE 2000 PID: Flow rate = 550 mL/min

Gas-Check Helium Meter: Flow rate = 2 mL/min

EES Environmental Consulting, Inc.

Soil Vapor & Subslab Vapor Sampling Sheet

EES Project No. 1133-01 | Location: White Center, WA

Site Name: Plaid Pantry 324 | Install Date: 3-4-11 | Sample Date: 3-4-11

Vapor Probe Construction

Probe or Sample I.D.: SG-6

Screen Material: —

Tube or Piping Material: Teflon

Tube or Piping Diameter (Nom.): 1/4 Inches

Slab Thickness: — Inches

Probe Intake Depth: 60 Inches bgs

Sub-Grade Aggregate Material:

Indoor Air Information

Temperature: — °F

Barometric Pressure: — ( )

GEM Readings: — % O_2

— % CO_2

PID Reading: 0.0 ppm VOCs

Purge Volume Calculation:

Sand Pack Dead Volume = mL

3/8" Probe Length = in (1.0 mL/in) = mL

1/4" Tubing Length = 120 in (0.37 mL/in) = 44.4 mL

Total Dead Volume: 44.4 mL

Volumes Purged: 2 x 44.4 = 88.8 mL

24 seconds purged

Outdoor Air Information

Temperature: 45 °F

Barometric Pressure: ( )

Leak Testing:

Tracer Material: Helium

Gas or Liquid? Gas

Shroud Used? Yes

Concentration in Shroud: 22.5 %

Summa Train Tight? Yes - Tightness test for 1 min

Purge Equipment

(Peristaltic Pump) / Purge Canister / Syringe

Purge Rate: 200 mL/min

Flow Controller Used? (yes) / no Rate: 200

Subslab Vapor Measurements (During/After Purging)

Temperature: — °F

Pressure: — ( )

GEM Readings: — % O_2

— % CO_2

PID Reading (Stable): ppm VOCs

Tracer Detected? yes / (no)

Concentration: 25? ppm

Sample Information

Sample I.D.: SG-6

Canister I.D.: 33708

Begin Vacuum: 29 in. Hg

End Vacuum: 6 in. Hg

Begin Sample Time: 1130

End Sample Time: 1137

Vacuum Gauge I.D. —

Flow Regulator I.D.: 2011

Particulate Filter I.D.: —

Notes:

Volume Calcs: (1 in^3 = 16.39 mL)

1/4-inch O.D. (0.170-inch I.D.) Tubing: 0.37 mL per linear inch of tubing

3/8-inch O.D. (0.277-inch I.D.) Tubing/Pipe: 1.0 mL per linear inch of tubing/piping

Handheld Meters:

RAE 2000 PID: Flow rate = 550 mL/min

Gas-Check Helium Meter: Flow rate = 2 mL/min

EES Environmental Consulting, Inc.

Soil Vapor & Subslab Vapor Sampling Sheet

EES Project No. 1133-01 | Location: White Center, WA

Site Name: Plaid Pantry 324 | Install Date: 3-4-14 | Sample Date: 3-4-14

Vapor Probe Construction

Probe or Sample I.D.: SG-7

Screen Material: —

Tube or Piping Material: Teflon

Tube or Piping Diameter (Nom.): 1/4 Inches

Slab Thickness: — Inches

Probe Intake Depth: 60 Inches bgs

Sub-Grade Aggregate Material:

Indoor Air Information

Temperature: — °F

Barometric Pressure: — ( )

GEM Readings: — % O_2

— % CO_2

PID Reading: 0.0 ppm VOCs

Purge Volume Calculation:

Sand Pack Dead Volume = mL

3/8" Probe Length = In (1.0 mL/in) = mL

1/4" Tubing Length = 120 In (0.37 mL/in) = 44.4 mL

Total Dead Volume: 44.4 mL

Volumes Purged: 2 × 44.4 = 88.8 mL

24 seconds purge

Outdoor Air Information

Temperature: 45 °F

Barometric Pressure: (—)

Leak Testing:

Tracer Material: Helium

Gas or Liquid? Gas

Shroud Used? Yes

Concentration In Shroud: 22 %

Summa Train Tight? Yes - Tightness test for 1 min

Purge Equipment

(Peristaltic Pump) / Purge Canister / Syringe

Purge Rate: 200 mL/min

Flow Controller Used? (yes) / no Rate: 200

Subslab Vapor Measurements (During/After Purging)

Temperature: — °F

Pressure: — ( )

GEM Readings: — % O_2

— % CO_2

PID Reading (Stable): 0.3 ppm VOCs

Tracer Detected? yes / (no)

Concentration: ~~2 ppm~~ 25 ppm

Sample Information

Sample I.D.: SG-7

Canister I.D.: 11463

Begin Vacuum: ~~10~~ 29 In. Hg

End Vacuum: ~~10~~ 8 6 In. Hg

Begin Sample Time: 1022

End Sample Time: 1028

Vacuum Gauge I.D —

Flow Regulator I.D.: 201 (a)

Particulate Filter I.D.: —

Notes:

Volume Calcs: (1 in^3 = 16.39 mL)

1/4-inch O.D. (0.170-inch I.D.) Tubing: 0.37 mL per linear inch of tubing

3/8-inch O.D. (0.277-inch I.D.) Tubing/Pipe: 1.0 mL per linear inch of tubing/piping

Handheld Meters:

RAE 2000 PID: Flow rate = 550 mL/min

Gas-Check Helium Meter: Flow rate = 2 mL/min

Appendix E

Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

Monday, March 31, 2014

Chris Rhea
EES Environmental Inc
240 N Broadway Ste 203
Portland, OR 97227

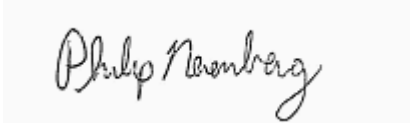
RE: Plaid / Plaid Pantry 324 / 1133-01

Enclosed are the results of analyses for work order A4C0203, which was received by the laboratory on 3/6/2014 at 4:00:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: pnerenberg@apex-labs.com, or by phone at 503-718-2323.

Apex Laboratories



Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

EES Environmental Inc	Project: **Plaid**	
240 N Broadway Ste 203	Project Number: Plaid Pantry 324 / 1133-01	**Reported:**
Portland, OR 97227	Project Manager: Chris Rhea	03/31/14 15:19

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B-41: 8-8.5	A4C0203-01	Soil	03/05/14 08:45	03/06/14 16:00
B-40: 8-8.5	A4C0203-03	Soil	03/05/14 09:30	03/06/14 16:00
B-39: 7-7.5	A4C0203-05	Soil	03/05/14 10:00	03/06/14 16:00
B-38: 4.5-5	A4C0203-07	Soil	03/05/14 10:40	03/06/14 16:00
B-37: 4.5-5	A4C0203-09	Soil	03/05/14 13:05	03/06/14 16:00
B-37A: 23-23.5	A4C0203-13	Soil	03/05/14 14:50	03/06/14 16:00

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

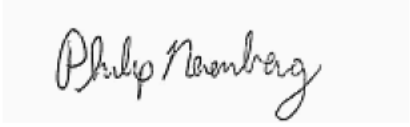
EES Environmental Inc	Project: **Plaid**	
240 N Broadway Ste 203	Project Number: Plaid Pantry 324 / 1133-01	**Reported:**
Portland, OR 97227	Project Manager: Chris Rhea	03/31/14 15:19

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene to Naphthalene) by NWTPH-Gx

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
B-41: 8-8.5 (A4C0203-01)			**Matrix: Soil**		**Batch: 4030207**			
Gasoline Range Organics	**2910**	---	58.9	mg/kg dry	500	03/07/14 17:06	NWTPH-Gx (MS)	Q-42
Surrogate: 4-Bromofluorobenzene (Sur)			*Recovery: 116 %*	*Limits: 50-150 %*	1	"	"	
1,4-Difluorobenzene (Sur)			*125 %*	*Limits: 50-150 %*	"	"	"	
B-40: 8-8.5 (A4C0203-03)			**Matrix: Soil**		**Batch: 4030207**			
Gasoline Range Organics	**2520**	---	49.2	mg/kg dry	500	03/07/14 19:15	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)			*Recovery: 119 %*	*Limits: 50-150 %*	1	"	"	
1,4-Difluorobenzene (Sur)			*121 %*	*Limits: 50-150 %*	"	"	"	
B-39: 7-7.5 (A4C0203-05)			**Matrix: Soil**		**Batch: 4030207**			
Gasoline Range Organics	**5970**	---	70.9	mg/kg dry	500	03/07/14 20:07	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)			*Recovery: 124 %*	*Limits: 50-150 %*	1	"	"	
1,4-Difluorobenzene (Sur)			*139 %*	*Limits: 50-150 %*	"	"	"	
B-38: 4.5-5 (A4C0203-07)			**Matrix: Soil**		**Batch: 4030207**			
Gasoline Range Organics	**22.3**	---	3.99	mg/kg dry	50	03/07/14 18:23	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)			*Recovery: 101 %*	*Limits: 50-150 %*	1	"	"	
1,4-Difluorobenzene (Sur)			*118 %*	*Limits: 50-150 %*	"	"	"	
B-37: 4.5-5 (A4C0203-09)			**Matrix: Soil**		**Batch: 4030207**			
Gasoline Range Organics	**2120**	---	39.5	mg/kg dry	500	03/07/14 19:41	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)			*Recovery: 132 %*	*Limits: 50-150 %*	1	"	"	
1,4-Difluorobenzene (Sur)			*122 %*	*Limits: 50-150 %*	"	"	"	
B-37A: 23-23.5 (A4C0203-13)			**Matrix: Soil**		**Batch: 4030207**			
Gasoline Range Organics	ND	---	4.59	mg/kg dry	50	03/07/14 18:49	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)			*Recovery: 94 %*	*Limits: 50-150 %*	1	"	"	
1,4-Difluorobenzene (Sur)			*116 %*	*Limits: 50-150 %*	"	"	"	

Apex Laboratories



Philip Nerenberg, Lab Director

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Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

EES Environmental Inc	Project: **Plaid**	
240 N Broadway Ste 203	Project Number: Plaid Pantry 324 / 1133-01	**Reported:**
Portland, OR 97227	Project Manager: Chris Rhea	03/31/14 15:19

ANALYTICAL SAMPLE RESULTS

RBCA Compounds (BTEX+) by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
B-41: 8-8.5 (A4C0203-01)			**Matrix: Soil**		**Batch: 4030207**			
Benzene	**448**	---	147	ug/kg dry	500	03/07/14 17:06	5035/8260B	Q-42
Toluene	**51300**	---	589	"	"	"	"	Q-42
Ethylbenzene	**49000**	---	295	"	"	"	"	Q-42
Xylenes, total	**286000**	---	884	"	"	"	"	Q-42
Naphthalene	**9610**	---	1180	"	"	"	"	Q-42
Methyl tert-butyl ether (MTBE)	ND	---	589	"	"	"	"	
Isopropylbenzene	**4580**	---	589	"	"	"	"	Q-42
n-Propylbenzene	**15800**	---	295	"	"	"	"	Q-42
1,2,4-Trimethylbenzene	**90300**	---	589	"	"	"	"	Q-42
1,3,5-Trimethylbenzene	**27300**	---	589	"	"	"	"	Q-42
1,2-Dibromoethane (EDB)	ND	---	589	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	---	295	"	"	"	"	
Surrogate: Dibromofluoromethane (Surr)			*Recovery: 95 %*	*Limits: 70-130 %*	1	"	"	
1,4-Difluorobenzene (Surr)			*105 %*	*Limits: 70-130 %*	"	"	"	
Toluene-d8 (Surr)			*87 %*	*Limits: 70-130 %*	"	"	"	
4-Bromofluorobenzene (Surr)			*85 %*	*Limits: 70-130 %*	"	"	"	
B-40: 8-8.5 (A4C0203-03)			**Matrix: Soil**		**Batch: 4030207**			
Benzene	**6580**	---	123	ug/kg dry	500	03/07/14 19:15	5035/8260B	
Ethylbenzene	**37200**	---	246	"	"	"	"	
Xylenes, total	**232000**	---	738	"	"	"	"	
Naphthalene	**8990**	---	984	"	"	"	"	
Methyl tert-butyl ether (MTBE)	ND	---	492	"	"	"	"	
Isopropylbenzene	**3700**	---	492	"	"	"	"	
n-Propylbenzene	**13800**	---	246	"	"	"	"	
1,2,4-Trimethylbenzene	**81600**	---	492	"	"	"	"	
1,3,5-Trimethylbenzene	**25500**	---	492	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	---	492	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	---	246	"	"	"	"	
Surrogate: Dibromofluoromethane (Surr)			*Recovery: 93 %*	*Limits: 70-130 %*	1	"	"	
1,4-Difluorobenzene (Surr)			*104 %*	*Limits: 70-130 %*	"	"	"	
Toluene-d8 (Surr)			*89 %*	*Limits: 70-130 %*	"	"	"	
4-Bromofluorobenzene (Surr)			*88 %*	*Limits: 70-130 %*	"	"	"	
B-40: 8-8.5 (A4C0203-03RE1)			**Matrix: Soil**		**Batch: 4030248**			
Toluene	**115000**	---	5590	ug/kg dry	5000	03/10/14 20:17	5035/8260B	
Surrogate: Dibromofluoromethane (Surr)			*Recovery: 100 %*	*Limits: 70-130 %*	1	"	"	
1,4-Difluorobenzene (Surr)			*107 %*	*Limits: 70-130 %*	"	"	"	

Apex Laboratories

Philip Nerenberg, Lab Director

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Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

EES Environmental Inc	Project: **Plaid**	
240 N Broadway Ste 203	Project Number: Plaid Pantry 324 / 1133-01	**Reported:**
Portland, OR 97227	Project Manager: Chris Rhea	03/31/14 15:19

ANALYTICAL SAMPLE RESULTS

RBCA Compounds (BTEX+) by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
B-40: 8-8.5 (A4C0203-03RE1)			**Matrix: Soil**		**Batch: 4030248**			
Surrogate: Toluene-d8 (Surr)			*Recovery: 88 %*	*Limits: 70-130 %*	1	"	5035/8260B	
4-Bromofluorobenzene (Surr)			*87 %*	*Limits: 70-130 %*	"	"	"	
B-39: 7-7.5 (A4C0203-05)			**Matrix: Soil**		**Batch: 4030207**			
Benzene	**11100**	---	177	ug/kg dry	500	03/07/14 20:07	5035/8260B	
Ethylbenzene	**122000**	---	355	"	"	"	"	
Naphthalene	**21900**	---	1420	"	"	"	"	
Methyl tert-butyl ether (MTBE)	ND	---	709	"	"	"	"	
Isopropylbenzene	**11000**	---	709	"	"	"	"	
n-Propylbenzene	**42300**	---	355	"	"	"	"	
1,3,5-Trimethylbenzene	**69300**	---	709	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	---	709	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	---	355	"	"	"	"	
Surrogate: Dibromofluoromethane (Surr)			*Recovery: 101 %*	*Limits: 70-130 %*	1	"	"	
1,4-Difluorobenzene (Surr)			*107 %*	*Limits: 70-130 %*	"	"	"	
Toluene-d8 (Surr)			*89 %*	*Limits: 70-130 %*	"	"	"	
4-Bromofluorobenzene (Surr)			*86 %*	*Limits: 70-130 %*	"	"	"	
B-39: 7-7.5 (A4C0203-05RE1)			**Matrix: Soil**		**Batch: 4030248**			
Toluene	**95800**	---	4910	ug/kg dry	5000	03/10/14 20:43	5035/8260B	
Xylenes, total	**234000**	---	7360	"	"	"	"	
1,2,4-Trimethylbenzene	**68000**	---	4910	"	"	"	"	
Surrogate: Dibromofluoromethane (Surr)			*Recovery: 103 %*	*Limits: 70-130 %*	1	"	"	
1,4-Difluorobenzene (Surr)			*107 %*	*Limits: 70-130 %*	"	"	"	
Toluene-d8 (Surr)			*84 %*	*Limits: 70-130 %*	"	"	"	
4-Bromofluorobenzene (Surr)			*91 %*	*Limits: 70-130 %*	"	"	"	
B-38: 4.5-5 (A4C0203-07)			**Matrix: Soil**		**Batch: 4030207**			
Benzene	**335**	---	9.98	ug/kg dry	50	03/07/14 18:23	5035/8260B	
Toluene	**732**	---	39.9	"	"	"	"	
Ethylbenzene	**320**	---	20.0	"	"	"	"	
Xylenes, total	**1890**	---	59.9	"	"	"	"	
Naphthalene	**95.4**	---	79.9	"	"	"	"	
Methyl tert-butyl ether (MTBE)	ND	---	39.9	"	"	"	"	
Isopropylbenzene	ND	---	39.9	"	"	"	"	
n-Propylbenzene	**90.2**	---	20.0	"	"	"	"	
1,2,4-Trimethylbenzene	**668**	---	39.9	"	"	"	"	
1,3,5-Trimethylbenzene	**242**	---	39.9	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	---	39.9	"	"	"	"	

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EES Environmental Inc	Project: **Plaid**	
240 N Broadway Ste 203	Project Number: Plaid Pantry 324 / 1133-01	**Reported:**
Portland, OR 97227	Project Manager: Chris Rhea	03/31/14 15:19

ANALYTICAL SAMPLE RESULTS

RBCA Compounds (BTEX+) by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
B-38: 4.5-5 (A4C0203-07)			**Matrix: Soil**		**Batch: 4030207**			
1,2-Dichloroethane (EDC)	ND	---	20.0	ug/kg dry	50	"	5035/8260B	
Surrogate: Dibromofluoromethane (Surr)			*Recovery: 98 %*	*Limits: 70-130 %*	1	"	"	
1,4-Difluorobenzene (Surr)			*105 %*	*Limits: 70-130 %*	"	"	"	
Toluene-d8 (Surr)			*90 %*	*Limits: 70-130 %*	"	"	"	
4-Bromofluorobenzene (Surr)			*90 %*	*Limits: 70-130 %*	"	"	"	
B-37: 4.5-5 (A4C0203-09)			**Matrix: Soil**		**Batch: 4030207**			
Benzene	**1620**	---	98.7	ug/kg dry	500	03/07/14 19:41	5035/8260B	
Toluene	**13600**	---	395	"	"	"	"	
Ethylbenzene	**17500**	---	197	"	"	"	"	
Xylenes, total	**160000**	---	592	"	"	"	"	
Naphthalene	**6210**	---	790	"	"	"	"	
Methyl tert-butyl ether (MTBE)	ND	---	395	"	"	"	"	
Isopropylbenzene	**2580**	---	395	"	"	"	"	
n-Propylbenzene	**8300**	---	197	"	"	"	"	
1,2,4-Trimethylbenzene	**63700**	---	395	"	"	"	"	
1,3,5-Trimethylbenzene	**25800**	---	395	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	---	395	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	---	197	"	"	"	"	
Surrogate: Dibromofluoromethane (Surr)			*Recovery: 98 %*	*Limits: 70-130 %*	1	"	"	
1,4-Difluorobenzene (Surr)			*107 %*	*Limits: 70-130 %*	"	"	"	
Toluene-d8 (Surr)			*86 %*	*Limits: 70-130 %*	"	"	"	
4-Bromofluorobenzene (Surr)			*89 %*	*Limits: 70-130 %*	"	"	"	
B-37A: 23-23.5 (A4C0203-13RE1)			**Matrix: Soil**		**Batch: 4030248**			
Benzene	ND	---	11.5	ug/kg dry	50	03/10/14 18:33	5035/8260B	
Toluene	ND	---	45.9	"	"	"	"	
Ethylbenzene	ND	---	22.9	"	"	"	"	
Xylenes, total	ND	---	68.8	"	"	"	"	
Naphthalene	ND	---	91.8	"	"	"	"	
Methyl tert-butyl ether (MTBE)	ND	---	45.9	"	"	"	"	
Isopropylbenzene	ND	---	45.9	"	"	"	"	
n-Propylbenzene	ND	---	22.9	"	"	"	"	
1,2,4-Trimethylbenzene	ND	---	45.9	"	"	"	"	
1,3,5-Trimethylbenzene	ND	---	45.9	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	---	45.9	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	---	22.9	"	"	"	"	
Surrogate: Dibromofluoromethane (Surr)			*Recovery: 104 %*	*Limits: 70-130 %*	1	"	"	

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EES Environmental Inc	Project: **Plaid**	
240 N Broadway Ste 203	Project Number: Plaid Pantry 324 / 1133-01	**Reported:**
Portland, OR 97227	Project Manager: Chris Rhea	03/31/14 15:19

ANALYTICAL SAMPLE RESULTS

RBCA Compounds (BTEX+) by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
B-37A: 23-23.5 (A4C0203-13RE1)			**Matrix: Soil**		**Batch: 4030248**			
Surrogate: 1,4-Difluorobenzene (Surr)			*Recovery: 110 %*	*Limits: 70-130 %*	1	"	5035/8260B	
Toluene-d8 (Surr)			*89 %*	*Limits: 70-130 %*	"	"	"	
4-Bromofluorobenzene (Surr)			*88 %*	*Limits: 70-130 %*	"	"	"	

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ANALYTICAL SAMPLE RESULTS

Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
B-41: 8-8.5 (A4C0203-01)			**Matrix: Soil**					
Batch: 4030304								
Total Organic Carbon	**500**	---	200	mg/kg	1	03/17/14 15:50	SM 5310B MOD	
B-40: 8-8.5 (A4C0203-03)			**Matrix: Soil**					
Batch: 4030304								
Total Organic Carbon	**370**	---	200	mg/kg	1	03/17/14 15:50	SM 5310B MOD	
B-39: 7-7.5 (A4C0203-05)			**Matrix: Soil**					
Batch: 4030304								
Total Organic Carbon	**460**	---	200	mg/kg	1	03/17/14 15:50	SM 5310B MOD	
B-38: 4.5-5 (A4C0203-07)			**Matrix: Soil**					
Batch: 4030304								
Total Organic Carbon	**420**	---	200	mg/kg	1	03/17/14 15:50	SM 5310B MOD	
B-37: 4.5-5 (A4C0203-09)			**Matrix: Soil**					
Batch: 4030304								
Total Organic Carbon	**1000**	---	200	mg/kg	1	03/17/14 15:50	SM 5310B MOD	

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240 N Broadway Ste 203	Project Number: Plaid Pantry 324 / 1133-01	**Reported:**
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ANALYTICAL SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
B-41: 8-8.5 (A4C0203-01)			**Matrix: Soil**		**Batch: 4030209**			
% Solids	**83.1**	---	1.00	% by Weight	1	03/10/14 10:14	EPA 8000C	
B-40: 8-8.5 (A4C0203-03)			**Matrix: Soil**		**Batch: 4030209**			
% Solids	**89.4**	---	1.00	% by Weight	1	03/10/14 10:14	EPA 8000C	
B-39: 7-7.5 (A4C0203-05)			**Matrix: Soil**		**Batch: 4030209**			
% Solids	**90.1**	---	1.00	% by Weight	1	03/10/14 10:14	EPA 8000C	
B-38: 4.5-5 (A4C0203-07)			**Matrix: Soil**		**Batch: 4030209**			
% Solids	**94.1**	---	1.00	% by Weight	1	03/10/14 10:14	EPA 8000C	
B-37: 4.5-5 (A4C0203-09)			**Matrix: Soil**		**Batch: 4030209**			
% Solids	**89.2**	---	1.00	% by Weight	1	03/10/14 10:14	EPA 8000C	
B-37A: 23-23.5 (A4C0203-13)			**Matrix: Soil**		**Batch: 4030209**			
% Solids	**85.4**	---	1.00	% by Weight	1	03/10/14 10:14	EPA 8000C	

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240 N Broadway Ste 203	Project Number: Plaid Pantry 324 / 1133-01	**Reported:**
Portland, OR 97227	Project Manager: Chris Rhea	03/31/14 15:19

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene to Naphthalene) by NWTPH-Gx

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4030207 - EPA 5035A							**Soil**					
Blank (4030207-BLK1)					Prepared: 03/07/14 12:00		Analyzed: 03/07/14 16:40					
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	---	3.33	mg/kg wet	50	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 91 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*111 %*	*50-150 %*			*"*					
LCS (4030207-BS2)					Prepared: 03/07/14 12:00		Analyzed: 03/07/14 16:14					
NWTPH-Gx (MS)												
Gasoline Range Organics	24.5	---	5.00	mg/kg wet	50	25.0	---	98	70-130%	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 96 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*111 %*	*50-150 %*			*"*					
Duplicate (4030207-DUP1)					Prepared: 03/05/14 08:45		Analyzed: 03/07/14 17:32					
QC Source Sample: B-41: 8-8.5 (A4C0203-01)												
NWTPH-Gx (MS)												
Gasoline Range Organics	**4620**	---	56.4	mg/kg dry	500	---	2910	---	---	46	30%	Q-04
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 128 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*127 %*	*50-150 %*			*"*					

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EES Environmental Inc	Project: **Plaid**	
240 N Broadway Ste 203	Project Number: Plaid Pantry 324 / 1133-01	**Reported:**
Portland, OR 97227	Project Manager: Chris Rhea	03/31/14 15:19

QUALITY CONTROL (QC) SAMPLE RESULTS

RBCA Compounds (BTEX+) by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4030207 - EPA 5035A							**Soil**					
Blank (4030207-BLK1)					Prepared: 03/07/14 12:00 Analyzed: 03/07/14 16:40							
5035/8260B												
Benzene	ND	---	8.33	ug/kg wet	50	---	---	---	---	---	---	
Toluene	ND	---	33.3	"	"	---	---	---	---	---	---	
Ethylbenzene	ND	---	16.7	"	"	---	---	---	---	---	---	
Xylenes, total	ND	---	50.0	"	"	---	---	---	---	---	---	
Naphthalene	ND	---	66.7	"	"	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	---	33.3	"	"	---	---	---	---	---	---	
Isopropylbenzene	ND	---	33.3	"	"	---	---	---	---	---	---	
n-Propylbenzene	ND	---	16.7	"	"	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	---	33.3	"	"	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	---	33.3	"	"	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	---	33.3	"	"	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	---	16.7	"	"	---	---	---	---	---	---	
Surr: Dibromofluoromethane (Surr)			*Recovery: 98 %*		*Limits: 70-130 %*			*Dilution: 1x*				
1,4-Difluorobenzene (Surr)			*103 %*		*70-130 %*			*"*				
Toluene-d8 (Surr)			*86 %*		*70-130 %*			*"*				
4-Bromofluorobenzene (Surr)			*92 %*		*70-130 %*			*"*				
LCS (4030207-BS1)					Prepared: 03/07/14 12:00 Analyzed: 03/07/14 15:48							
5035/8260B												
Benzene	1010	---	12.5	ug/kg wet	50	1000	---	101	65-135%	---	---	
Toluene	900	---	50.0	"	"	"	---	90	"	---	---	
Ethylbenzene	908	---	25.0	"	"	"	---	91	"	---	---	
Xylenes, total	2760	---	75.0	"	"	3000	---	92	"	---	---	
Naphthalene	813	---	100	"	"	1000	---	81	"	---	---	
Methyl tert-butyl ether (MTBE)	1010	---	50.0	"	"	"	---	101	"	---	---	
Isopropylbenzene	871	---	50.0	"	"	"	---	87	"	---	---	
n-Propylbenzene	935	---	25.0	"	"	"	---	94	"	---	---	
1,2,4-Trimethylbenzene	949	---	50.0	"	"	"	---	95	"	---	---	
1,3,5-Trimethylbenzene	970	---	50.0	"	"	"	---	97	"	---	---	
1,2-Dibromoethane (EDB)	942	---	50.0	"	"	"	---	94	"	---	---	
1,2-Dichloroethane (EDC)	1090	---	25.0	"	"	"	---	109	"	---	---	
Surr: Dibromofluoromethane (Surr)			*Recovery: 98 %*		*Limits: 70-130 %*			*Dilution: 1x*				
1,4-Difluorobenzene (Surr)			*106 %*		*70-130 %*			*"*				
Toluene-d8 (Surr)			*85 %*		*70-130 %*			*"*				
4-Bromofluorobenzene (Surr)			*86 %*		*70-130 %*			*"*				

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EES Environmental Inc	Project: **Plaid**	
240 N Broadway Ste 203	Project Number: Plaid Pantry 324 / 1133-01	**Reported:**
Portland, OR 97227	Project Manager: Chris Rhea	03/31/14 15:19

QUALITY CONTROL (QC) SAMPLE RESULTS

RBCA Compounds (BTEX+) by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4030207 - EPA 5035A							**Soil**					
Duplicate (4030207-DUP1)					Prepared: 03/05/14 08:45 Analyzed: 03/07/14 17:32							
QC Source Sample: B-41: 8-8.5 (A4C0203-01)												
5035/8260B												
Benzene	**727**	---	141	ug/kg dry	500	---	448	---	---	48	30%	Q-04
Toluene	**91600**	---	564	"	"	---	51300	---	---	56	30%	Q-04
Ethylbenzene	**79100**	---	282	"	"	---	49000	---	---	47	30%	Q-04
Xylenes, total	**466000**	---	846	"	"	---	286000	---	---	48	30%	E, Q-04
Naphthalene	**14100**	---	1130	"	"	---	9610	---	---	38	30%	Q-04
Methyl tert-butyl ether (MTBE)	ND	---	564	"	"	---	ND	---	---	---	30%	
Isopropylbenzene	**7660**	---	564	"	"	---	4580	---	---	50	30%	Q-04
n-Propylbenzene	**25900**	---	282	"	"	---	15800	---	---	48	30%	Q-04
1,2,4-Trimethylbenzene	**144000**	---	564	"	"	---	90300	---	---	46	30%	E, Q-04
1,3,5-Trimethylbenzene	**43500**	---	564	"	"	---	27300	---	---	46	30%	Q-04
1,2-Dibromoethane (EDB)	ND	---	564	"	"	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	---	282	"	"	---	ND	---	---	---	30%	
Surr: Dibromofluoromethane (Surr)			*Recovery: 93 %*	*Limits: 70-130 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Surr)			*107 %*	*70-130 %*			*"*					
Toluene-d8 (Surr)			*92 %*	*70-130 %*			*"*					
4-Bromofluorobenzene (Surr)			*88 %*	*70-130 %*			*"*					
Matrix Spike (4030207-MS1)					Prepared: 03/07/14 19:03 Analyzed: 03/08/14 01:29							
QC Source Sample: Other (A4C0023-01)												
5035/8260B												
Benzene	6810	---	70.8	ug/kg dry	200	5660	612	109	65-135%	---	---	
Toluene	16500	---	283	"	"	"	10100	112	"	---	---	
Ethylbenzene	17700	---	142	"	"	"	11000	120	"	---	---	
Xylenes, total	84600	---	425	"	"	17000	63000	127	"	---	---	
Naphthalene	13500	---	566	"	"	5660	6600	122	"	---	---	
Methyl tert-butyl ether (MTBE)	6640	---	283	"	"	"	ND	117	"	---	---	
Isopropylbenzene	9120	---	283	"	"	"	3120	106	"	---	---	
n-Propylbenzene	18400	---	142	"	"	"	11400	123	"	---	---	
1,2,4-Trimethylbenzene	77000	---	283	"	"	"	64800	216	"	---	---	E, Q-03
1,3,5-Trimethylbenzene	24200	---	283	"	"	"	16300	139	"	---	---	Q-01
1,2-Dibromoethane (EDB)	5510	---	283	"	"	"	ND	97	"	---	---	
1,2-Dichloroethane (EDC)	7240	---	142	"	"	"	ND	128	"	---	---	
Surr: Dibromofluoromethane (Surr)			*Recovery: 103 %*	*Limits: 70-130 %*			*Dilution: 1x*					

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QUALITY CONTROL (QC) SAMPLE RESULTS

RBCA Compounds (BTEX+) by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4030207 - EPA 5035A							**Soil**					
Matrix Spike (4030207-MS1)					Prepared: 03/07/14 19:03 Analyzed: 03/08/14 01:29							
QC Source Sample: Other (A4C0023-01)												
Surr: 1,4-Difluorobenzene (Surr)	*Recovery: 109 %*		*Limits: 70-130 %*		*Dilution: 1x*							
Toluene-d8 (Surr)	*91 %*		*70-130 %*		*"*							
4-Bromofluorobenzene (Surr)	*86 %*		*70-130 %*		*"*							

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Philip Nerenberg, Lab Director

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EES Environmental Inc	Project: **Plaid**	
240 N Broadway Ste 203	Project Number: Plaid Pantry 324 / 1133-01	**Reported:**
Portland, OR 97227	Project Manager: Chris Rhea	03/31/14 15:19

QUALITY CONTROL (QC) SAMPLE RESULTS

RBCA Compounds (BTEX+) by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4030248 - EPA 5035A							**Soil**					
Blank (4030248-BLK1)					Prepared: 03/10/14 14:00 Analyzed: 03/10/14 18:07							
5035/8260B												
Benzene	ND	---	8.33	ug/kg wet	50	---	---	---	---	---	---	
Toluene	ND	---	33.3	"	"	---	---	---	---	---	---	
Ethylbenzene	ND	---	16.7	"	"	---	---	---	---	---	---	
Xylenes, total	ND	---	50.0	"	"	---	---	---	---	---	---	
Naphthalene	ND	---	66.7	"	"	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	---	33.3	"	"	---	---	---	---	---	---	
Isopropylbenzene	ND	---	33.3	"	"	---	---	---	---	---	---	
n-Propylbenzene	ND	---	16.7	"	"	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	---	33.3	"	"	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	---	33.3	"	"	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	---	33.3	"	"	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	---	16.7	"	"	---	---	---	---	---	---	
Surr: Dibromofluoromethane (Surr)			*Recovery: 102 %*		*Limits: 70-130 %*			*Dilution: 1x*				
1,4-Difluorobenzene (Surr)			*110 %*		*70-130 %*			*"*				
Toluene-d8 (Surr)			*87 %*		*70-130 %*			*"*				
4-Bromofluorobenzene (Surr)			*88 %*		*70-130 %*			*"*				
LCS (4030248-BS1)					Prepared: 03/10/14 14:00 Analyzed: 03/10/14 17:15							
5035/8260B												
Benzene	1040	---	12.5	ug/kg wet	50	1000	---	104	65-135%	---	---	
Toluene	949	---	50.0	"	"	"	---	95	"	---	---	
Ethylbenzene	958	---	25.0	"	"	"	---	96	"	---	---	
Xylenes, total	2870	---	75.0	"	"	3000	---	96	"	---	---	
Naphthalene	810	---	100	"	"	1000	---	81	"	---	---	
Methyl tert-butyl ether (MTBE)	1090	---	50.0	"	"	"	---	109	"	---	---	
Isopropylbenzene	911	---	50.0	"	"	"	---	91	"	---	---	
n-Propylbenzene	1010	---	25.0	"	"	"	---	101	"	---	---	
1,2,4-Trimethylbenzene	976	---	50.0	"	"	"	---	98	"	---	---	
1,3,5-Trimethylbenzene	1010	---	50.0	"	"	"	---	101	"	---	---	
1,2-Dibromoethane (EDB)	987	---	50.0	"	"	"	---	99	"	---	---	
1,2-Dichloroethane (EDC)	1230	---	25.0	"	"	"	---	123	"	---	---	
Surr: Dibromofluoromethane (Surr)			*Recovery: 100 %*		*Limits: 70-130 %*			*Dilution: 1x*				
1,4-Difluorobenzene (Surr)			*107 %*		*70-130 %*			*"*				
Toluene-d8 (Surr)			*85 %*		*70-130 %*			*"*				
4-Bromofluorobenzene (Surr)			*85 %*		*70-130 %*			*"*				

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Philip Nerenberg, Lab Director

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EES Environmental Inc	Project: **Plaid**	
240 N Broadway Ste 203	Project Number: Plaid Pantry 324 / 1133-01	**Reported:**
Portland, OR 97227	Project Manager: Chris Rhea	03/31/14 15:19

QUALITY CONTROL (QC) SAMPLE RESULTS

RBCA Compounds (BTEX+) by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4030248 - EPA 5035A							**Soil**					
Duplicate (4030248-DUP1)					Prepared: 03/07/14 18:40 Analyzed: 03/10/14 22:03							
QC Source Sample: Other (A4C0231-01)												
5035/8260B												
Benzene	ND	---	17.4	ug/kg dry	50	---	ND	---	---	---	30%	
Toluene	ND	---	69.6	"	"	---	ND	---	---	---	30%	
Ethylbenzene	ND	---	34.8	"	"	---	ND	---	---	---	30%	
Xylenes, total	ND	---	104	"	"	---	ND	---	---	---	30%	
Naphthalene	ND	---	139	"	"	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	---	69.6	"	"	---	ND	---	---	---	30%	
Isopropylbenzene	ND	---	69.6	"	"	---	ND	---	---	---	30%	
n-Propylbenzene	ND	---	34.8	"	"	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	---	69.6	"	"	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	---	69.6	"	"	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	---	69.6	"	"	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	---	34.8	"	"	---	ND	---	---	---	30%	
Surr: Dibromofluoromethane (Surr)			*Recovery: 105 %*	*Limits: 70-130 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Surr)			*111 %*	*70-130 %*			*"*					
Toluene-d8 (Surr)			*86 %*	*70-130 %*			*"*					
4-Bromofluorobenzene (Surr)			*82 %*	*70-130 %*			*"*					
Matrix Spike (4030248-MS1)					Prepared: 03/10/14 16:39 Analyzed: 03/11/14 01:56							
QC Source Sample: Other (A4C0230-01)												
5035/8260B												
Benzene	1600	---	19.1	ug/kg dry	50	1530	ND	105	65-135%	---	---	
Toluene	1350	---	76.3	"	"	"	ND	88	"	---	---	
Ethylbenzene	1410	---	38.1	"	"	"	ND	92	"	---	---	
Xylenes, total	4370	---	114	"	"	4580	ND	95	"	---	---	
Naphthalene	1980	---	153	"	"	1530	312	110	"	---	---	
Methyl tert-butyl ether (MTBE)	1690	---	76.3	"	"	"	ND	111	"	---	---	
Isopropylbenzene	1510	---	76.3	"	"	"	76.3	94	"	---	---	
n-Propylbenzene	1790	---	38.1	"	"	"	167	106	"	---	---	
1,2,4-Trimethylbenzene	1530	---	76.3	"	"	"	ND	100	"	---	---	
1,3,5-Trimethylbenzene	1540	---	76.3	"	"	"	ND	101	"	---	---	
1,2-Dibromoethane (EDB)	1420	---	76.3	"	"	"	ND	93	"	---	---	
1,2-Dichloroethane (EDC)	1690	---	38.1	"	"	"	ND	111	"	---	---	
Surr: Dibromofluoromethane (Surr)			*Recovery: 104 %*	*Limits: 70-130 %*			*Dilution: 1x*					

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Portland, OR 97227	Project Manager: Chris Rhea	03/31/14 15:19

QUALITY CONTROL (QC) SAMPLE RESULTS

RBCA Compounds (BTEX+) by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4030248 - EPA 5035A							**Soil**					
Matrix Spike (4030248-MS1)					Prepared: 03/10/14 16:39 Analyzed: 03/11/14 01:56							
QC Source Sample: Other (A4C0230-01)												
Surr: 1,4-Difluorobenzene (Surr)	*Recovery: 111 %*		*Limits: 70-130 %*		*Dilution: 1x*							
Toluene-d8 (Surr)	*87 %*		*70-130 %*		*"*							
4-Bromofluorobenzene (Surr)	*87 %*		*70-130 %*		*"*							

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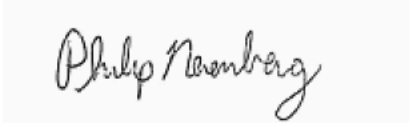

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Portland, OR 97227	Project Manager: Chris Rhea	03/31/14 15:19

QUALITY CONTROL (QC) SAMPLE RESULTS

Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4030304 - Method Prep: Non-Aq							**Soil**					
Blank (4030304-BLK1)					Prepared: 03/12/14 09:33		Analyzed: 03/17/14 15:50					
SM 5310B MOD												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
LCS (4030304-BS1)					Prepared: 03/12/14 09:33		Analyzed: 03/17/14 15:50					
SM 5310B MOD												
Total Organic Carbon	10000	---		mg/kg	1	10000	---	100	85-115%	---	---	
Duplicate (4030304-DUP1)					Prepared: 03/12/14 09:33		Analyzed: 03/17/14 15:50					
QC Source Sample: B-41: 8-8.5 (A4C0203-01)												
SM 5310B MOD												
Total Organic Carbon	**450**	---	200	mg/kg	1	---	500	---	---	10	20%	

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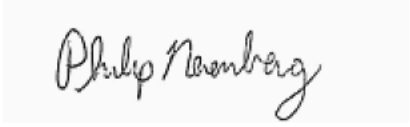

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Portland, OR 97227	Project Manager: Chris Rhea	03/31/14 15:19

QUALITY CONTROL (QC) SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4030209 - Total Solids (Dry Weight)							**Soil**					
Duplicate (4030209-DUP1)					Prepared: 03/07/14 14:01		Analyzed: 03/10/14 10:14					
QC Source Sample: Other (A4C0200-04)												
EPA 8000C												
% Solids	**83.0**	---	1.00	% by Weight	1	---	83.0	---	---	0	20%	
Duplicate (4030209-DUP2)					Prepared: 03/07/14 16:50		Analyzed: 03/10/14 10:14					
QC Source Sample: B-37A: 23-23.5 (A4C0203-13)												
EPA 8000C												
% Solids	**86.2**	---	1.00	% by Weight	1	---	85.4	---	---	0.9	20%	
Duplicate (4030209-DUP3)					Prepared: 03/07/14 17:36		Analyzed: 03/10/14 10:14					
QC Source Sample: Other (A4C0229-02)												
EPA 8000C												
% Solids	**76.8**	---	1.00	% by Weight	1	---	72.4	---	---	6	20%	
Duplicate (4030209-DUP4)					Prepared: 03/07/14 18:45		Analyzed: 03/10/14 10:14					
QC Source Sample: Other (A4C0234-02)												
EPA 8000C												
% Solids	**72.1**	---	1.00	% by Weight	1	---	72.1	---	---	0	20%	
Duplicate (4030209-DUP5)					Prepared: 03/07/14 18:45		Analyzed: 03/10/14 10:14					
QC Source Sample: Other (A4C0241-02)												
EPA 8000C												
% Solids	**74.4**	---	1.00	% by Weight	1	---	74.5	---	---	0.1	20%	

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240 N Broadway Ste 203	Project Number: Plaid Pantry 324 / 1133-01	**Reported:**
Portland, OR 97227	Project Manager: Chris Rhea	03/31/14 15:19

SAMPLE PREPARATION INFORMATION

Gasoline Range Hydrocarbons (Benzene to Naphthalene) by NWTPH-Gx

Prep: EPA 5035A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 4030207							
A4C0203-01	Soil	NWTPH-Gx (MS)	03/05/14 08:45	03/05/14 08:45	6.17g/5mL	10g/10mL	0.81
A4C0203-03	Soil	NWTPH-Gx (MS)	03/05/14 09:30	03/05/14 09:30	6.46g/5mL	10g/10mL	0.77
A4C0203-05	Soil	NWTPH-Gx (MS)	03/05/14 10:00	03/05/14 10:00	4.24g/5mL	10g/10mL	1.18
A4C0203-07	Soil	NWTPH-Gx (MS)	03/05/14 10:40	03/05/14 10:40	7.22g/5mL	10g/10mL	0.69
A4C0203-09	Soil	NWTPH-Gx (MS)	03/05/14 13:05	03/05/14 13:05	8.38g/5mL	10g/10mL	0.60
A4C0203-13	Soil	NWTPH-Gx (MS)	03/05/14 14:50	03/05/14 14:50	7.84g/5mL	10g/10mL	0.64

RBCA Compounds (BTEX+) by EPA 8260B

Prep: EPA 5035A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 4030207							
A4C0203-01	Soil	5035/8260B	03/05/14 08:45	03/05/14 08:45	6.17g/5mL	10g/10mL	0.81
A4C0203-03	Soil	5035/8260B	03/05/14 09:30	03/05/14 09:30	6.46g/5mL	10g/10mL	0.77
A4C0203-05	Soil	5035/8260B	03/05/14 10:00	03/05/14 10:00	4.24g/5mL	10g/10mL	1.18
A4C0203-07	Soil	5035/8260B	03/05/14 10:40	03/05/14 10:40	7.22g/5mL	10g/10mL	0.69
A4C0203-09	Soil	5035/8260B	03/05/14 13:05	03/05/14 13:05	8.38g/5mL	10g/10mL	0.60
Batch: 4030248							
A4C0203-03RE1	Soil	5035/8260B	03/05/14 09:30	03/05/14 09:30	5.6g/5mL	10g/10mL	0.89
A4C0203-05RE1	Soil	5035/8260B	03/05/14 10:00	03/05/14 10:00	6.37g/5mL	10g/10mL	0.79
A4C0203-13RE1	Soil	5035/8260B	03/05/14 14:50	03/05/14 14:50	7.84g/5mL	10g/10mL	0.64

Conventional Chemistry Parameters

Prep: Method Prep: Non-Aq

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 4030304							
A4C0203-01	Soil	SM 5310B MOD	03/05/14 08:45	03/12/14 09:33	5g/5g	5g/5g	NA
A4C0203-03	Soil	SM 5310B MOD	03/05/14 09:30	03/12/14 09:33	5g/5g	5g/5g	NA
A4C0203-05	Soil	SM 5310B MOD	03/05/14 10:00	03/12/14 09:33	5g/5g	5g/5g	NA
A4C0203-07	Soil	SM 5310B MOD	03/05/14 10:40	03/12/14 09:33	5g/5g	5g/5g	NA
A4C0203-09	Soil	SM 5310B MOD	03/05/14 13:05	03/12/14 09:33	5g/5g	5g/5g	NA

Percent Dry Weight

Prep: Total Solids (Dry Weight)

Sample	Default	RL Prep

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Portland, OR 97227	Project Manager: Chris Rhea	03/31/14 15:19

SAMPLE PREPARATION INFORMATION

Percent Dry Weight

Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
Batch: 4030209							
A4C0203-01	Soil	EPA 8000C	03/05/14 08:45	03/07/14 16:50	1N/A/1N/A	1N/A/1N/A	NA
A4C0203-03	Soil	EPA 8000C	03/05/14 09:30	03/07/14 16:50	1N/A/1N/A	1N/A/1N/A	NA
A4C0203-05	Soil	EPA 8000C	03/05/14 10:00	03/07/14 16:50	1N/A/1N/A	1N/A/1N/A	NA
A4C0203-07	Soil	EPA 8000C	03/05/14 10:40	03/07/14 16:50	1N/A/1N/A	1N/A/1N/A	NA
A4C0203-09	Soil	EPA 8000C	03/05/14 13:05	03/07/14 16:50	1N/A/1N/A	1N/A/1N/A	NA
A4C0203-13	Soil	EPA 8000C	03/05/14 14:50	03/07/14 16:50	1N/A/1N/A	1N/A/1N/A	NA

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Portland, OR 97227	Project Manager: Chris Rhea	03/31/14 15:19

Notes and Definitions

Qualifiers:

E	Estimated Value. The result is above the calibration range of the instrument.
Q-01	Spike recovery and/or RPD is outside acceptance limits.
Q-03	Spike recovery and/or RPD is outside control limits due to the high concentration of analyte present in the sample.
Q-04	Spike recovery and/or RPD is outside control limits due to a non-homogeneous sample matrix.
Q-42	Matrix Spike and/or Duplicate analysis was performed on this sample. % Recovery or RPD for this analyte is outside laboratory control limits. (Refer to the QC Section of Analytical Report.)

Notes and Conventions:

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry'designation are not dry weight corrected.
RPD	Relative Percent Difference
MDL	If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
WMSC	Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
Batch QC	In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
Blank Policy	Apex assesses blank data for potential high bias down to a level equal to ½ the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses. For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor. Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
---	QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
***	Used to indicate a possible discrepency with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

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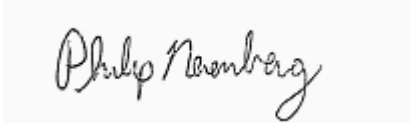

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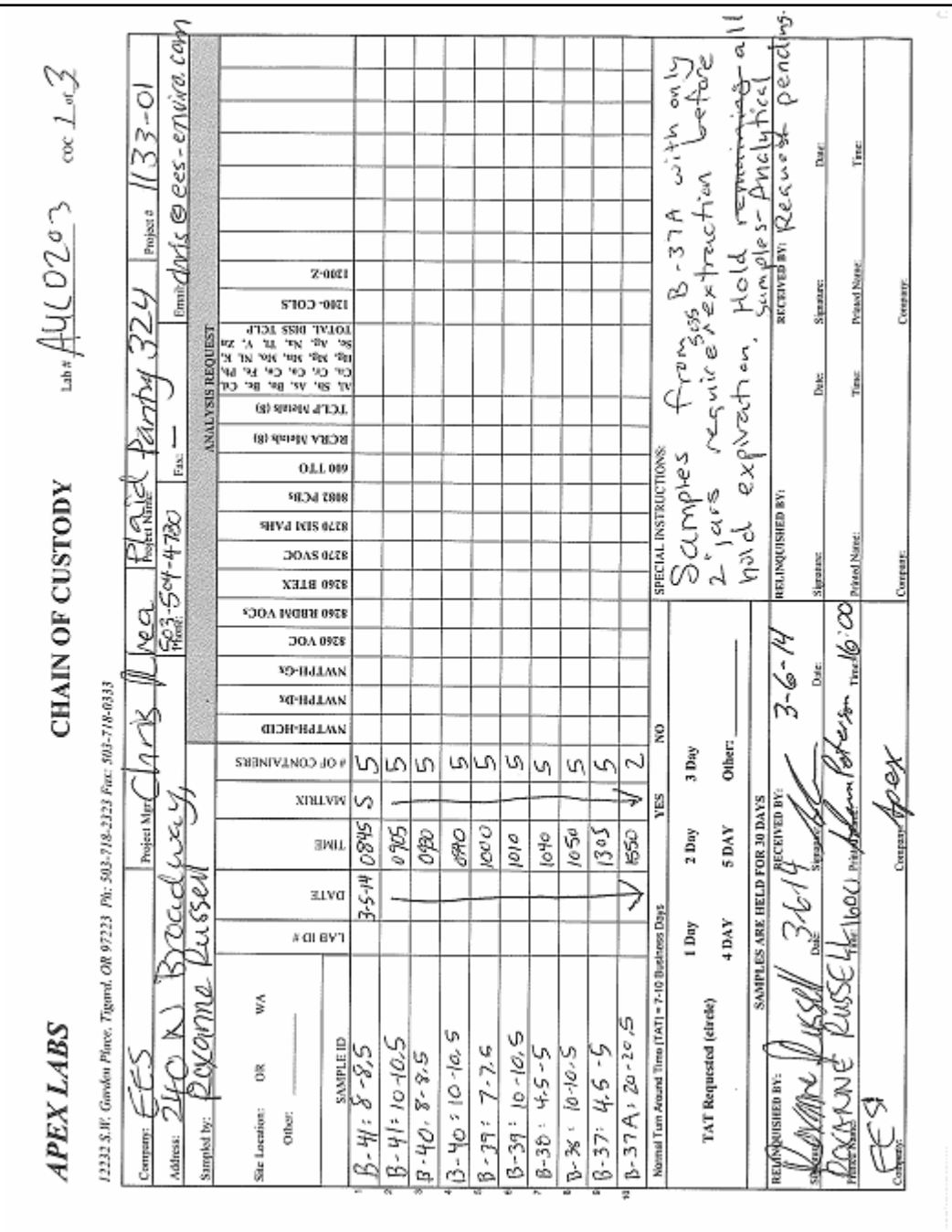


APEX LABS

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

CHAIN OF CUSTODY

Lab # AYL0203 COC 1 of 3

Company: EES | Project Mgr: Chris Rhea | Project Name: Plaid Pantry 324 | Project #: 1133-01

Address: 240 N Broadway | Phone: 503-594-4780 | Fax: — | Email: chris@ees-enviro.com

Sampled by: Roxanne Russell

Site Location: OR WA Other: _____

ANALYSIS REQUEST

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 VOC	8260 RRDM VOCs	8260 BTEX	8270 SVOC	8270 SIM PAHs	8082 PCBs	600 TTO	RCRA Metals (8)	TCLP Metals (8)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Si, Ag, Na, Tl, V, Zn TOTAL DISS TCLP	1200-COLS	1200-Z
1 B-41: 8-8.5		3-5-14	0845	S	5															
2 B-41: 10-10.5			0905		5															
3 B-40: 8-8.5			0930		5															
4 B-40: 10-10.5			0940		5															
5 B-39: 7-7.5			1000		5															
6 B-39: 10-10.5			1010		5															
7 B-38: 4.5-5			1040		5															
8 B-38: 10-10.5			1050		5															
9 B-37: 4.5-5			1305		5															
10 B-37A: 20-20.5		✓	1550	✓	2															

Normal Turn Around Time (TAT) = 7-10 Business Days

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: _____

SAMPLES ARE HELD FOR 30 DAYS

SPECIAL INSTRUCTIONS: YES NO

Samples from B-37A with only 2 jars requiring extraction before hold expiration. Hold remaining all samples-Analytical pending Results.

RELINQUISHED BY: Roxanne Russell Date: 3-6-14 Time: 1600 Printed Name: Roxanne Russell Company: EES

RECEIVED BY: Date: 3-6-14 Time: 1600 Printed Name: Jason Peterson Company: Apex

RELINQUISHED BY: Signature: Date: Time: Printed Name: Company:

RECEIVED BY: Signature: Date: Time: Printed Name: Company:

Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

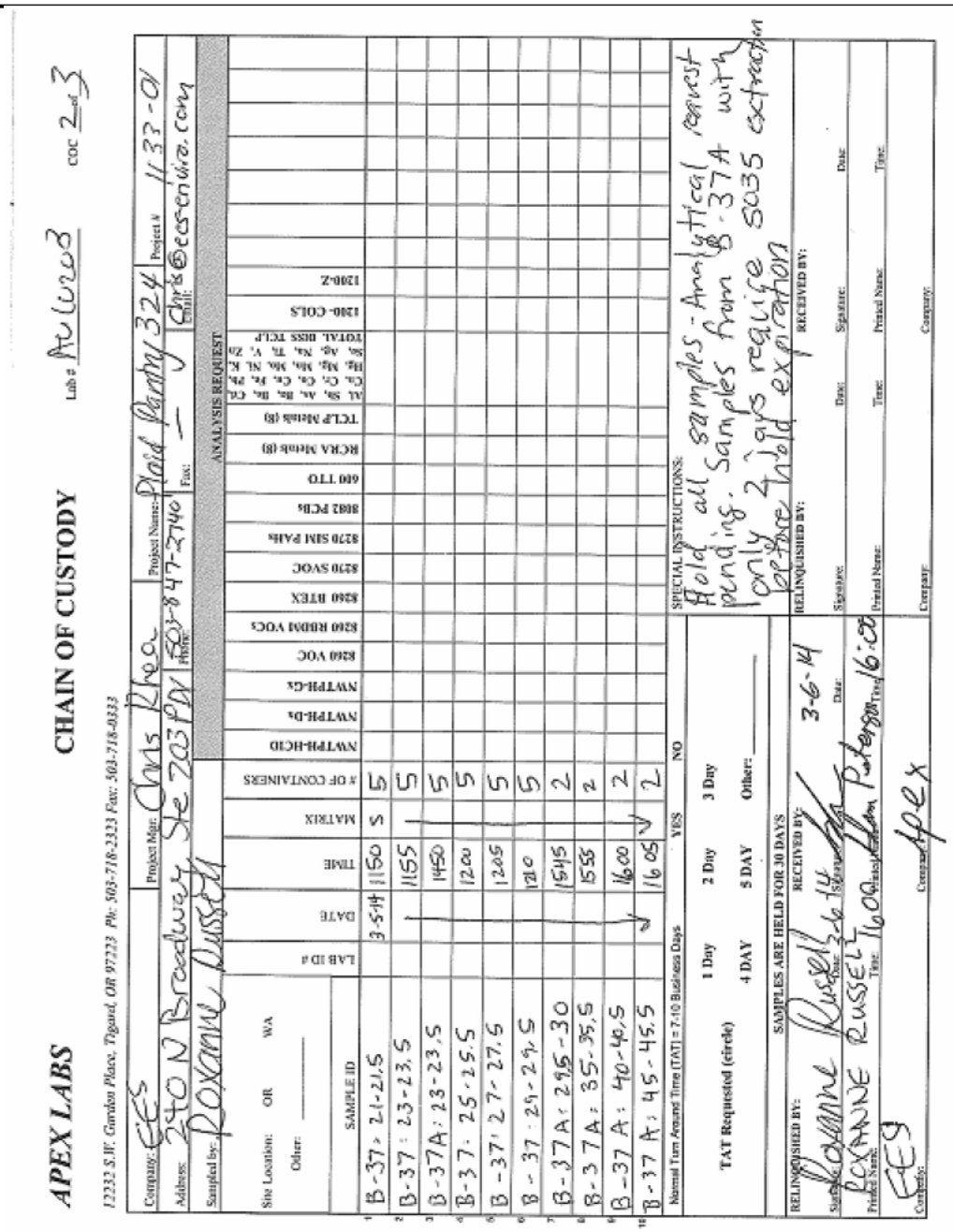
Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

EES Environmental Inc	Project: **Plaid**	
240 N Broadway Ste 203	Project Number: Plaid Pantry 324 / 1133-01	**Reported:**
Portland, OR 97227	Project Manager: Chris Rhea	03/31/14 15:19



APEX LABS — **CHAIN OF CUSTODY**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Lab # Apex — COC 2 of 3

Company: EES — Project Mgr: Chris Rhea — Project Name: Plaid Pantry 324 — Project # 1133-01

Address: 240 N Broadway Ste 203 PDX — Phone: 503-847-2740 — Fax: — Email: chris@eesenviro.com

Sampled by: ROXANNE RUSSELL

Site Location: OR WA — Other: ____

ANALYSIS REQUEST

	SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 VOC	8260 RRDM1 VOCs	8260 BTEX	8270 SVOC	8270 SIM PAHs	8082 PCBs	608 TTO	RCRA Metals (8)	TCLP Metals (8)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL, DISS TCLP	1280-COLS	1280-Z
1	B-37: 21-21.5		3-5-14	1150	S	5															
2	B-37: 23-23.5			1155		5															
3	B-37A: 23-23.5			1450		5															
4	B-37: 25-25.5			1200		5															
5	B-37: 27-27.5			1205		5															
6	B-37: 29-29.5			1210		5															
7	B-37A: 295-30			1545		2															
8	B-37A: 35-35.5			1555		2															
9	B-37A: 40-40.5			1600		2															
10	B-37A: 45-45.5		✓	1605	✓	2															

Normal Turn Around Time (TAT) = 7-10 Business Days — YES / NO

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: ____

SAMPLES ARE HELD FOR 30 DAYS

SPECIAL INSTRUCTIONS: Hold all samples - Analytical request pending. Samples from B-37A with only 2 days require 5035 extraction before hold expiration

RELINQUISHED BY: Roxanne Russell — Date: 3-6-14 — Time: 1600 — RECEIVED BY: Peterson — Date: 3-6-14 — Time: 16:05

RELINQUISHED BY: — Signature: — Date: — Printed Name: — Time: — Company: — RECEIVED BY: — Signature: — Date: — Printed Name: — Time: — Company:

Printed Name: ROXANNE RUSSELL — Company: EES — Company: Apex

Apex Laboratories

Philip Nerenberg

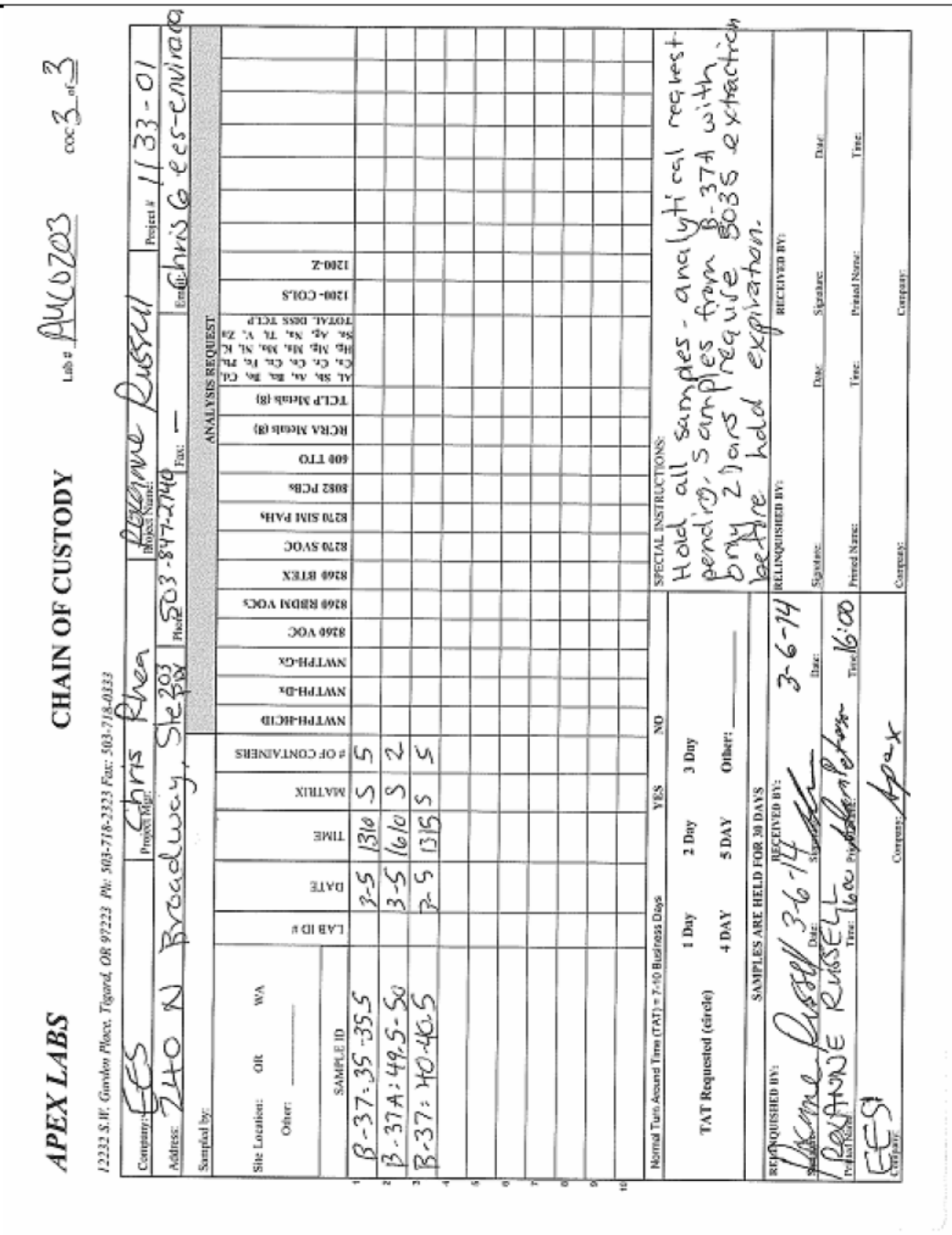
The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Philip Nerenberg, Lab Director

Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

EES Environmental Inc	Project: **Plaid**	
240 N Broadway Ste 203	Project Number: Plaid Pantry 324 / 1133-01	**Reported:**
Portland, OR 97227	Project Manager: Chris Rhea	03/31/14 15:19



APEX LABS — **CHAIN OF CUSTODY**

12232 S.W. Garden Place, Tigard, OR 97223 PH: 503-718-2323 Fax: 503-718-0333

Lab # AU0703 — COC 3 of 3

Company: EES — Project Mgr: Chris Rhea — Project Name: Plaid — Project # 1133-01

Address: 240 N Broadway, Ste 203 — Phone: 503-847-7440 — Fax: — Email: chris@ees-enviro.com

Sampled by: Lorraine Russell

Site Location: OR WA Other: ____

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS
B-37: 35-35.5		3-5	1310	S	5
B-37A: 49.5-50		3-5	1610	S	2
B-37: 40-40.5		3-5	1315	S	5

ANALYSIS REQUEST: NWTPH-HCID; NWTPH-Dx; NWTPH-Gx; 8260 VOC; 8260 RBDM VOCs; 8260 BTEX; 8270 SVOC; 8270 SIM PAHs; 8082 PCBs; 608 TTO; RCRA Metals (8); TCLP Metals (8); TOTAL DISS TCLP: Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn; 1200-COLS; 1200-Z

Normal Turn Around Time (TAT) = 7-10 Business Days — YES — NO

TAT Requested (circle): 1 Day, 2 Day, 3 Day, 4 DAY, 5 DAY, Other: ____

SPECIAL INSTRUCTIONS: Hold all samples - analytical request pending, samples from B-37A with bay 2 jars require 8035 extraction. Lorraine hold expiration.

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: Lorraine Russell — Date: 3-6-14 — Time: 16:00 — Printed Name: Lorraine Russell — Company: EES

RECEIVED BY: Signature: — Date: — Printed Name: — Time: — Company: Apex

RELINQUISHED BY: Signature: — Date: — Printed Name: — Time: — Company:

RECEIVED BY: Signature: — Date: — Printed Name: — Time: — Company:

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Crystal

From: Chris Rhea
Sent: Friday, March 07, 2014 9:24 AM
To: Philip Nerenberg (PNerenberg@Apex-Labs.com)
Cc: Paul Ecker; Roxanne Russell; Crystal
Subject: Plaid 324: Sample Analytical Request

Importance: High

Follow Up Flag: Flag for follow up
Flag Status: Completed

Hi Philip,

Yesterday we submitted a cooler of soil samples from Plaid 324 (EES Project #1133-02) on hold. Please see the analytical request for these samples listed below.

Analyses Requested: We would like to analyze samples B-41(8-8.5), B-40(8-8.5), B-39(7-7.5), B-38(4.5-5), and B-37(4.5-5) for the following:

- Gasoline-range hydrocarbons by Method 5035
- RBCA VOCs by Method 5035
- EPH/VPH by Method NWTPH
- Soil characteristic analyses including:
    - Organic carbon content by EPA Method 5310B
    - Moisture content by ASTM Method D-2216

We would also like to analyze sample B-37A(23-23.5) for Gasoline-range hydrocarbons by Method 5035 and RBCA VOCs by Method 5035.

Sample Preservation Note: We submitted only two 4-oz soil jars for samples B-37A(20-20.5), B-37A(29.5-30), B-37A(35-35.5), B-37A(40-40.5), B-37A(45.45.5), and B-37A(49.5-50). These samples are not currently listed for analysis. However, please extract these samples for possible Gx and VOC analysis by Method 5035. Please confirm that these samples will be extracted before the end of the 48-hr extraction period (no later than 3pm today, I believe).

Turnaround Time: Standard Turnaround Time on all samples except B-37A(23-23.5). Please run B-37A(23-23.5) on a 5-Day turnaround time.

As always, thank you!

Christopher J. Rhea, RG, LG, CWRE
EES ENVIRONMENTAL CONSULTING, INC.
240 N Broadway, Suite 203
Portland OR 97227
(503) 847-2740
chris@ees-environmental.com
www.ees-environmental.com

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Apex Laboratories
Philip Nerenberg
12232 S.W. Garden Place
Tigard, OR 97223

RE: A4C0203
Lab ID: 1403107

March 26, 2014

Attention Philip Nerenberg:

Fremont Analytical, Inc. received 5 sample(s) on 3/11/2014 for the analyses presented in the following report.

Extractable Petroleum Hydrocarbons by NWEPH
Sample Moisture (Percent Moisture)
Volatile Petroleum Hydrocarbons by NWVPH

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Michael Dee
Sr. Chemist / Principal

Date: *03/26/2014*

CLIENT: Apex Laboratories
Project: A4C0203
Lab Order: 1403107

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1403107-001	B-41:8-8.5	03/05/2014 8:45 AM	03/11/2014 2:05 PM
1403107-002	B-40:8-8.5	03/05/2014 9:30 AM	03/11/2014 2:05 PM
1403107-003	B-39:7-7.5	03/05/2014 10:00 AM	03/11/2014 2:05 PM
1403107-004	B-38:4.5-5	03/05/2014 10:40 AM	03/11/2014 2:05 PM
1403107-005	B-37:4.5-5	03/05/2014 1:05 PM	03/11/2014 2:05 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Case Narrative

WO#: **1403107**
Date: **3/26/2014**

CLIENT: Apex Laboratories
Project: A4C0203

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Analytical Report

WO#: **1403107**
Date Reported: **3/26/2014**

Client: Apex Laboratories
Collection Date: 3/5/2014 8:45:00 AM
Project: A4C0203
Lab ID: 1403107-001
Matrix: Soil
Client Sample ID: **B-41:8-8.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 6859		Analyst: BR
Aliphatic Hydrocarbon (C8-C10)	61.5	5.44	*	mg/Kg-dry	1	3/14/2014 11:24:00 PM
Aliphatic Hydrocarbon (C10-C12)	34.9	5.44		mg/Kg-dry	1	3/14/2014 11:24:00 PM
Aliphatic Hydrocarbon (C12-C16)	43.3	5.44		mg/Kg-dry	1	3/14/2014 11:24:00 PM
Aliphatic Hydrocarbon (C16-C21)	9.82	5.44		mg/Kg-dry	1	3/14/2014 11:24:00 PM
Aliphatic Hydrocarbon (C21-C34)	ND	5.44		mg/Kg-dry	1	3/14/2014 11:24:00 PM
Aromatic Hydrocarbon (C8-C10)	29.7	5.44		mg/Kg-dry	1	3/15/2014 5:56:00 AM
Aromatic Hydrocarbon (C10-C12)	13.8	5.44		mg/Kg-dry	1	3/15/2014 5:56:00 AM
Aromatic Hydrocarbon (C12-C16)	9.37	5.44		mg/Kg-dry	1	3/15/2014 5:56:00 AM
Aromatic Hydrocarbon (C16-C21)	7.47	5.44		mg/Kg-dry	1	3/15/2014 5:56:00 AM
Aromatic Hydrocarbon (C21-C34)	ND	5.44		mg/Kg-dry	1	3/15/2014 5:56:00 AM
Surr: 1-Chlorooctadecane	88.7	65-140		%REC	1	3/14/2014 11:24:00 PM
Surr: o-Terphenyl	67.4	65-140		%REC	1	3/15/2014 5:56:00 AM

NOTES:
* - Flagged value is not within established control limits.

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 6879		Analyst: EM
Aliphatic Hydrocarbon (C5-C6)	98.3	76.9	D	mg/Kg-dry	20	3/15/2014 1:11:00 PM
Aliphatic Hydrocarbon (C6-C8)	10.2	3.84		mg/Kg-dry	1	3/14/2014 10:43:00 PM
Aliphatic Hydrocarbon (C8-C10)	23.1	3.84		mg/Kg-dry	1	3/14/2014 10:43:00 PM
Aliphatic Hydrocarbon (C10-C12)	156	76.9	D	mg/Kg-dry	20	3/15/2014 1:11:00 PM
Aromatic Hydrocarbon (C8-C10)	668	76.9	D	mg/Kg-dry	20	3/15/2014 1:11:00 PM
Aromatic Hydrocarbon (C10-C12)	511	76.9	D	mg/Kg-dry	20	3/15/2014 1:11:00 PM
Aromatic Hydrocarbon (C12-C13)	284	76.9	D	mg/Kg-dry	20	3/15/2014 1:11:00 PM
Benzene	2.92	0.961		mg/Kg-dry	1	3/14/2014 10:43:00 PM
Toluene	70.7	19.2	D	mg/Kg-dry	20	3/15/2014 1:11:00 PM
Ethy benzene	60.5	19.2	D	mg/Kg-dry	20	3/15/2014 1:11:00 PM
m,p-Xylene	279	19.2	D	mg/Kg-dry	20	3/15/2014 1:11:00 PM
o-Xylene	90.4	19.2	D	mg/Kg-dry	20	3/15/2014 1:11:00 PM
Naphthalene	21.8	0.961		mg/Kg-dry	1	3/14/2014 10:43:00 PM
Methyl tert-butyl ether (MTBE)	8.96	0.961		mg/Kg-dry	1	3/14/2014 10:43:00 PM
Surr: 1,4-Difluorobenzene	90.8	65-140		%REC	1	3/14/2014 10:43:00 PM
Surr: Bromofluorobenzene	95.4	65-140		%REC	1	3/14/2014 10:43:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
RL	Reporting Limit	S	Spike recovery outside accepted recovery limits

Analytical Report

WO#: **1403107**
Date Reported: **3/26/2014**

Client: Apex Laboratories
Collection Date: 3/5/2014 8:45:00 AM
Project: A4C0203
Lab ID: 1403107-001
Matrix: Soil
Client Sample ID: **B-41:8-8.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Sample Moisture (Percent Moisture)				Batch ID: R12979		Analyst: KZ
Percent Moisture	9.98			wt%	1	3/12/2014 8:43:40 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
RL	Reporting Limit	S	Spike recovery outside accepted recovery limits

Analytical Report

WO#: **1403107**
Date Reported: **3/26/2014**

Client: Apex Laboratories
Collection Date: 3/5/2014 9:30:00 AM
Project: A4C0203
Lab ID: 1403107-002
Matrix: Soil
Client Sample ID: **B-40:8-8.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 6859		Analyst: BR
Aliphatic Hydrocarbon (C8-C10)	76.1	5.54	*	mg/Kg-dry	1	3/15/2014 12:07:00 AM
Aliphatic Hydrocarbon (C10-C12)	26.9	5.54		mg/Kg-dry	1	3/15/2014 12:07:00 AM
Aliphatic Hydrocarbon (C12-C16)	15.2	5.54		mg/Kg-dry	1	3/15/2014 12:07:00 AM
Aliphatic Hydrocarbon (C16-C21)	ND	5.54		mg/Kg-dry	1	3/15/2014 12:07:00 AM
Aliphatic Hydrocarbon (C21-C34)	ND	5.54		mg/Kg-dry	1	3/15/2014 12:07:00 AM
Aromatic Hydrocarbon (C8-C10)	63.0	5.54		mg/Kg-dry	1	3/15/2014 6:40:00 AM
Aromatic Hydrocarbon (C10-C12)	28.9	5.54		mg/Kg-dry	1	3/15/2014 6:40:00 AM
Aromatic Hydrocarbon (C12-C16)	11.3	5.54		mg/Kg-dry	1	3/15/2014 6:40:00 AM
Aromatic Hydrocarbon (C16-C21)	7.00	5.54		mg/Kg-dry	1	3/15/2014 6:40:00 AM
Aromatic Hydrocarbon (C21-C34)	ND	5.54		mg/Kg-dry	1	3/15/2014 6:40:00 AM
Surr: 1-Chlorooctadecane	84.8	65-140		%REC	1	3/15/2014 12:07:00 AM
Surr: o-Terphenyl	88.5	65-140		%REC	1	3/15/2014 6:40:00 AM

NOTES:
* - Flagged value is not within established control limits.

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 6879		Analyst: EM
Aliphatic Hydrocarbon (C5-C6)	332	54.8	D	mg/Kg-dry	20	3/15/2014 1:45:00 PM
Aliphatic Hydrocarbon (C6-C8)	392	54.8	D	mg/Kg-dry	20	3/15/2014 1:45:00 PM
Aliphatic Hydrocarbon (C8-C10)	15.2	2.74		mg/Kg-dry	1	3/15/2014 2:04:00 AM
Aliphatic Hydrocarbon (C10-C12)	118	54.8	D	mg/Kg-dry	20	3/15/2014 1:45:00 PM
Aromatic Hydrocarbon (C8-C10)	573	54.8	D	mg/Kg-dry	20	3/15/2014 1:45:00 PM
Aromatic Hydrocarbon (C10-C12)	378	54.8	D	mg/Kg-dry	20	3/15/2014 1:45:00 PM
Aromatic Hydrocarbon (C12-C13)	127	54.8	D	mg/Kg-dry	20	3/15/2014 1:45:00 PM
Benzene	10.6	0.685		mg/Kg-dry	1	3/15/2014 2:04:00 AM
Toluene	133	13.7	D	mg/Kg-dry	20	3/15/2014 1:45:00 PM
Ethy benzene	40.3	13.7	D	mg/Kg-dry	20	3/15/2014 1:45:00 PM
m,p-Xylene	192	13.7	D	mg/Kg-dry	20	3/15/2014 1:45:00 PM
o-Xylene	72.9	13.7	D	mg/Kg-dry	20	3/15/2014 1:45:00 PM
Naphthalene	14.8	0.685		mg/Kg-dry	1	3/15/2014 2:04:00 AM
Methyl tert-butyl ether (MTBE)	16.5	0.685		mg/Kg-dry	1	3/15/2014 2:04:00 AM
Surr: 1,4-Difluorobenzene	95.8	65-140		%REC	1	3/15/2014 2:04:00 AM
Surr: Bromofluorobenzene	92.5	65-140		%REC	1	3/15/2014 2:04:00 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
RL	Reporting Limit	S	Spike recovery outside accepted recovery limits

Analytical Report

WO#: **1403107**
Date Reported: **3/26/2014**

Client: Apex Laboratories
Project: A4C0203
Lab ID: 1403107-002
Client Sample ID: **B-40:8-8.5**

Collection Date: 3/5/2014 9:30:00 AM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Sample Moisture (Percent Moisture)				Batch ID: R12979		Analyst: KZ
Percent Moisture	11.5			wt%	1	3/12/2014 8:43:40 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
RL	Reporting Limit	S	Spike recovery outside accepted recovery limits

Analytical Report

WO#: **1403107**
Date Reported: **3/26/2014**

Client: Apex Laboratories
Collection Date: 3/5/2014 10:00:00 AM
Project: A4C0203
Lab ID: 1403107-003
Matrix: Soil
Client Sample ID: **B-39:7-7.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 6859		Analyst: BR
Aliphatic Hydrocarbon (C8-C10)	113	5.55	*	mg/Kg-dry	1	3/15/2014 12:51:00 AM
Aliphatic Hydrocarbon (C10-C12)	34.2	5.55		mg/Kg-dry	1	3/15/2014 12:51:00 AM
Aliphatic Hydrocarbon (C12-C16)	19.7	5.55		mg/Kg-dry	1	3/15/2014 12:51:00 AM
Aliphatic Hydrocarbon (C16-C21)	5.74	5.55		mg/Kg-dry	1	3/15/2014 12:51:00 AM
Aliphatic Hydrocarbon (C21-C34)	ND	5.55		mg/Kg-dry	1	3/15/2014 12:51:00 AM
Aromatic Hydrocarbon (C8-C10)	64.5	5.55		mg/Kg-dry	1	3/15/2014 7:23:00 AM
Aromatic Hydrocarbon (C10-C12)	29.0	5.55		mg/Kg-dry	1	3/15/2014 7:23:00 AM
Aromatic Hydrocarbon (C12-C16)	11.8	5.55		mg/Kg-dry	1	3/15/2014 7:23:00 AM
Aromatic Hydrocarbon (C16-C21)	7.66	5.55		mg/Kg-dry	1	3/15/2014 7:23:00 AM
Aromatic Hydrocarbon (C21-C34)	ND	5.55		mg/Kg-dry	1	3/15/2014 7:23:00 AM
Surr: 1-Chlorooctadecane	86.3	65-140		%REC	1	3/15/2014 12:51:00 AM
Surr: o-Terphenyl	83.1	65-140		%REC	1	3/15/2014 7:23:00 AM

NOTES:
* - Flagged value is not within established control limits.

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 6879		Analyst: EM
Aliphatic Hydrocarbon (C5-C6)	26.2	36.9	D	mg/Kg-dry	20	3/15/2014 2:18:00 PM
Aliphatic Hydrocarbon (C6-C8)	64.4	36.9	D	mg/Kg-dry	20	3/15/2014 2:18:00 PM
Aliphatic Hydrocarbon (C8-C10)	60.8	36.9	D	mg/Kg-dry	20	3/15/2014 2:18:00 PM
Aliphatic Hydrocarbon (C10-C12)	73.4	36.9	D	mg/Kg-dry	20	3/15/2014 2:18:00 PM
Aromatic Hydrocarbon (C8-C10)	163	36.9	D	mg/Kg-dry	20	3/15/2014 2:18:00 PM
Aromatic Hydrocarbon (C10-C12)	144	36.9	D	mg/Kg-dry	20	3/15/2014 2:18:00 PM
Aromatic Hydrocarbon (C12-C13)	54.4	36.9	D	mg/Kg-dry	20	3/15/2014 2:18:00 PM
Benzene	0.556	0.462		mg/Kg-dry	1	3/15/2014 3:45:00 AM
Toluene	9.64	0.462		mg/Kg-dry	1	3/15/2014 3:45:00 AM
Ethy benzene	14.3	0.462		mg/Kg-dry	1	3/15/2014 3:45:00 AM
m,p-Xylene	47.5	9.23	D	mg/Kg-dry	20	3/15/2014 2:18:00 PM
o-Xylene	23.7	0.462		mg/Kg-dry	1	3/15/2014 3:45:00 AM
Naphthalene	6.05	0.462		mg/Kg-dry	1	3/15/2014 3:45:00 AM
Methyl tert-butyl ether (MTBE)	ND	0.462		mg/Kg-dry	1	3/15/2014 3:45:00 AM
Surr: 1,4-Difluorobenzene	85.1	65-140		%REC	1	3/15/2014 3:45:00 AM
Surr: Bromofluorobenzene	95.6	65-140		%REC	1	3/15/2014 3:45:00 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
RL	Reporting Limit	S	Spike recovery outside accepted recovery limits

Analytical Report

WO#: **1403107**
Date Reported: **3/26/2014**

Client: Apex Laboratories
Collection Date: 3/5/2014 10:00:00 AM
Project: A4C0203
Lab ID: 1403107-003
Matrix: Soil
Client Sample ID: **B-39:7-7.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Sample Moisture (Percent Moisture)				Batch ID: R12979		Analyst: KZ
Percent Moisture	12.9			wt%	1	3/12/2014 8:43:40 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
RL	Reporting Limit	S	Spike recovery outside accepted recovery limits

Analytical Report

WO#: **1403107**
Date Reported: **3/26/2014**

Client: Apex Laboratories
Collection Date: 3/5/2014 10:40:00 AM
Project: A4C0203
Lab ID: 1403107-004
Matrix: Soil
Client Sample ID: **B-38:4.5-5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 6859		Analyst: BR
Aliphatic Hydrocarbon (C8-C10)	ND	5.41	*	mg/Kg-dry	1	3/15/2014 1:35:00 AM
Aliphatic Hydrocarbon (C10-C12)	ND	5.41		mg/Kg-dry	1	3/15/2014 1:35:00 AM
Aliphatic Hydrocarbon (C12-C16)	ND	5.41		mg/Kg-dry	1	3/15/2014 1:35:00 AM
Aliphatic Hydrocarbon (C16-C21)	ND	5.41		mg/Kg-dry	1	3/15/2014 1:35:00 AM
Aliphatic Hydrocarbon (C21-C34)	ND	5.41		mg/Kg-dry	1	3/15/2014 1:35:00 AM
Aromatic Hydrocarbon (C8-C10)	ND	5.41		mg/Kg-dry	1	3/15/2014 8:06:00 AM
Aromatic Hydrocarbon (C10-C12)	ND	5.41		mg/Kg-dry	1	3/15/2014 8:06:00 AM
Aromatic Hydrocarbon (C12-C16)	ND	5.41		mg/Kg-dry	1	3/15/2014 8:06:00 AM
Aromatic Hydrocarbon (C16-C21)	ND	5.41		mg/Kg-dry	1	3/15/2014 8:06:00 AM
Aromatic Hydrocarbon (C21-C34)	ND	5.41		mg/Kg-dry	1	3/15/2014 8:06:00 AM
Surr: 1-Chlorooctadecane	88.3	65-140		%REC	1	3/15/2014 1:35:00 AM
Surr: o-Terphenyl	87.2	65-140		%REC	1	3/15/2014 8:06:00 AM

NOTES:
* - Flagged value is not within established control limits.

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 6879		Analyst: EM
Aliphatic Hydrocarbon (C5-C6)	ND	2.24		mg/Kg-dry	1	3/15/2014 5:25:00 AM
Aliphatic Hydrocarbon (C6-C8)	ND	2.24		mg/Kg-dry	1	3/15/2014 5:25:00 AM
Aliphatic Hydrocarbon (C8-C10)	ND	2.24		mg/Kg-dry	1	3/15/2014 5:25:00 AM
Aliphatic Hydrocarbon (C10-C12)	ND	2.24		mg/Kg-dry	1	3/15/2014 5:25:00 AM
Aromatic Hydrocarbon (C8-C10)	ND	2.24		mg/Kg-dry	1	3/15/2014 5:25:00 AM
Aromatic Hydrocarbon (C10-C12)	ND	2.24		mg/Kg-dry	1	3/15/2014 5:25:00 AM
Aromatic Hydrocarbon (C12-C13)	ND	2.24		mg/Kg-dry	1	3/15/2014 5:25:00 AM
Benzene	ND	0.561		mg/Kg-dry	1	3/15/2014 5:25:00 AM
Toluene	ND	0.561		mg/Kg-dry	1	3/15/2014 5:25:00 AM
Ethy benzene	ND	0.561		mg/Kg-dry	1	3/15/2014 5:25:00 AM
m,p-Xylene	ND	0.561		mg/Kg-dry	1	3/15/2014 5:25:00 AM
o-Xylene	ND	0.561		mg/Kg-dry	1	3/15/2014 5:25:00 AM
Naphthalene	ND	0.561		mg/Kg-dry	1	3/15/2014 5:25:00 AM
Methyl tert-butyl ether (MTBE)	ND	0.561		mg/Kg-dry	1	3/15/2014 5:25:00 AM
Surr: 1,4-Difluorobenzene	97.7	65-140		%REC	1	3/15/2014 5:25:00 AM
Surr: Bromofluorobenzene	95.2	65-140		%REC	1	3/15/2014 5:25:00 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
RL	Reporting Limit	S	Spike recovery outside accepted recovery limits

Analytical Report

WO#: **1403107**
Date Reported: **3/26/2014**

Client: Apex Laboratories
Collection Date: 3/5/2014 10:40:00 AM
Project: A4C0203
Lab ID: 1403107-004
Matrix: Soil
Client Sample ID: **B-38:4.5-5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Sample Moisture (Percent Moisture)				Batch ID: R12979		Analyst: KZ
Percent Moisture	11.8			wt%	1	3/12/2014 8:43:40 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
RL	Reporting Limit	S	Spike recovery outside accepted recovery limits

Analytical Report

WO#: **1403107**
Date Reported: **3/26/2014**

Client: Apex Laboratories
Collection Date: 3/5/2014 1:05:00 PM
Project: A4C0203
Lab ID: 1403107-005
Matrix: Soil
Client Sample ID: **B-37:4.5-5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 6859		Analyst: BR
Aliphatic Hydrocarbon (C8-C10)	43.4	5.30	*	mg/Kg-dry	1	3/15/2014 3:02:00 AM
Aliphatic Hydrocarbon (C10-C12)	60.0	5.30		mg/Kg-dry	1	3/15/2014 3:02:00 AM
Aliphatic Hydrocarbon (C12-C16)	142	53.0	D	mg/Kg-dry	10	3/20/2014 10:22:00 PM
Aliphatic Hydrocarbon (C16-C21)	33.0	5.30		mg/Kg-dry	1	3/15/2014 3:02:00 AM
Aliphatic Hydrocarbon (C21-C34)	ND	5.30		mg/Kg-dry	1	3/15/2014 3:02:00 AM
Aromatic Hydrocarbon (C8-C10)	15.7	5.30		mg/Kg-dry	1	3/15/2014 9:33:00 AM
Aromatic Hydrocarbon (C10-C12)	9.46	5.30		mg/Kg-dry	1	3/15/2014 9:33:00 AM
Aromatic Hydrocarbon (C12-C16)	22.8	5.30		mg/Kg-dry	1	3/15/2014 9:33:00 AM
Aromatic Hydrocarbon (C16-C21)	27.6	5.30		mg/Kg-dry	1	3/15/2014 9:33:00 AM
Aromatic Hydrocarbon (C21-C34)	ND	5.30		mg/Kg-dry	1	3/15/2014 9:33:00 AM
Surr: 1-Chlorooctadecane	97.9	65-140		%REC	1	3/15/2014 3:02:00 AM
Surr: o-Terphenyl	87.9	65-140		%REC	1	3/15/2014 9:33:00 AM

NOTES:
* - Flagged value is not within established control limits.

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 6879		Analyst: EM
Aliphatic Hydrocarbon (C5-C6)	134	61.3	D	mg/Kg-dry	20	3/15/2014 3:25:00 PM
Aliphatic Hydrocarbon (C6-C8)	256	61.3	D	mg/Kg-dry	20	3/15/2014 3:25:00 PM
Aliphatic Hydrocarbon (C8-C10)	19.5	3.06		mg/Kg-dry	1	3/15/2014 7:05:00 AM
Aliphatic Hydrocarbon (C10-C12)	830	61.3	D	mg/Kg-dry	20	3/15/2014 3:25:00 PM
Aromatic Hydrocarbon (C8-C10)	427	61.3	D	mg/Kg-dry	20	3/15/2014 3:25:00 PM
Aromatic Hydrocarbon (C10-C12)	563	61.3	D	mg/Kg-dry	20	3/15/2014 3:25:00 PM
Aromatic Hydrocarbon (C12-C13)	724	61.3	D	mg/Kg-dry	20	3/15/2014 3:25:00 PM
Benzene	4.82	0.766		mg/Kg-dry	1	3/15/2014 7:05:00 AM
Toluene	29.6	0.766		mg/Kg-dry	1	3/15/2014 7:05:00 AM
Ethy benzene	28.0	0.766		mg/Kg-dry	1	3/15/2014 7:05:00 AM
m,p-Xylene	153	15.3	D	mg/Kg-dry	20	3/15/2014 3:25:00 PM
o-Xylene	52.1	15.3	D	mg/Kg-dry	20	3/15/2014 3:25:00 PM
Naphthalene	26.2	0.766		mg/Kg-dry	1	3/15/2014 7:05:00 AM
Methyl tert-butyl ether (MTBE)	13.0	0.766		mg/Kg-dry	1	3/15/2014 7:05:00 AM
Surr: 1,4-Difluorobenzene	89.3	65-140		%REC	1	3/15/2014 7:05:00 AM
Surr: Bromofluorobenzene	103	65-140		%REC	1	3/15/2014 7:05:00 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
RL	Reporting Limit	S	Spike recovery outside accepted recovery limits

Analytical Report

WO#: **1403107**
Date Reported: **3/26/2014**

Client: Apex Laboratories
Collection Date: 3/5/2014 1:05:00 PM
Project: A4C0203
Lab ID: 1403107-005
Matrix: Soil
Client Sample ID: **B-37:4.5-5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Sample Moisture (Percent Moisture)				Batch ID: R12979		Analyst: KZ
Percent Moisture	10.5			wt%	1	3/12/2014 8:43:40 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
RL	Reporting Limit	S	Spike recovery outside accepted recovery limits

Work Order: 1403107
CLIENT: Apex Laboratories
Project: A4C0203

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **1403107-004ADUP**	SampType: **DUP**			Units: **mg/Kg-dry**		Prep Date: **3/13/2014**		RunNo: **13179**		
Client ID: **B-38:4.5-5**	Batch ID: **6859**					Analysis Date: **3/15/2014**		SeqNo: **265087**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C8-C10)	ND	5.66						0		30	*
Aliphatic Hydrocarbon (C10-C12)	ND	5.66						0		30	
Aliphatic Hydrocarbon (C12-C16)	ND	5.66						0		30	
Aliphatic Hydrocarbon (C16-C21)	ND	5.66						0		30	
Aliphatic Hydrocarbon (C21-C34)	ND	5.66						0		30	
Surr: 1-Chlorooctadecane	4.19		4.524		92.5	65	140		0		

NOTES:
* - Flagged value is not within established control limits.

Sample ID: **1403107-004ADUP**	SampType: **DUP**			Units: **mg/Kg-dry**		Prep Date: **3/13/2014**		RunNo: **13179**		
Client ID: **B-38:4.5-5**	Batch ID: **6859**					Analysis Date: **3/15/2014**		SeqNo: **265088**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C8-C10)	ND	5.66						0		30	
Aromatic Hydrocarbon (C10-C12)	ND	5.66						0		30	
Aromatic Hydrocarbon (C12-C16)	ND	5.66						0		30	
Aromatic Hydrocarbon (C16-C21)	ND	5.66						0		30	
Aromatic Hydrocarbon (C21-C34)	ND	5.66						0		30	
Surr: o-Terphenyl	3.90		4.524		86.2	65	140		0		

Sample ID: **LCS-6859**	SampType: **LCS**			Units: **mg/Kg**		Prep Date: **3/13/2014**		RunNo: **13179**		
Client ID: **LCSS**	Batch ID: **6859**					Analysis Date: **3/14/2014**		SeqNo: **265097**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C8-C10)	9.49	5.00	20.00	0	47.5	70	130				S
Aliphatic Hydrocarbon (C10-C12)	7.07	5.00	10.00	0	70.7	70	130				
Aliphatic Hydrocarbon (C12-C16)	7.42	5.00	10.00	0	74.2	70	130				
Aliphatic Hydrocarbon (C16-C21)	8.85	5.00	10.00	0	88.5	70	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike recovery outside accepted recovery limits

Work Order: 1403107
CLIENT: Apex Laboratories
Project: A4C0203

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **LCS-6859**	SampType: **LCS**			Units: **mg/Kg**		Prep Date: **3/13/2014**		RunNo: **13179**			
Client ID: **LCSS**	Batch ID: **6859**					Analysis Date: **3/14/2014**		SeqNo: **265097**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C21-C34)	8.54	5.00	10.00	0	85.4	70	130				
Surr: 1-Chlorooctadecane	3.19		4.000		79.6	65	140				

NOTES:
S - Outlying QC recoveries were associated with the LCS (Low bias - Aliphatic C8-C10) - Please refer to NWVPH (Aliphatic C8-C10). Corresponding samples will be marked with an *.

Sample ID: **LCS-6859**	SampType: **LCS**			Units: **mg/Kg**		Prep Date: **3/13/2014**		RunNo: **13179**			
Client ID: **LCSS**	Batch ID: **6859**					Analysis Date: **3/15/2014**		SeqNo: **265098**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C8-C10)	7.59	5.00	10.00	0	75.9	70	130				
Aromatic Hydrocarbon (C10-C12)	7.12	5.00	10.00	0	71.2	70	130				
Aromatic Hydrocarbon (C12-C16)	7.14	5.00	10.00	0	71.4	70	130				
Aromatic Hydrocarbon (C16-C21)	11.0	5.00	10.00	0	110	70	130				
Aromatic Hydrocarbon (C21-C34)	11.1	5.00	10.00	0	111	70	130				
Surr: o-Terphenyl	4.59		4.000		115	65	140				

Sample ID: **LCSD-6859**	SampType: **LCSD**			Units: **mg/Kg**		Prep Date: **3/13/2014**		RunNo: **13179**			
Client ID: **LCSS02**	Batch ID: **6859**					Analysis Date: **3/14/2014**		SeqNo: **265099**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C8-C10)	11.5	5.00	20.00	0	57.6	70	130	9.494	19.2	20	S
Aliphatic Hydrocarbon (C10-C12)	7.50	5.00	10.00	0	75.0	70	130	7.073	5.86	20	
Aliphatic Hydrocarbon (C12-C16)	8.25	5.00	10.00	0	82.5	70	130	7.422	10.5	20	
Aliphatic Hydrocarbon (C16-C21)	9.52	5.00	10.00	0	95.2	70	130	8.850	7.27	20	
Aliphatic Hydrocarbon (C21-C34)	9.11	5.00	10.00	0	91.1	70	130	8.542	6.39	20	
Surr: 1-Chlorooctadecane	3.61		4.000		90.3	65	140		0		

NOTES:
S - Outlying QC recoveries were associated with the LCSD (Low bias - Aliphatic C8-C10) - Please refer to NWVPH (Aliphatic C8-C10). Corresponding samples will be marked with an *.

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike recovery outside accepted recovery limits

Work Order: 1403107
CLIENT: Apex Laboratories
Project: A4C0203

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **LCSD-6859**	SampType: **LCSD**			Units: **mg/Kg**		Prep Date: **3/13/2014**		RunNo: **13179**		
Client ID: **LCSS02**	Batch ID: **6859**					Analysis Date: **3/15/2014**		SeqNo: **265100**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C8-C10)	7.45	5.00	10.00	0	74.5	70	130	7.587	1.79	20	
Aromatic Hydrocarbon (C10-C12)	7.36	5.00	10.00	0	73.6	70	130	7.122	3.31	20	
Aromatic Hydrocarbon (C12-C16)	7.73	5.00	10.00	0	77.3	70	130	7.145	7.85	20	
Aromatic Hydrocarbon (C16-C21)	10.8	5.00	10.00	0	108	70	130	10.99	1.68	20	
Aromatic Hydrocarbon (C21-C34)	11.1	5.00	10.00	0	111	70	130	11.14	0.450	20	
Surr: o-Terphenyl	3.25		4.000		81.3	65	140		0		

Sample ID: **MB-6859**	SampType: **MBLK**			Units: **mg/Kg**		Prep Date: **3/13/2014**		RunNo: **13179**		
Client ID: **MBLKS**	Batch ID: **6859**					Analysis Date: **3/14/2014**		SeqNo: **265101**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C8-C10)	ND	5.00									
Aliphatic Hydrocarbon (C10-C12)	ND	5.00									
Aliphatic Hydrocarbon (C12-C16)	ND	5.00									
Aliphatic Hydrocarbon (C16-C21)	ND	5.00									
Aliphatic Hydrocarbon (C21-C34)	ND	5.00									
Surr: 1-Chlorooctadecane	3.19		4.000		79.8	65	140				

Sample ID: **MB-6859**	SampType: **MBLK**			Units: **mg/Kg**		Prep Date: **3/13/2014**		RunNo: **13179**		
Client ID: **MBLKS**	Batch ID: **6859**					Analysis Date: **3/15/2014**		SeqNo: **265102**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C8-C10)	ND	5.00									
Aromatic Hydrocarbon (C10-C12)	ND	5.00									
Aromatic Hydrocarbon (C12-C16)	ND	5.00									
Aromatic Hydrocarbon (C16-C21)	ND	5.00									
Aromatic Hydrocarbon (C21-C34)	ND	5.00									
Surr: o-Terphenyl	3.45		4.000		86.2	65	140				

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike recovery outside accepted recovery limits

Work Order: 1403107
CLIENT: Apex Laboratories
Project: A4C0203

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **MB-6859**	SampType: **MBLK**			Units: **mg/Kg**		Prep Date: **3/13/2014**		RunNo: **13179**			
Client ID: **MBLKS**	Batch ID: **6859**					Analysis Date: **3/15/2014**		SeqNo: **265102**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID: **CCV-6859C**	SampType: **CCV**			Units: **mg/Kg**		Prep Date: **3/20/2014**		RunNo: **13179**			
Client ID: **CCV**	Batch ID: **6859**					Analysis Date: **3/20/2014**		SeqNo: **265105**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C8-C10)	90.8	5.00	100.0	0	90.8	80	120				
Aliphatic Hydrocarbon (C10-C12)	52.6	5.00	50.00	0	105	80	120				
Aliphatic Hydrocarbon (C12-C16)	56.5	5.00	50.00	0	113	80	120				
Aliphatic Hydrocarbon (C16-C21)	52.7	5.00	50.00	0	105	80	120				
Aliphatic Hydrocarbon (C21-C34)	52.0	5.00	50.00	0	104	80	120				
Surr: 1-Chlorooctadecane	42.9		40.00		107	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike recovery outside accepted recovery limits

Work Order: 1403107
CLIENT: Apex Laboratories
Project: A4C0203

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID: **1403107-005BMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **3/14/2014** RunNo: **13200**
Client ID: **B-37:4.5-5** Batch ID: **6879** Analysis Date: **3/15/2014** SeqNo: **265543**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	228	3.06	45.96	210.9	36.5	70	130				S
Aliphatic Hydrocarbon (C6-C8)	191	3.06	15.32	203.3	-81.2	70	130				S
Aliphatic Hydrocarbon (C8-C10)	18.3	3.06	15.32	19.48	-7.87	70	130				S
Aliphatic Hydrocarbon (C10-C12)	266	3.06	15.32	274.0	-52.3	70	130				S
Aromatic Hydrocarbon (C8-C10)	478	3.06	61.28	456.0	36.6	70	130				S
Aromatic Hydrocarbon (C10-C12)	716	3.06	15.32	601.0	753	70	130				S
Aromatic Hydrocarbon (C12-C13)	669	3.06	15.32	571.8	632	70	130				S
Benzene	15.4	0.766	15.32	4.820	68.7	70	130				S
Toluene	39.1	0.766	15.32	29.59	62.0	70	130				S
Ethy benzene	36.9	0.766	15.32	28.03	58.0	70	130				S
m,p-Xylene	144	0.766	30.64	134.5	32.0	70	130				S
o-Xylene	58.5	0.766	15.32	52.10	42.0	70	130				S
Naphthalene	38.9	0.766	15.32	26.23	82.9	70	130				
Methyl tert-butyl ether (MTBE)	24.4	0.766	15.32	12.98	74.3	70	130				
Surr: 1,4-Difluorobenzene	3.51		3.830		91.6	65	140				
Surr: Bromofluorobenzene	3.87		3.830		101	65	140				

NOTES:
S - Analyte concentration too high for accurate MS recovery.

Sample ID: **LCS-6879** SampType: **LCS** Units: **mg/Kg** Prep Date: **3/14/2014** RunNo: **13200**
Client ID: **LCSS** Batch ID: **6879** Analysis Date: **3/14/2014** SeqNo: **265546**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	23.1	2.00	30.00	0	77.2	70	130				
Aliphatic Hydrocarbon (C6-C8)	10.7	2.00	10.00	0	107	70	130				
Aliphatic Hydrocarbon (C8-C10)	8.28	2.00	10.00	0	82.8	70	130				
Aliphatic Hydrocarbon (C10-C12)	11.4	2.00	10.00	0	114	70	130				
Aromatic Hydrocarbon (C8-C10)	38.1	2.00	40.00	0	95.2	70	130				
Aromatic Hydrocarbon (C10-C12)	11.6	2.00	10.00	0	116	70	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike recovery outside accepted recovery limits

Date: *3/26/2014*

Work Order: 1403107
CLIENT: Apex Laboratories
Project: A4C0203

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID: **LCS-6879** SampType: **LCS** Units: **mg/Kg** Prep Date: **3/14/2014** RunNo: **13200**
Client ID: **LCSS** Batch ID: **6879** Analysis Date: **3/14/2014** SeqNo: **265546**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C12-C13)	8.49	2.00	10.00	0	84.9	70	130				
Benzene	7.06	0.500	10.00	0	70.6	70	130				
Toluene	7.73	0.500	10.00	0	77.3	70	130				
Ethy benzene	7.48	0.500	10.00	0	74.8	70	130				
m,p-Xylene	15.5	0.500	20.00	0	77.5	70	130				
o-Xylene	7.71	0.500	10.00	0	77.1	70	130				
Naphthalene	10.2	0.500	10.00	0	102	70	130				
Methyl tert-butyl ether (MTBE)	8.28	0.500	10.00	0	82.8	70	130				
Surr: 1,4-Difluorobenzene	2.79		2.500		111	65	140				
Surr: Bromofluorobenzene	2.53		2.500		101	65	140				

Sample ID: **MB-6879** SampType: **MBLK** Units: **mg/Kg** Prep Date: **3/14/2014** RunNo: **13200**
Client ID: **MBLKS** Batch ID: **6879** Analysis Date: **3/14/2014** SeqNo: **265547**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	ND	2.00		0	0						
Aliphatic Hydrocarbon (C6-C8)	ND	2.00		0	0						
Aliphatic Hydrocarbon (C8-C10)	ND	2.00		0	0						
Aliphatic Hydrocarbon (C10-C12)	ND	2.00		0	0						
Aromatic Hydrocarbon (C8-C10)	ND	2.00		0	0						
Aromatic Hydrocarbon (C10-C12)	ND	2.00		0	0						
Aromatic Hydrocarbon (C12-C13)	ND	2.00		0	0						
Benzene	ND	0.500		0	0						
Toluene	ND	0.500		0	0						
Ethy benzene	ND	0.500		0	0						
m,p-Xylene	ND	0.500		0	0						
o-Xylene	ND	0.500		0	0						
Naphthalene	ND	0.500		0	0						

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike recovery outside accepted recovery limits

Work Order: 1403107
CLIENT: Apex Laboratories
Project: A4C0203

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID: **MB-6879** SampType: **MBLK** Units: **mg/Kg** Prep Date: **3/14/2014** RunNo: **13200**
Client ID: **MBLKS** Batch ID: **6879** Analysis Date: **3/14/2014** SeqNo: **265547**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	ND	0.500		0	0						
Surr: 1,4-Difluorobenzene	2.47		2.500		98.7	65	140				
Surr: Bromofluorobenzene	2.28		2.500		91.2	65	140				

Sample ID: **1403107-003BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **3/14/2014** RunNo: **13200**
Client ID: **B-39:7-7.5** Batch ID: **6879** Analysis Date: **3/24/2014** SeqNo: **265922**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	31.9	1.85		0	0			30.38	4.86	25	EH
Aliphatic Hydrocarbon (C6-C8)	106	1.85		0	0			87.76	19.3	25	EH
Aliphatic Hydrocarbon (C8-C10)	32.1	1.85		0	0			31.66	1.32	25	EH
Aliphatic Hydrocarbon (C10-C12)	113	1.85		0	0			138.1	20.2	25	EH
Aromatic Hydrocarbon (C8-C10)	254	1.85		0	0			219.1	14.8	25	EH
Aromatic Hydrocarbon (C10-C12)	253	1.85		0	0			215.3	16.0	25	EH
Aromatic Hydrocarbon (C12-C13)	78.0	1.85		0	0			61.53	23.6	25	EH
Benzene	0.684	0.462		0	0			0.5560	20.6	25	H
Toluene	13.4	0.462		0	0			9.641	32.3	25	RH
Ethy benzene	15.9	0.462		0	0			14.32	10.7	25	H
m,p-Xylene	67.7	0.462		0	0			53.86	22.7	25	EH
o-Xylene	26.9	0.462		0	0			23.67	12.8	25	H
Naphthalene	9.08	0.462		0	0			6.047	40.1	25	RH
Methyl tert-butyl ether (MTBE)	0.493	0.462		0	0			0.1769	94.4	25	H
Surr: 1,4-Difluorobenzene	1.88		2.308		81.5	65	140		0		H
Surr: Bromofluorobenzene	2.08		2.308		90.3	65	140		0		H

NOTES:
R - High RPD. The method is in control as indicated by the Laboratory Control Sample (LCS).

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike recovery outside accepted recovery limits

Fremont Analytical

Date: *3/26/2014*

Work Order: 1403107
CLIENT: Apex Laboratories
Project: A4C0203

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID: **CCV-R13200C** SampType: **CCV** Units: **mg/Kg** Prep Date: **3/24/2014** RunNo: **13200**
Client ID: **CCV** Batch ID: **6879** Analysis Date: **3/24/2014** SeqNo: **265923**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	609	2.00	600.0	0	101	80	120				
Aliphatic Hydrocarbon (C6-C8)	213	2.00	200.0	0	106	80	120				
Aliphatic Hydrocarbon (C8-C10)	210	2.00	200.0	0	105	80	120				
Aliphatic Hydrocarbon (C10-C12)	211	2.00	200.0	0	105	80	120				
Aromatic Hydrocarbon (C8-C10)	816	2.00	800.0	0	102	80	120				
Aromatic Hydrocarbon (C10-C12)	238	2.00	200.0	0	119	80	120				
Aromatic Hydrocarbon (C12-C13)	211	2.00	200.0	0	105	80	120				
Benzene	176	0.500	200.0	0	88.0	80	120				
Toluene	185	0.500	200.0	0	92.7	80	120				
Ethy benzene	192	0.500	200.0	0	96.0	80	120				
m,p-Xylene	411	0.500	400.0	0	103	80	120				
o-Xylene	192	0.500	200.0	0	95.8	80	120				
Naphthalene	236	0.500	200.0	0	118	80	120				
Methyl tert-butyl ether (MTBE)	166	0.500	200.0	0	82.8	80	120				
Surr: 1,4-Difluorobenzene	54.5		50.00		109	65	140				
Surr: Bromofluorobenzene	50.1		50.00		100	65	140				

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike recovery outside accepted recovery limits

Sample Log-In Check List

Client Name:	**APEX**	Work Order Number:	**1403107**
Logged by:	**Clare Griggs**	Date Received:	**3/11/2014 2:05:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	UPS		

Log In

3.	Coolers are present?	Yes ☑	No ☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Required ☑
6.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
7.	Were all coolers received at a temperature of >0°C to 10.0°C	Yes ☑	No ☐	NA ☐
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is the headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified:		Date:	
By Whom:		Via:	☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:			
Client Instructions:			

19. Additional remarks:

Item Information

Item #	Temp ºC	Condition
Cooler	4.9	Good
Sample	7.0	Good

SUBCONTRACT ORDER

Apex Laboratories

A4C0203

140307

SENDING LABORATORY:

Apex Laboratories
12232 S.W. Garden Place
Tigard, OR 97223
Phone: (503) 718-2323
Fax: (503) 718-0333
Project Manager: Philip Nerenberg

RECEIVING LABORATORY:

Fremont Analytical
3600 Fremont Avenue N.
Seattle, WA 98103
Phone :(206) 352-3790
Fax: (206) 352-7178

Sample Name: B-41: 8-8.5 **Soil** **Sampled: 03/05/14 08:45** (A4C0203-01)

Analysis	Due	Expires	Comments
NWTPH-EPH (Sub)	03/20/14 17:00	03/19/14 08:45	Sub to Fremont
NWTPH-VPH (Sub)	03/20/14 17:00	03/19/14 08:45	Sub to Fremont
Containers Supplied:			
(C)4 oz Glass Jar			
(D)40 mL VOA - 5035 (MeOH)			

Sample Name: B-40: 8-8.5 **Soil** **Sampled: 03/05/14 09:30** (A4C0203-03)

Analysis	Due	Expires	Comments
NWTPH-EPH (Sub)	03/20/14 17:00	03/19/14 09:30	Sub to Fremont
NWTPH-VPH (Sub)	03/20/14 17:00	03/19/14 09:30	Sub to Fremont
Containers Supplied:			
(C)4 oz Glass Jar			
(D)40 mL VOA - 5035 (MeOH)			

Sample Name: B-39: 7-7.5 **Soil** **Sampled: 03/05/14 10:00** (A4C0203-05)

Analysis	Due	Expires	Comments
NWTPH-EPH (Sub)	03/20/14 17:00	03/19/14 10:00	Sub to Fremont
NWTPH-VPH (Sub)	03/20/14 17:00	03/19/14 10:00	Sub to Fremont
Containers Supplied:			
(C)4 oz Glass Jar			
(D)40 mL VOA - 5035 (MeOH)			

standard turn

Released By	Date	Received By	Date
3/10/14		UPS (Shipper)	
UPS (Shipper)		3/11/14	2:05 pm
Released By	Date	Received By	Date

SUBCONTRACT ORDER

Apex Laboratories

A4C0203

Sample Name: B-38: 4.5-5 **Soil** **Sampled: 03/05/14 10:40** (A4C0203-07)

Analysis	Due	Expires	Comments
NWTPH-EPH (Sub)	03/20/14 17:00	03/19/14 10:40	Sub to Fremont
NWTPH-VPH (Sub)	03/20/14 17:00	03/19/14 10:40	Sub to Fremont
Containers Supplied:			
(C)4 oz Glass Jar			
(D)40 mL VOA - 5035 (MeOH)			

Sample Name: B-37: 4.5-5 **Soil** **Sampled: 03/05/14 13:05** (A4C0203-09)

Analysis	Due	Expires	Comments
NWTPH-EPH (Sub)	03/20/14 17:00	03/19/14 13:05	Sub to Fremont
NWTPH-VPH (Sub)	03/20/14 17:00	03/19/14 13:05	Sub to Fremont
Containers Supplied:			
(C)4 oz Glass Jar			
(D)40 mL VOA - 5035 (MeOH)			

Started TAT

3/10/14

Released By	Date	Received By	Date
		UPS (Shipper)	
UPS (Shipper)			
Released By	Date	Received By	Date

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3/24/2014
Mr. Chris Rhea
EES Environmental Consulting, Inc.
240 N Broadway
Suite 203
Portland OR 97227

Project Name: Plaid Pantry 324
Project #: 1133-01
Workorder #: 1403166

Dear Mr. Chris Rhea

The following report includes the data for the above referenced project for sample(s) received on 3/10/2014 at Air Toxics Ltd.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1403166

Work Order Summary

CLIENT:	Mr. Chris Rhea EES Environmental Consulting, Inc. 240 N Broadway Suite 203 Portland, OR 97227	**BILL TO:**	Mr. Chris Rhea EES Environmental Consulting, Inc. 240 N Broadway Suite 203 Portland, OR 97227
PHONE:	530-847-2740	**P.O. #**	
FAX:		**PROJECT #**	1133-01 Plaid Pantry 324
DATE RECEIVED:	03/10/2014	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	03/24/2014		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SG-1	TO-15	4.5 "Hg	15.5 psi
02A	SG-2	TO-15	4.1 "Hg	15.1 psi
03A	SG-3	TO-15	4.5 "Hg	15.1 psi
04A	SG-4	TO-15	5.7 "Hg	15.2 psi
05A	SG-5	TO-15	11.6 "Hg	15.1 psi
06A	SG-6	TO-15	4.1 "Hg	14.9 psi
07A	SG-7	TO-15	4.7 "Hg	15 psi
08A	Lab Blank	TO-15	NA	NA
08B	Lab Blank	TO-15	NA	NA
09A	CCV	TO-15	NA	NA
09B	CCV	TO-15	NA	NA
10A	LCS	TO-15	NA	NA
10AA	LCSD	TO-15	NA	NA
10B	LCS	TO-15	NA	NA
10BB	LCSD	TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 03/24/14

Technical Director

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-13-6, UT NELAP CA009332013-4, VA NELAP - 460197, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2013, Expiration date: 10/17/2014.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
EPA Method TO-15
EES Environmental Consulting, Inc.
Workorder# 1403166

Seven 1 Liter Summa Canister (100% Certified) samples were received on March 10, 2014. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

The Chain of Custody (COC) information for sample SG-7 did not match the information on the canister with regard to canister identification. The client was notified of the discrepancy and the information on the canister was used to process and report the sample.

Analytical Notes

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page. Target compound non-detects in the samples that are associated with high bias in QC analyses have not been flagged.

A single point calibration for TPH referenced to Gasoline was performed for each daily analytical batch. Recovery is reported as 100% in the associated results for each CCV.

Dilution was performed on samples SG-3, SG-4 and SG-5 due to the presence of high level target species.

The Relative Percent Difference (RPD) of the LCS/LCSD exceeded acceptance limits for Bromomethane and Chloroethane analyzed on MSD-14 March 20, 2014.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SG-1

Lab ID#: 1403166-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,3-Butadiene	1.2	2.7	2.7	5.9
Ethanol	4.8	17	9.1	33
Acetone	12	48	29	120
Hexane	1.2	6.4	4.3	22
2-Butanone (Methyl Ethyl Ketone)	4.8	6.5	14	19
Cyclohexane	1.2	4.6	4.2	16
2,2,4-Trimethylpentane	1.2	2.1	5.6	9.8
Benzene	1.2	1.5	3.9	4.8
Heptane	1.2	3.7	5.0	15
Toluene	1.2	1.4	4.6	5.3
TPH ref. to Gasoline (MW=100)	60	250	250	1000

Client Sample ID: SG-2

Lab ID#: 1403166-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	1.8	5.8	8.8
1,3-Butadiene	1.2	10	2.6	23
Ethanol	4.7	21	8.8	40
Acetone	12	40	28	96
Hexane	1.2	4.4	4.1	15
Cyclohexane	1.2	2.4	4.0	8.2
Benzene	1.2	2.0	3.8	6.6
Heptane	1.2	1.8	4.8	7.2
Toluene	1.2	2.4	4.4	9.1
TPH ref. to Gasoline (MW=100)	59	230	240	940

Client Sample ID: SG-3

Lab ID#: 1403166-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,3-Butadiene	8.0	18	18	41
Ethanol	32	40	60	76

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SG-3

Lab ID#: 1403166-03A

Hexane	8.0	530	28	1800
Cyclohexane	8.0	220	27	750
2,2,4-Trimethylpentane	8.0	510	37	2400
Benzene	8.0	82	25	260
Heptane	8.0	380	32	1600
Toluene	8.0	1300	30	5000
Ethyl Benzene	8.0	430	34	1900
m,p-Xylene	8.0	2200	34	9800
o-Xylene	8.0	750	34	3200
Cumene	8.0	39	39	190
Propylbenzene	8.0	110	39	530
4-Ethyltoluene	8.0	600	39	2900
1,3,5-Trimethylbenzene	8.0	250	39	1200
1,2,4-Trimethylbenzene	8.0	620	39	3000
TPH ref. to Gasoline (MW=100)	400	20000	1600	82000

Client Sample ID: SG-4

Lab ID#: 1403166-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,3-Butadiene	42	58	92	130
Hexane	42	5200	150	18000
Cyclohexane	42	2600	140	8800
2,2,4-Trimethylpentane	42	6600	200	31000
Benzene	42	740	130	2400
Heptane	42	2800	170	11000
Toluene	42	4700	160	18000
Ethyl Benzene	42	2100	180	9300
m,p-Xylene	42	7800	180	34000
o-Xylene	42	1600	180	7000
Cumene	42	360	200	1800
Propylbenzene	42	840	200	4200
4-Ethyltoluene	42	4000	200	19000
1,3,5-Trimethylbenzene	42	3600	200	18000
1,2,4-Trimethylbenzene	42	6900	200	34000

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SG-4

Lab ID#: 1403166-04A

TPH ref. to Gasoline (MW=100)	2100	170000	8600	700000

Client Sample ID: SG-5

Lab ID#: 1403166-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	210	72000	730	250000
Cyclohexane	210	37000	710	130000
2,2,4-Trimethylpentane	210	32000	970	150000
Benzene	210	32000	660	100000
Heptane	210	38000	850	160000
Toluene	210	130000	780	480000
Ethyl Benzene	210	22000	900	97000
m,p-Xylene	210	96000	900	420000
o-Xylene	210	33000	900	140000
Cumene	210	1400	1000	6800
Propylbenzene	210	3800	1000	18000
4-Ethyltoluene	210	18000	1000	89000
1,3,5-Trimethylbenzene	210	5800	1000	29000
1,2,4-Trimethylbenzene	210	17000	1000	86000
TPH ref. to Gasoline (MW=100)	4100	2100000	17000	8600000

Client Sample ID: SG-6

Lab ID#: 1403166-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	2.5	5.8	12
1,3-Butadiene	1.2	6.5	2.6	14
Ethanol	4.7	9.3	8.8	18
Hexane	1.2	13	4.1	47
Cyclohexane	1.2	8.8	4.0	30
2,2,4-Trimethylpentane	1.2	5.4	5.4	25
Benzene	1.2	3.7	3.7	12
Heptane	1.2	6.2	4.8	25

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SG-6

Lab ID#: 1403166-06A

Toluene	1.2	4.3	4.4	16
Ethyl Benzene	1.2	1.3	5.0	5.5
m,p-Xylene	1.2	5.0	5.0	22
o-Xylene	1.2	1.7	5.0	7.4
TPH ref. to Gasoline (MW=100)	58	480	240	2000

Client Sample ID: SG-7

Lab ID#: 1403166-07A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,3-Butadiene	1.2	7.1	2.6	16
Ethanol	4.8	9.2	9.0	17
Hexane	1.2	10	4.2	37
2-Butanone (Methyl Ethyl Ketone)	4.8	4.8	14	14
Cyclohexane	1.2	7.8	4.1	27
Benzene	1.2	2.8	3.8	8.9
Heptane	1.2	6.7	4.9	27
Toluene	1.2	2.5	4.5	9.4
TPH ref. to Gasoline (MW=100)	60	370	240	1500

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Client Sample ID: SG-1

Lab ID#: 1403166-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2031411**	**Date of Collection:**	**3/4/14 9:47:00 AM**
Dil. Factor:	**2.42**	**Date of Analysis:**	**3/14/14 04:47 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	Not Detected	6.0	Not Detected
Freon 114	1.2	Not Detected	8.4	Not Detected
Chloromethane	12	Not Detected	25	Not Detected
Vinyl Chloride	1.2	Not Detected	3.1	Not Detected
1,3-Butadiene	1.2	2.7	2.7	5.9
Bromomethane	12	Not Detected	47	Not Detected
Chloroethane	4.8	Not Detected	13	Not Detected
Freon 11	1.2	Not Detected	6.8	Not Detected
Ethanol	4.8	17	9.1	33
Freon 113	1.2	Not Detected	9.3	Not Detected
1,1-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Acetone	12	48	29	120
2-Propanol	4.8	Not Detected	12	Not Detected
Carbon Disulfide	4.8	Not Detected	15	Not Detected
3-Chloropropene	4.8	Not Detected	15	Not Detected
Methylene Chloride	12	Not Detected	42	Not Detected
Methyl tert-butyl ether	1.2	Not Detected	4.4	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Hexane	1.2	6.4	4.3	22
1,1-Dichloroethane	1.2	Not Detected	4.9	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.8	6.5	14	19
cis-1,2-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Tetrahydrofuran	1.2	Not Detected	3.6	Not Detected
Chloroform	1.2	Not Detected	5.9	Not Detected
1,1,1-Trichloroethane	1.2	Not Detected	6.6	Not Detected
Cyclohexane	1.2	4.6	4.2	16
Carbon Tetrachloride	1.2	Not Detected	7.6	Not Detected
2,2,4-Trimethylpentane	1.2	2.1	5.6	9.8
Benzene	1.2	1.5	3.9	4.8
1,2-Dichloroethane	1.2	Not Detected	4.9	Not Detected
Heptane	1.2	3.7	5.0	15
Trichloroethene	1.2	Not Detected	6.5	Not Detected
1,2-Dichloropropane	1.2	Not Detected	5.6	Not Detected
1,4-Dioxane	4.8	Not Detected	17	Not Detected
Bromodichloromethane	1.2	Not Detected	8.1	Not Detected
cis-1,3-Dichloropropene	1.2	Not Detected	5.5	Not Detected
4-Methyl-2-pentanone	1.2	Not Detected	5.0	Not Detected
Toluene	1.2	1.4	4.6	5.3
trans-1,3-Dichloropropene	1.2	Not Detected	5.5	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.6	Not Detected
Tetrachloroethene	1.2	Not Detected	8.2	Not Detected
2-Hexanone	4.8	Not Detected	20	Not Detected

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Client Sample ID: SG-1

Lab ID#: 1403166-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2031411**	**Date of Collection:**	**3/4/14 9:47:00 AM**
Dil. Factor:	**2.42**	**Date of Analysis:**	**3/14/14 04:47 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.2	Not Detected	10	Not Detected
1,2-Dibromoethane (EDB)	1.2	Not Detected	9.3	Not Detected
Chlorobenzene	1.2	Not Detected	5.6	Not Detected
Ethyl Benzene	1.2	Not Detected	5.2	Not Detected
m,p-Xylene	1.2	Not Detected	5.2	Not Detected
o-Xylene	1.2	Not Detected	5.2	Not Detected
Styrene	1.2	Not Detected	5.2	Not Detected
Bromoform	1.2	Not Detected	12	Not Detected
Cumene	1.2	Not Detected	5.9	Not Detected
1,1,2,2-Tetrachloroethane	1.2	Not Detected	8.3	Not Detected
Propylbenzene	1.2	Not Detected	5.9	Not Detected
4-Ethyltoluene	1.2	Not Detected	5.9	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	5.9	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	5.9	Not Detected
1,3-Dichlorobenzene	1.2	Not Detected	7.3	Not Detected
1,4-Dichlorobenzene	1.2	Not Detected	7.3	Not Detected
alpha-Chlorotoluene	1.2	Not Detected	6.3	Not Detected
1,2-Dichlorobenzene	1.2	Not Detected	7.3	Not Detected
1,2,4-Trichlorobenzene	4.8	Not Detected	36	Not Detected
Hexachlorobutadiene	4.8	Not Detected	52	Not Detected
TPH ref. to Gasoline (MW=100)	60	250	250	1000

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	90	70-130

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Client Sample ID: SG-2

Lab ID#: 1403166-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2031412**	**Date of Collection:**	**3/4/14 8:59:00 AM**
Dil. Factor:	**2.35**	**Date of Analysis:**	**3/14/14 05:20 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	1.8	5.8	8.8
Freon 114	1.2	Not Detected	8.2	Not Detected
Chloromethane	12	Not Detected	24	Not Detected
Vinyl Chloride	1.2	Not Detected	3.0	Not Detected
1,3-Butadiene	1.2	10	2.6	23
Bromomethane	12	Not Detected	46	Not Detected
Chloroethane	4.7	Not Detected	12	Not Detected
Freon 11	1.2	Not Detected	6.6	Not Detected
Ethanol	4.7	21	8.8	40
Freon 113	1.2	Not Detected	9.0	Not Detected
1,1-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Acetone	12	40	28	96
2-Propanol	4.7	Not Detected	12	Not Detected
Carbon Disulfide	4.7	Not Detected	15	Not Detected
3-Chloropropene	4.7	Not Detected	15	Not Detected
Methylene Chloride	12	Not Detected	41	Not Detected
Methyl tert-butyl ether	1.2	Not Detected	4.2	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Hexane	1.2	4.4	4.1	15
1,1-Dichloroethane	1.2	Not Detected	4.8	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.7	Not Detected	14	Not Detected
cis-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Tetrahydrofuran	1.2	Not Detected	3.5	Not Detected
Chloroform	1.2	Not Detected	5.7	Not Detected
1,1,1-Trichloroethane	1.2	Not Detected	6.4	Not Detected
Cyclohexane	1.2	2.4	4.0	8.2
Carbon Tetrachloride	1.2	Not Detected	7.4	Not Detected
2,2,4-Trimethylpentane	1.2	Not Detected	5.5	Not Detected
Benzene	1.2	2.0	3.8	6.6
1,2-Dichloroethane	1.2	Not Detected	4.8	Not Detected
Heptane	1.2	1.8	4.8	7.2
Trichloroethene	1.2	Not Detected	6.3	Not Detected
1,2-Dichloropropane	1.2	Not Detected	5.4	Not Detected
1,4-Dioxane	4.7	Not Detected	17	Not Detected
Bromodichloromethane	1.2	Not Detected	7.9	Not Detected
cis-1,3-Dichloropropene	1.2	Not Detected	5.3	Not Detected
4-Methyl-2-pentanone	1.2	Not Detected	4.8	Not Detected
Toluene	1.2	2.4	4.4	9.1
trans-1,3-Dichloropropene	1.2	Not Detected	5.3	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.4	Not Detected
Tetrachloroethene	1.2	Not Detected	8.0	Not Detected
2-Hexanone	4.7	Not Detected	19	Not Detected

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Client Sample ID: SG-2

Lab ID#: 1403166-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2031412**	**Date of Collection:**	**3/4/14 8:59:00 AM**
Dil. Factor:	**2.35**	**Date of Analysis:**	**3/14/14 05:20 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.2	Not Detected	10	Not Detected
1,2-Dibromoethane (EDB)	1.2	Not Detected	9.0	Not Detected
Chlorobenzene	1.2	Not Detected	5.4	Not Detected
Ethyl Benzene	1.2	Not Detected	5.1	Not Detected
m,p-Xylene	1.2	Not Detected	5.1	Not Detected
o-Xylene	1.2	Not Detected	5.1	Not Detected
Styrene	1.2	Not Detected	5.0	Not Detected
Bromoform	1.2	Not Detected	12	Not Detected
Cumene	1.2	Not Detected	5.8	Not Detected
1,1,2,2-Tetrachloroethane	1.2	Not Detected	8.1	Not Detected
Propylbenzene	1.2	Not Detected	5.8	Not Detected
4-Ethyltoluene	1.2	Not Detected	5.8	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	5.8	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	5.8	Not Detected
1,3-Dichlorobenzene	1.2	Not Detected	7.1	Not Detected
1,4-Dichlorobenzene	1.2	Not Detected	7.1	Not Detected
alpha-Chlorotoluene	1.2	Not Detected	6.1	Not Detected
1,2-Dichlorobenzene	1.2	Not Detected	7.1	Not Detected
1,2,4-Trichlorobenzene	4.7	Not Detected	35	Not Detected
Hexachlorobutadiene	4.7	Not Detected	50	Not Detected
TPH ref. to Gasoline (MW=100)	59	230	240	940

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	96	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	90	70-130

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Client Sample ID: SG-3

Lab ID#: 1403166-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2031415**	**Date of Collection:**	**3/4/14 2:08:00 PM**
Dil. Factor:	**15.9**	**Date of Analysis:**	**3/14/14 07:32 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	8.0	Not Detected	39	Not Detected
Freon 114	8.0	Not Detected	56	Not Detected
Chloromethane	80	Not Detected	160	Not Detected
Vinyl Chloride	8.0	Not Detected	20	Not Detected
1,3-Butadiene	8.0	18	18	41
Bromomethane	80	Not Detected	310	Not Detected
Chloroethane	32	Not Detected	84	Not Detected
Freon 11	8.0	Not Detected	45	Not Detected
Ethanol	32	40	60	76
Freon 113	8.0	Not Detected	61	Not Detected
1,1-Dichloroethene	8.0	Not Detected	32	Not Detected
Acetone	80	Not Detected	190	Not Detected
2-Propanol	32	Not Detected	78	Not Detected
Carbon Disulfide	32	Not Detected	99	Not Detected
3-Chloropropene	32	Not Detected	100	Not Detected
Methylene Chloride	80	Not Detected	280	Not Detected
Methyl tert-butyl ether	8.0	Not Detected	29	Not Detected
trans-1,2-Dichloroethene	8.0	Not Detected	32	Not Detected
Hexane	8.0	530	28	1800
1,1-Dichloroethane	8.0	Not Detected	32	Not Detected
2-Butanone (Methyl Ethyl Ketone)	32	Not Detected	94	Not Detected
cis-1,2-Dichloroethene	8.0	Not Detected	32	Not Detected
Tetrahydrofuran	8.0	Not Detected	23	Not Detected
Chloroform	8.0	Not Detected	39	Not Detected
1,1,1-Trichloroethane	8.0	Not Detected	43	Not Detected
Cyclohexane	8.0	220	27	750
Carbon Tetrachloride	8.0	Not Detected	50	Not Detected
2,2,4-Trimethylpentane	8.0	510	37	2400
Benzene	8.0	82	25	260
1,2-Dichloroethane	8.0	Not Detected	32	Not Detected
Heptane	8.0	380	32	1600
Trichloroethene	8.0	Not Detected	43	Not Detected
1,2-Dichloropropane	8.0	Not Detected	37	Not Detected
1,4-Dioxane	32	Not Detected	110	Not Detected
Bromodichloromethane	8.0	Not Detected	53	Not Detected
cis-1,3-Dichloropropene	8.0	Not Detected	36	Not Detected
4-Methyl-2-pentanone	8.0	Not Detected	32	Not Detected
Toluene	8.0	1300	30	5000
trans-1,3-Dichloropropene	8.0	Not Detected	36	Not Detected
1,1,2-Trichloroethane	8.0	Not Detected	43	Not Detected
Tetrachloroethene	8.0	Not Detected	54	Not Detected
2-Hexanone	32	Not Detected	130	Not Detected

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Client Sample ID: SG-3

Lab ID#: 1403166-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2031415**	**Date of Collection:**	**3/4/14 2:08:00 PM**
Dil. Factor:	**15.9**	**Date of Analysis:**	**3/14/14 07:32 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	8.0	Not Detected	68	Not Detected
1,2-Dibromoethane (EDB)	8.0	Not Detected	61	Not Detected
Chlorobenzene	8.0	Not Detected	36	Not Detected
Ethyl Benzene	8.0	430	34	1900
m,p-Xylene	8.0	2200	34	9800
o-Xylene	8.0	750	34	3200
Styrene	8.0	Not Detected	34	Not Detected
Bromoform	8.0	Not Detected	82	Not Detected
Cumene	8.0	39	39	190
1,1,2,2-Tetrachloroethane	8.0	Not Detected	54	Not Detected
Propylbenzene	8.0	110	39	530
4-Ethyltoluene	8.0	600	39	2900
1,3,5-Trimethylbenzene	8.0	250	39	1200
1,2,4-Trimethylbenzene	8.0	620	39	3000
1,3-Dichlorobenzene	8.0	Not Detected	48	Not Detected
1,4-Dichlorobenzene	8.0	Not Detected	48	Not Detected
alpha-Chlorotoluene	8.0	Not Detected	41	Not Detected
1,2-Dichlorobenzene	8.0	Not Detected	48	Not Detected
1,2,4-Trichlorobenzene	32	Not Detected	240	Not Detected
Hexachlorobutadiene	32	Not Detected	340	Not Detected
TPH ref. to Gasoline (MW=100)	400	20000	1600	82000

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: SG-4

Lab ID#: 1403166-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2031417**	**Date of Collection:**	**3/4/14 1:32:00 PM**
Dil. Factor:	**83.7**	**Date of Analysis:**	**3/14/14 09:27 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	42	Not Detected	210	Not Detected
Freon 114	42	Not Detected	290	Not Detected
Chloromethane	420	Not Detected	860	Not Detected
Vinyl Chloride	42	Not Detected	110	Not Detected
1,3-Butadiene	42	58	92	130
Bromomethane	420	Not Detected	1600	Not Detected
Chloroethane	170	Not Detected	440	Not Detected
Freon 11	42	Not Detected	240	Not Detected
Ethanol	170	Not Detected	320	Not Detected
Freon 113	42	Not Detected	320	Not Detected
1,1-Dichloroethene	42	Not Detected	160	Not Detected
Acetone	420	Not Detected	990	Not Detected
2-Propanol	170	Not Detected	410	Not Detected
Carbon Disulfide	170	Not Detected	520	Not Detected
3-Chloropropene	170	Not Detected	520	Not Detected
Methylene Chloride	420	Not Detected	1400	Not Detected
Methyl tert-butyl ether	42	Not Detected	150	Not Detected
trans-1,2-Dichloroethene	42	Not Detected	160	Not Detected
Hexane	42	5200	150	18000
1,1-Dichloroethane	42	Not Detected	170	Not Detected
2-Butanone (Methyl Ethyl Ketone)	170	Not Detected	490	Not Detected
cis-1,2-Dichloroethene	42	Not Detected	160	Not Detected
Tetrahydrofuran	42	Not Detected	120	Not Detected
Chloroform	42	Not Detected	200	Not Detected
1,1,1-Trichloroethane	42	Not Detected	230	Not Detected
Cyclohexane	42	2600	140	8800
Carbon Tetrachloride	42	Not Detected	260	Not Detected
2,2,4-Trimethylpentane	42	6600	200	31000
Benzene	42	740	130	2400
1,2-Dichloroethane	42	Not Detected	170	Not Detected
Heptane	42	2800	170	11000
Trichloroethene	42	Not Detected	220	Not Detected
1,2-Dichloropropane	42	Not Detected	190	Not Detected
1,4-Dioxane	170	Not Detected	600	Not Detected
Bromodichloromethane	42	Not Detected	280	Not Detected
cis-1,3-Dichloropropene	42	Not Detected	190	Not Detected
4-Methyl-2-pentanone	42	Not Detected	170	Not Detected
Toluene	42	4700	160	18000
trans-1,3-Dichloropropene	42	Not Detected	190	Not Detected
1,1,2-Trichloroethane	42	Not Detected	230	Not Detected
Tetrachloroethene	42	Not Detected	280	Not Detected
2-Hexanone	170	Not Detected	680	Not Detected

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Client Sample ID: SG-4

Lab ID#: 1403166-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2031417**	**Date of Collection: 3/4/14 1:32:00 PM**	
Dil. Factor:	**83.7**	**Date of Analysis: 3/14/14 09:27 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	42	Not Detected	360	Not Detected
1,2-Dibromoethane (EDB)	42	Not Detected	320	Not Detected
Chlorobenzene	42	Not Detected	190	Not Detected
Ethyl Benzene	42	2100	180	9300
m,p-Xylene	42	7800	180	34000
o-Xylene	42	1600	180	7000
Styrene	42	Not Detected	180	Not Detected
Bromoform	42	Not Detected	430	Not Detected
Cumene	42	360	200	1800
1,1,2,2-Tetrachloroethane	42	Not Detected	290	Not Detected
Propylbenzene	42	840	200	4200
4-Ethyltoluene	42	4000	200	19000
1,3,5-Trimethylbenzene	42	3600	200	18000
1,2,4-Trimethylbenzene	42	6900	200	34000
1,3-Dichlorobenzene	42	Not Detected	250	Not Detected
1,4-Dichlorobenzene	42	Not Detected	250	Not Detected
alpha-Chlorotoluene	42	Not Detected	220	Not Detected
1,2-Dichlorobenzene	42	Not Detected	250	Not Detected
1,2,4-Trichlorobenzene	170	Not Detected	1200	Not Detected
Hexachlorobutadiene	170	Not Detected	1800	Not Detected
TPH ref. to Gasoline (MW=100)	2100	170000	8600	700000

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: SG-5

Lab ID#: 1403166-05A

EPA METHOD TO-15 GC/MS

File Name:	**14032014**	**Date of Collection:**	**3/4/14 4:45:00 PM**
Dil. Factor:	**41.4**	**Date of Analysis:**	**3/20/14 03:05 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	210	Not Detected	1000	Not Detected
Freon 114	210	Not Detected	1400	Not Detected
Chloromethane	830	Not Detected	1700	Not Detected
Vinyl Chloride	210	Not Detected	530	Not Detected
1,3-Butadiene	210	Not Detected	460	Not Detected
Bromomethane	210	Not Detected UJ	800	Not Detected UJ
Chloroethane	830	Not Detected	2200	Not Detected
Freon 11	210	Not Detected	1200	Not Detected
Ethanol	830	Not Detected	1600	Not Detected
Freon 113	210	Not Detected UJ	1600	Not Detected UJ
1,1-Dichloroethene	210	Not Detected	820	Not Detected
Acetone	830	Not Detected	2000	Not Detected
2-Propanol	830	Not Detected	2000	Not Detected
Carbon Disulfide	210	Not Detected	640	Not Detected
3-Chloropropene	830	Not Detected	2600	Not Detected
Methylene Chloride	210	Not Detected	720	Not Detected
Methyl tert-butyl ether	210	Not Detected	750	Not Detected
trans-1,2-Dichloroethene	210	Not Detected	820	Not Detected
Hexane	210	72000	730	250000
1,1-Dichloroethane	210	Not Detected	840	Not Detected
2-Butanone (Methyl Ethyl Ketone)	830	Not Detected	2400	Not Detected
cis-1,2-Dichloroethene	210	Not Detected	820	Not Detected
Tetrahydrofuran	210	Not Detected	610	Not Detected
Chloroform	210	Not Detected	1000	Not Detected
1,1,1-Trichloroethane	210	Not Detected	1100	Not Detected
Cyclohexane	210	37000	710	130000
Carbon Tetrachloride	210	Not Detected	1300	Not Detected
2,2,4-Trimethylpentane	210	32000	970	150000
Benzene	210	32000	660	100000
1,2-Dichloroethane	210	Not Detected	840	Not Detected
Heptane	210	38000	850	160000
Trichloroethene	210	Not Detected	1100	Not Detected
1,2-Dichloropropane	210	Not Detected	960	Not Detected
1,4-Dioxane	830	Not Detected	3000	Not Detected
Bromodichloromethane	210	Not Detected	1400	Not Detected
cis-1,3-Dichloropropene	210	Not Detected	940	Not Detected
4-Methyl-2-pentanone	210	Not Detected	850	Not Detected
Toluene	210	130000	780	480000
trans-1,3-Dichloropropene	210	Not Detected	940	Not Detected
1,1,2-Trichloroethane	210	Not Detected	1100	Not Detected
Tetrachloroethene	210	Not Detected	1400	Not Detected
2-Hexanone	830	Not Detected	3400	Not Detected

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Client Sample ID: SG-5

Lab ID#: 1403166-05A

EPA METHOD TO-15 GC/MS

File Name:	**14032014**	**Date of Collection:**	**3/4/14 4:45:00 PM**
Dil. Factor:	**41.4**	**Date of Analysis:**	**3/20/14 03:05 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	210	Not Detected	1800	Not Detected
1,2-Dibromoethane (EDB)	210	Not Detected	1600	Not Detected
Chlorobenzene	210	Not Detected	950	Not Detected
Ethyl Benzene	210	22000	900	97000
m,p-Xylene	210	96000	900	420000
o-Xylene	210	33000	900	140000
Styrene	210	Not Detected	880	Not Detected
Bromoform	210	Not Detected	2100	Not Detected
Cumene	210	1400	1000	6800
1,1,2,2-Tetrachloroethane	210	Not Detected	1400	Not Detected
Propylbenzene	210	3800	1000	18000
4-Ethyltoluene	210	18000	1000	89000
1,3,5-Trimethylbenzene	210	5800	1000	29000
1,2,4-Trimethylbenzene	210	17000	1000	86000
1,3-Dichlorobenzene	210	Not Detected	1200	Not Detected
1,4-Dichlorobenzene	210	Not Detected	1200	Not Detected
alpha-Chlorotoluene	210	Not Detected	1100	Not Detected
1,2-Dichlorobenzene	210	Not Detected	1200	Not Detected
1,2,4-Trichlorobenzene	830	Not Detected	6100	Not Detected
Hexachlorobutadiene	830	Not Detected	8800	Not Detected
TPH ref. to Gasoline (MW=100)	4100	2100000	17000	8600000

UJ = Non-detected compound associated with low bias in the CCV and/or LCS.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	105	70-130
Toluene-d8	91	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: SG-6

Lab ID#: 1403166-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2031413**	**Date of Collection:**	**3/4/14 11:37:00 AM**
Dil. Factor:	**2.33**	**Date of Analysis:**	**3/14/14 06:11 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	2.5	5.8	12
Freon 114	1.2	Not Detected	8.1	Not Detected
Chloromethane	12	Not Detected	24	Not Detected
Vinyl Chloride	1.2	Not Detected	3.0	Not Detected
1,3-Butadiene	1.2	6.5	2.6	14
Bromomethane	12	Not Detected	45	Not Detected
Chloroethane	4.7	Not Detected	12	Not Detected
Freon 11	1.2	Not Detected	6.5	Not Detected
Ethanol	4.7	9.3	8.8	18
Freon 113	1.2	Not Detected	8.9	Not Detected
1,1-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Acetone	12	Not Detected	28	Not Detected
2-Propanol	4.7	Not Detected	11	Not Detected
Carbon Disulfide	4.7	Not Detected	14	Not Detected
3-Chloropropene	4.7	Not Detected	14	Not Detected
Methylene Chloride	12	Not Detected	40	Not Detected
Methyl tert-butyl ether	1.2	Not Detected	4.2	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Hexane	1.2	13	4.1	47
1,1-Dichloroethane	1.2	Not Detected	4.7	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.7	Not Detected	14	Not Detected
cis-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Tetrahydrofuran	1.2	Not Detected	3.4	Not Detected
Chloroform	1.2	Not Detected	5.7	Not Detected
1,1,1-Trichloroethane	1.2	Not Detected	6.4	Not Detected
Cyclohexane	1.2	8.8	4.0	30
Carbon Tetrachloride	1.2	Not Detected	7.3	Not Detected
2,2,4-Trimethylpentane	1.2	5.4	5.4	25
Benzene	1.2	3.7	3.7	12
1,2-Dichloroethane	1.2	Not Detected	4.7	Not Detected
Heptane	1.2	6.2	4.8	25
Trichloroethene	1.2	Not Detected	6.3	Not Detected
1,2-Dichloropropane	1.2	Not Detected	5.4	Not Detected
1,4-Dioxane	4.7	Not Detected	17	Not Detected
Bromodichloromethane	1.2	Not Detected	7.8	Not Detected
cis-1,3-Dichloropropene	1.2	Not Detected	5.3	Not Detected
4-Methyl-2-pentanone	1.2	Not Detected	4.8	Not Detected
Toluene	1.2	4.3	4.4	16
trans-1,3-Dichloropropene	1.2	Not Detected	5.3	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.4	Not Detected
Tetrachloroethene	1.2	Not Detected	7.9	Not Detected
2-Hexanone	4.7	Not Detected	19	Not Detected

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Client Sample ID: SG-6

Lab ID#: 1403166-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2031413**	**Date of Collection:**	**3/4/14 11:37:00 AM**
Dil. Factor:	**2.33**	**Date of Analysis:**	**3/14/14 06:11 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.2	Not Detected	9.9	Not Detected
1,2-Dibromoethane (EDB)	1.2	Not Detected	9.0	Not Detected
Chlorobenzene	1.2	Not Detected	5.4	Not Detected
Ethyl Benzene	1.2	1.3	5.0	5.5
m,p-Xylene	1.2	5.0	5.0	22
o-Xylene	1.2	1.7	5.0	7.4
Styrene	1.2	Not Detected	5.0	Not Detected
Bromoform	1.2	Not Detected	12	Not Detected
Cumene	1.2	Not Detected	5.7	Not Detected
1,1,2,2-Tetrachloroethane	1.2	Not Detected	8.0	Not Detected
Propylbenzene	1.2	Not Detected	5.7	Not Detected
4-Ethyltoluene	1.2	Not Detected	5.7	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	5.7	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	5.7	Not Detected
1,3-Dichlorobenzene	1.2	Not Detected	7.0	Not Detected
1,4-Dichlorobenzene	1.2	Not Detected	7.0	Not Detected
alpha-Chlorotoluene	1.2	Not Detected	6.0	Not Detected
1,2-Dichlorobenzene	1.2	Not Detected	7.0	Not Detected
1,2,4-Trichlorobenzene	4.7	Not Detected	34	Not Detected
Hexachlorobutadiene	4.7	Not Detected	50	Not Detected
TPH ref. to Gasoline (MW=100)	58	480	240	2000

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	92	70-130

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Client Sample ID: SG-7

Lab ID#: 1403166-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2031414**	**Date of Collection:**	**3/4/14 10:28:00 AM**
Dil. Factor:	**2.40**	**Date of Analysis:**	**3/14/14 06:54 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	Not Detected	5.9	Not Detected
Freon 114	1.2	Not Detected	8.4	Not Detected
Chloromethane	12	Not Detected	25	Not Detected
Vinyl Chloride	1.2	Not Detected	3.1	Not Detected
1,3-Butadiene	1.2	7.1	2.6	16
Bromomethane	12	Not Detected	47	Not Detected
Chloroethane	4.8	Not Detected	13	Not Detected
Freon 11	1.2	Not Detected	6.7	Not Detected
Ethanol	4.8	9.2	9.0	17
Freon 113	1.2	Not Detected	9.2	Not Detected
1,1-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Acetone	12	Not Detected	28	Not Detected
2-Propanol	4.8	Not Detected	12	Not Detected
Carbon Disulfide	4.8	Not Detected	15	Not Detected
3-Chloropropene	4.8	Not Detected	15	Not Detected
Methylene Chloride	12	Not Detected	42	Not Detected
Methyl tert-butyl ether	1.2	Not Detected	4.3	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Hexane	1.2	10	4.2	37
1,1-Dichloroethane	1.2	Not Detected	4.8	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.8	4.8	14	14
cis-1,2-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Tetrahydrofuran	1.2	Not Detected	3.5	Not Detected
Chloroform	1.2	Not Detected	5.8	Not Detected
1,1,1-Trichloroethane	1.2	Not Detected	6.5	Not Detected
Cyclohexane	1.2	7.8	4.1	27
Carbon Tetrachloride	1.2	Not Detected	7.6	Not Detected
2,2,4-Trimethylpentane	1.2	Not Detected	5.6	Not Detected
Benzene	1.2	2.8	3.8	8.9
1,2-Dichloroethane	1.2	Not Detected	4.8	Not Detected
Heptane	1.2	6.7	4.9	27
Trichloroethene	1.2	Not Detected	6.4	Not Detected
1,2-Dichloropropane	1.2	Not Detected	5.5	Not Detected
1,4-Dioxane	4.8	Not Detected	17	Not Detected
Bromodichloromethane	1.2	Not Detected	8.0	Not Detected
cis-1,3-Dichloropropene	1.2	Not Detected	5.4	Not Detected
4-Methyl-2-pentanone	1.2	Not Detected	4.9	Not Detected
Toluene	1.2	2.5	4.5	9.4
trans-1,3-Dichloropropene	1.2	Not Detected	5.4	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.5	Not Detected
Tetrachloroethene	1.2	Not Detected	8.1	Not Detected
2-Hexanone	4.8	Not Detected	20	Not Detected

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Client Sample ID: SG-7

Lab ID#: 1403166-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2031414**	**Date of Collection:**	**3/4/14 10:28:00 AM**
Dil. Factor:	**2.40**	**Date of Analysis:**	**3/14/14 06:54 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.2	Not Detected	10	Not Detected
1,2-Dibromoethane (EDB)	1.2	Not Detected	9.2	Not Detected
Chlorobenzene	1.2	Not Detected	5.5	Not Detected
Ethyl Benzene	1.2	Not Detected	5.2	Not Detected
m,p-Xylene	1.2	Not Detected	5.2	Not Detected
o-Xylene	1.2	Not Detected	5.2	Not Detected
Styrene	1.2	Not Detected	5.1	Not Detected
Bromoform	1.2	Not Detected	12	Not Detected
Cumene	1.2	Not Detected	5.9	Not Detected
1,1,2,2-Tetrachloroethane	1.2	Not Detected	8.2	Not Detected
Propylbenzene	1.2	Not Detected	5.9	Not Detected
4-Ethyltoluene	1.2	Not Detected	5.9	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	5.9	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	5.9	Not Detected
1,3-Dichlorobenzene	1.2	Not Detected	7.2	Not Detected
1,4-Dichlorobenzene	1.2	Not Detected	7.2	Not Detected
alpha-Chlorotoluene	1.2	Not Detected	6.2	Not Detected
1,2-Dichlorobenzene	1.2	Not Detected	7.2	Not Detected
1,2,4-Trichlorobenzene	4.8	Not Detected	36	Not Detected
Hexachlorobutadiene	4.8	Not Detected	51	Not Detected
TPH ref. to Gasoline (MW=100)	60	370	240	1500

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1403166-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2031406**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/14/14 12:40 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
1,3-Butadiene	0.50	Not Detected	1.1	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
Ethanol	2.0	Not Detected	3.8	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
2-Propanol	2.0	Not Detected	4.9	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
3-Chloropropene	2.0	Not Detected	6.3	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Cyclohexane	0.50	Not Detected	1.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Heptane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
1,4-Dioxane	2.0	Not Detected	7.2	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.0	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
2-Hexanone	2.0	Not Detected	8.2	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1403166-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2031406**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/14/14 12:40 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected
TPH ref. to Gasoline (MW=100)	25	Not Detected	100	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	103	70-130
4-Bromofluorobenzene	91	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1403166-08B

EPA METHOD TO-15 GC/MS

File Name:	**14032006**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/20/14 10:12 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.0	Not Detected	25	Not Detected
Freon 114	5.0	Not Detected	35	Not Detected
Chloromethane	20	Not Detected	41	Not Detected
Vinyl Chloride	5.0	Not Detected	13	Not Detected
1,3-Butadiene	5.0	Not Detected	11	Not Detected
Bromomethane	5.0	Not Detected UJ	19	Not Detected UJ
Chloroethane	20	Not Detected	53	Not Detected
Freon 11	5.0	Not Detected	28	Not Detected
Ethanol	20	Not Detected	38	Not Detected
Freon 113	5.0	Not Detected UJ	38	Not Detected UJ
1,1-Dichloroethene	5.0	Not Detected	20	Not Detected
Acetone	20	Not Detected	48	Not Detected
2-Propanol	20	Not Detected	49	Not Detected
Carbon Disulfide	5.0	Not Detected	16	Not Detected
3-Chloropropene	20	Not Detected	63	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	5.0	Not Detected	18	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Hexane	5.0	Not Detected	18	Not Detected
1,1-Dichloroethane	5.0	Not Detected	20	Not Detected
2-Butanone (Methyl Ethyl Ketone)	20	Not Detected	59	Not Detected
cis-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Tetrahydrofuran	5.0	Not Detected	15	Not Detected
Chloroform	5.0	Not Detected	24	Not Detected
1,1,1-Trichloroethane	5.0	Not Detected	27	Not Detected
Cyclohexane	5.0	Not Detected	17	Not Detected
Carbon Tetrachloride	5.0	Not Detected	31	Not Detected
2,2,4-Trimethylpentane	5.0	Not Detected	23	Not Detected
Benzene	5.0	Not Detected	16	Not Detected
1,2-Dichloroethane	5.0	Not Detected	20	Not Detected
Heptane	5.0	Not Detected	20	Not Detected
Trichloroethene	5.0	Not Detected	27	Not Detected
1,2-Dichloropropane	5.0	Not Detected	23	Not Detected
1,4-Dioxane	20	Not Detected	72	Not Detected
Bromodichloromethane	5.0	Not Detected	34	Not Detected
cis-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
4-Methyl-2-pentanone	5.0	Not Detected	20	Not Detected
Toluene	5.0	Not Detected	19	Not Detected
trans-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
1,1,2-Trichloroethane	5.0	Not Detected	27	Not Detected
Tetrachloroethene	5.0	Not Detected	34	Not Detected
2-Hexanone	20	Not Detected	82	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1403166-08B

EPA METHOD TO-15 GC/MS

File Name:	**14032006**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/20/14 10:12 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5.0	Not Detected	42	Not Detected
1,2-Dibromoethane (EDB)	5.0	Not Detected	38	Not Detected
Chlorobenzene	5.0	Not Detected	23	Not Detected
Ethyl Benzene	5.0	Not Detected	22	Not Detected
m,p-Xylene	5.0	Not Detected	22	Not Detected
o-Xylene	5.0	Not Detected	22	Not Detected
Styrene	5.0	Not Detected	21	Not Detected
Bromoform	5.0	Not Detected	52	Not Detected
Cumene	5.0	Not Detected	24	Not Detected
1,1,2,2-Tetrachloroethane	5.0	Not Detected	34	Not Detected
Propylbenzene	5.0	Not Detected	24	Not Detected
4-Ethyltoluene	5.0	Not Detected	24	Not Detected
1,3,5-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,2,4-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,3-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,4-Dichlorobenzene	5.0	Not Detected	30	Not Detected
alpha-Chlorotoluene	5.0	Not Detected	26	Not Detected
1,2-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,2,4-Trichlorobenzene	20	Not Detected	150	Not Detected
Hexachlorobutadiene	20	Not Detected	210	Not Detected
TPH ref. to Gasoline (MW=100)	100	Not Detected	410	Not Detected

UJ = Non-detected compound associated with low bias in the CCV and/or LCS.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: CCV

Lab ID#: 1403166-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2031402**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 3/14/14 09:26 AM**

Compound	%Recovery
Freon 12	102
Freon 114	102
Chloromethane	95
Vinyl Chloride	100
1,3-Butadiene	102
Bromomethane	114
Chloroethane	102
Freon 11	102
Ethanol	108
Freon 113	101
1,1-Dichloroethene	107
Acetone	101
2-Propanol	104
Carbon Disulfide	106
3-Chloropropene	109
Methylene Chloride	104
Methyl tert-butyl ether	108
trans-1,2-Dichloroethene	104
Hexane	105
1,1-Dichloroethane	104
2-Butanone (Methyl Ethyl Ketone)	105
cis-1,2-Dichloroethene	108
Tetrahydrofuran	108
Chloroform	105
1,1,1-Trichloroethane	107
Cyclohexane	107
Carbon Tetrachloride	107
2,2,4-Trimethylpentane	106
Benzene	102
1,2-Dichloroethane	104
Heptane	103
Trichloroethene	106
1,2-Dichloropropane	104
1,4-Dioxane	103
Bromodichloromethane	104
cis-1,3-Dichloropropene	108
4-Methyl-2-pentanone	109
Toluene	103
trans-1,3-Dichloropropene	115
1,1,2-Trichloroethane	108
Tetrachloroethene	105
2-Hexanone	123

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Client Sample ID: CCV

Lab ID#: 1403166-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2031402**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/14/14 09:26 AM**	

Compound	%Recovery
Dibromochloromethane	110
1,2-Dibromoethane (EDB)	109
Chlorobenzene	106
Ethyl Benzene	110
m,p-Xylene	114
o-Xylene	110
Styrene	116
Bromoform	108
Cumene	111
1,1,2,2-Tetrachloroethane	106
Propylbenzene	112
4-Ethyltoluene	112
1,3,5-Trimethylbenzene	109
1,2,4-Trimethylbenzene	109
1,3-Dichlorobenzene	109
1,4-Dichlorobenzene	111
alpha-Chlorotoluene	136 Q
1,2-Dichlorobenzene	110
1,2,4-Trichlorobenzene	100
Hexachlorobutadiene	102
TPH ref. to Gasoline (MW=100)	100

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: CCV

Lab ID#: 1403166-09B

EPA METHOD TO-15 GC/MS

File Name:	**14032002**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 3/20/14 08:10 AM**

Compound	%Recovery
Freon 12	107
Freon 114	104
Chloromethane	105
Vinyl Chloride	101
1,3-Butadiene	99
Bromomethane	68 Q
Chloroethane	79
Freon 11	103
Ethanol	108
Freon 113	66 Q
1,1-Dichloroethene	90
Acetone	97
2-Propanol	96
Carbon Disulfide	95
3-Chloropropene	81
Methylene Chloride	94
Methyl tert-butyl ether	92
trans-1,2-Dichloroethene	103
Hexane	97
1,1-Dichloroethane	97
2-Butanone (Methyl Ethyl Ketone)	99
cis-1,2-Dichloroethene	96
Tetrahydrofuran	102
Chloroform	98
1,1,1-Trichloroethane	100
Cyclohexane	102
Carbon Tetrachloride	102
2,2,4-Trimethylpentane	110
Benzene	98
1,2-Dichloroethane	101
Heptane	102
Trichloroethene	99
1,2-Dichloropropane	100
1,4-Dioxane	105
Bromodichloromethane	102
cis-1,3-Dichloropropene	96
4-Methyl-2-pentanone	99
Toluene	98
trans-1,3-Dichloropropene	93
1,1,2-Trichloroethane	102
Tetrachloroethene	100
2-Hexanone	97

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Client Sample ID: CCV

Lab ID#: 1403166-09B

EPA METHOD TO-15 GC/MS

File Name:	**14032002**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/20/14 08:10 AM**	

Compound	%Recovery
Dibromochloromethane	102
1,2-Dibromoethane (EDB)	102
Chlorobenzene	100
Ethyl Benzene	103
m,p-Xylene	105
o-Xylene	106
Styrene	112
Bromoform	105
Cumene	111
1,1,2,2-Tetrachloroethane	104
Propylbenzene	108
4-Ethyltoluene	108
1,3,5-Trimethylbenzene	113
1,2,4-Trimethylbenzene	112
1,3-Dichlorobenzene	105
1,4-Dichlorobenzene	108
alpha-Chlorotoluene	110
1,2-Dichlorobenzene	107
1,2,4-Trichlorobenzene	107
Hexachlorobutadiene	111
TPH ref. to Gasoline (MW=100)	100

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	109	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: LCS

Lab ID#: 1403166-10A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2031403**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/14/14 10:10 AM**	

Compound	%Recovery	Method Limits
Freon 12	106	70-130
Freon 114	108	70-130
Chloromethane	102	70-130
Vinyl Chloride	107	70-130
1,3-Butadiene	106	70-130
Bromomethane	116	70-130
Chloroethane	109	70-130
Freon 11	106	70-130
Ethanol	113	70-130
Freon 113	114	70-130
1,1-Dichloroethene	121	70-130
Acetone	108	70-130
2-Propanol	106	70-130
Carbon Disulfide	93	70-130
3-Chloropropene	102	70-130
Methylene Chloride	112	70-130
Methyl tert-butyl ether	111	70-130
trans-1,2-Dichloroethene	92	70-130
Hexane	108	70-130
1,1-Dichloroethane	109	70-130
2-Butanone (Methyl Ethyl Ketone)	110	70-130
cis-1,2-Dichloroethene	127	70-130
Tetrahydrofuran	111	70-130
Chloroform	108	70-130
1,1,1-Trichloroethane	109	70-130
Cyclohexane	116	70-130
Carbon Tetrachloride	109	70-130
2,2,4-Trimethylpentane	111	70-130
Benzene	104	70-130
1,2-Dichloroethane	105	70-130
Heptane	107	70-130
Trichloroethene	106	70-130
1,2-Dichloropropane	105	70-130
1,4-Dioxane	106	70-130
Bromodichloromethane	109	70-130
cis-1,3-Dichloropropene	114	70-130
4-Methyl-2-pentanone	113	70-130
Toluene	103	70-130
trans-1,3-Dichloropropene	110	70-130
1,1,2-Trichloroethane	108	70-130
Tetrachloroethene	108	70-130
2-Hexanone	123	70-130

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Client Sample ID: LCS

Lab ID#: 1403166-10A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2031403**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/14/14 10:10 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	115	70-130
1,2-Dibromoethane (EDB)	110	70-130
Chlorobenzene	105	70-130
Ethyl Benzene	108	70-130
m,p-Xylene	110	70-130
o-Xylene	107	70-130
Styrene	111	70-130
Bromoform	114	70-130
Cumene	110	70-130
1,1,2,2-Tetrachloroethane	106	70-130
Propylbenzene	108	70-130
4-Ethyltoluene	107	70-130
1,3,5-Trimethylbenzene	103	70-130
1,2,4-Trimethylbenzene	103	70-130
1,3-Dichlorobenzene	105	70-130
1,4-Dichlorobenzene	107	70-130
alpha-Chlorotoluene	144 Q	70-130
1,2-Dichlorobenzene	106	70-130
1,2,4-Trichlorobenzene	102	70-130
Hexachlorobutadiene	99	70-130
TPH ref. to Gasoline (MW=100)	Not Spiked	

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: LCSD

Lab ID#: 1403166-10AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2031404**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/14/14 10:40 AM**	

Compound	%Recovery	Method Limits
Freon 12	108	70-130
Freon 114	109	70-130
Chloromethane	102	70-130
Vinyl Chloride	110	70-130
1,3-Butadiene	108	70-130
Bromomethane	119	70-130
Chloroethane	108	70-130
Freon 11	106	70-130
Ethanol	94	70-130
Freon 113	117	70-130
1,1-Dichloroethene	122	70-130
Acetone	112	70-130
2-Propanol	107	70-130
Carbon Disulfide	97	70-130
3-Chloropropene	104	70-130
Methylene Chloride	114	70-130
Methyl tert-butyl ether	113	70-130
trans-1,2-Dichloroethene	96	70-130
Hexane	111	70-130
1,1-Dichloroethane	110	70-130
2-Butanone (Methyl Ethyl Ketone)	110	70-130
cis-1,2-Dichloroethene	128	70-130
Tetrahydrofuran	111	70-130
Chloroform	109	70-130
1,1,1-Trichloroethane	110	70-130
Cyclohexane	116	70-130
Carbon Tetrachloride	110	70-130
2,2,4-Trimethylpentane	112	70-130
Benzene	103	70-130
1,2-Dichloroethane	102	70-130
Heptane	105	70-130
Trichloroethene	104	70-130
1,2-Dichloropropane	103	70-130
1,4-Dioxane	104	70-130
Bromodichloromethane	105	70-130
cis-1,3-Dichloropropene	112	70-130
4-Methyl-2-pentanone	112	70-130
Toluene	101	70-130
trans-1,3-Dichloropropene	107	70-130
1,1,2-Trichloroethane	106	70-130
Tetrachloroethene	106	70-130
2-Hexanone	121	70-130

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Client Sample ID: LCSD

Lab ID#: 1403166-10AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2031404**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/14/14 10:40 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	113	70-130
1,2-Dibromoethane (EDB)	108	70-130
Chlorobenzene	105	70-130
Ethyl Benzene	106	70-130
m,p-Xylene	109	70-130
o-Xylene	104	70-130
Styrene	112	70-130
Bromoform	112	70-130
Cumene	109	70-130
1,1,2,2-Tetrachloroethane	103	70-130
Propylbenzene	109	70-130
4-Ethyltoluene	96	70-130
1,3,5-Trimethylbenzene	120	70-130
1,2,4-Trimethylbenzene	104	70-130
1,3-Dichlorobenzene	106	70-130
1,4-Dichlorobenzene	106	70-130
alpha-Chlorotoluene	143 Q	70-130
1,2-Dichlorobenzene	106	70-130
1,2,4-Trichlorobenzene	107	70-130
Hexachlorobutadiene	104	70-130
TPH ref. to Gasoline (MW=100)	Not Spiked	

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: LCS

Lab ID#: 1403166-10B

EPA METHOD TO-15 GC/MS

File Name:	**14032003**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/20/14 08:39 AM**	

Compound	%Recovery	Method Limits
Freon 12	112	70-130
Freon 114	113	70-130
Chloromethane	113	70-130
Vinyl Chloride	104	70-130
1,3-Butadiene	100	70-130
Bromomethane	92	70-130
Chloroethane	83	70-130
Freon 11	103	70-130
Ethanol	102	70-130
Freon 113	88	70-130
1,1-Dichloroethene	101	70-130
Acetone	94	70-130
2-Propanol	89	70-130
Carbon Disulfide	82	70-130
3-Chloropropene	87	70-130
Methylene Chloride	94	70-130
Methyl tert-butyl ether	92	70-130
trans-1,2-Dichloroethene	83	70-130
Hexane	92	70-130
1,1-Dichloroethane	95	70-130
2-Butanone (Methyl Ethyl Ketone)	102	70-130
cis-1,2-Dichloroethene	107	70-130
Tetrahydrofuran	96	70-130
Chloroform	99	70-130
1,1,1-Trichloroethane	100	70-130
Cyclohexane	102	70-130
Carbon Tetrachloride	99	70-130
2,2,4-Trimethylpentane	101	70-130
Benzene	95	70-130
1,2-Dichloroethane	97	70-130
Heptane	100	70-130
Trichloroethene	104	70-130
1,2-Dichloropropane	114	70-130
1,4-Dioxane	124	70-130
Bromodichloromethane	122	70-130
cis-1,3-Dichloropropene	116	70-130
4-Methyl-2-pentanone	119	70-130
Toluene	110	70-130
trans-1,3-Dichloropropene	90	70-130
1,1,2-Trichloroethane	98	70-130
Tetrachloroethene	98	70-130
2-Hexanone	100	70-130

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Client Sample ID: LCS

Lab ID#: 1403166-10B

EPA METHOD TO-15 GC/MS

File Name:	**14032003**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/20/14 08:39 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	103	70-130
1,2-Dibromoethane (EDB)	99	70-130
Chlorobenzene	96	70-130
Ethyl Benzene	100	70-130
m,p-Xylene	104	70-130
o-Xylene	101	70-130
Styrene	108	70-130
Bromoform	107	70-130
Cumene	109	70-130
1,1,2,2-Tetrachloroethane	103	70-130
Propylbenzene	109	70-130
4-Ethyltoluene	109	70-130
1,3,5-Trimethylbenzene	110	70-130
1,2,4-Trimethylbenzene	110	70-130
1,3-Dichlorobenzene	103	70-130
1,4-Dichlorobenzene	104	70-130
alpha-Chlorotoluene	120	70-130
1,2-Dichlorobenzene	108	70-130
1,2,4-Trichlorobenzene	128	70-130
Hexachlorobutadiene	131 Q	70-130
TPH ref. to Gasoline (MW=100)	Not Spiked	

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	115	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: LCSD

Lab ID#: 1403166-10BB

EPA METHOD TO-15 GC/MS

File Name:	**14032004**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/20/14 08:59 AM**	

Compound	%Recovery	Method Limits
Freon 12	96	70-130
Freon 114	95	70-130
Chloromethane	95	70-130
Vinyl Chloride	95	70-130
1,3-Butadiene	91	70-130
Bromomethane	63 Q	70-130
Chloroethane	64 Q	70-130
Freon 11	98	70-130
Ethanol	109	70-130
Freon 113	82	70-130
1,1-Dichloroethene	108	70-130
Acetone	105	70-130
2-Propanol	100	70-130
Carbon Disulfide	92	70-130
3-Chloropropene	80	70-130
Methylene Chloride	107	70-130
Methyl tert-butyl ether	92	70-130
trans-1,2-Dichloroethene	91	70-130
Hexane	104	70-130
1,1-Dichloroethane	103	70-130
2-Butanone (Methyl Ethyl Ketone)	101	70-130
cis-1,2-Dichloroethene	111	70-130
Tetrahydrofuran	103	70-130
Chloroform	101	70-130
1,1,1-Trichloroethane	100	70-130
Cyclohexane	105	70-130
Carbon Tetrachloride	94	70-130
2,2,4-Trimethylpentane	104	70-130
Benzene	98	70-130
1,2-Dichloroethane	98	70-130
Heptane	102	70-130
Trichloroethene	97	70-130
1,2-Dichloropropane	99	70-130
1,4-Dioxane	108	70-130
Bromodichloromethane	98	70-130
cis-1,3-Dichloropropene	98	70-130
4-Methyl-2-pentanone	100	70-130
Toluene	94	70-130
trans-1,3-Dichloropropene	85	70-130
1,1,2-Trichloroethane	98	70-130
Tetrachloroethene	97	70-130
2-Hexanone	99	70-130

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Client Sample ID: LCSD

Lab ID#: 1403166-10BB

EPA METHOD TO-15 GC/MS

File Name:	**14032004**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/20/14 08:59 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	103	70-130
1,2-Dibromoethane (EDB)	100	70-130
Chlorobenzene	96	70-130
Ethyl Benzene	99	70-130
m,p-Xylene	103	70-130
o-Xylene	101	70-130
Styrene	109	70-130
Bromoform	108	70-130
Cumene	110	70-130
1,1,2,2-Tetrachloroethane	102	70-130
Propylbenzene	107	70-130
4-Ethyltoluene	108	70-130
1,3,5-Trimethylbenzene	110	70-130
1,2,4-Trimethylbenzene	109	70-130
1,3-Dichlorobenzene	104	70-130
1,4-Dichlorobenzene	104	70-130
alpha-Chlorotoluene	118	70-130
1,2-Dichlorobenzene	108	70-130
1,2,4-Trichlorobenzene	127	70-130
Hexachlorobutadiene	137 Q	70-130
TPH ref. to Gasoline (MW=100)	Not Spiked	

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	103	70-130

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Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

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Project Manager Chris Rhea
Collected by: (Print and Sign) Roxanne Russell
Company EES Environmental Email chris@ees-enviro.com
Address 240 N Broadway Ste 203 City Portland State OR Zip 97227
Phone 503-504-4730 Fax —

Project Info:
P.O. # —
Project # 1133-01
Project Name Plaid Pantry 324

Turn Around Time:
☒ Normal
☐ Rush
specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	SG-1	A9764	3-4-14	0947	TO-15	29	6		
02A	SG-2	34572		0859		29	6		
03A	SG-3	37708		1408		28	6		
04A	SG-4	3738		1332		29	6		
05A	SG-5	3056		1645		29	12.5		
06A	SG-6	33708		1137		29	6		
07A	SG-7	114631		1028		29	6		

Relinquished by: (signature) Date/Time: Roxanne Russell 3-5-14, 1602
Received by: (signature) Date/Time: ATL 3/10/14 1340
Relinquished by: (signature) Date/Time:
Received by: (signature) Date/Time:
Relinquished by: (signature) Date/Time:
Received by: (signature) Date/Time:

Notes:

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	Fedex Ground		NA	Good	Yes No (None)	1403166

Form 1293 rev.11

Appendix F

EES
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Technical Memorandum

To: Mark Conan, Plaid Pantries, Inc.
From: Regina Skarzinskas (Technical Assessment Services, Inc.) and Paul Ecker
Date: May 30, 2014

Subject: **Risk Assessment & Development of MTCA Modified Method B Cleanup Levels**
Former Plaid Pantries Store 324
White Center/King County, Washington
Ecology VCP Site ID Number NW2585
EES Project Number 1133-02

EES Environmental Consulting, Inc. (EES) and Technical Assessment Services, Inc. (TAS) prepared this technical memorandum to document the site-specific human health risk assessment and development of MTCA modified Method B Cleanup Levels (CULs) which we calculated for the subject Site in accordance with published regulatory guidance (Ecology 2007-2011). This Site includes the former Plaid Pantries Property and adjacent 16th Avenue Right-of-Way (ROW) which is owned by King County, Washington. A neighboring auto repair building located north of the subject Property is also considered in this assessment.

Risk assessment and CUL details are provided below and in attached documentation. This technical memorandum is intended to accompany the EES Site Characterization Report dated May 19, 2014, which provides Site background and related supporting information.

1 RISK ASSESSMENT ANALYTICAL DATA AND INITIAL SCREENING

Analytical data for the former Plaid Pantry #324 consisted of surface soil, subsurface soil, and soil gas samples collected during Remedial Investigation activities between 2006 and 2014. The analytical data incorporated into the risk evaluation were obtained from representative portions of the Site, including:

- Subject Property:
  - Twenty-one surface soil samples (0 - 4 ft below ground surface [bgs])
  - Seventy-one subsurface soil samples (> 4 ft bgs)
  - Seven soil gas samples (5 ft bgs)

- Adjacent Right-of-Way:
  - Seventeen surface soil samples (0 - 3 ft bgs)
  - Eighteen subsurface soil samples (5 ft bgs)

Media samples were analyzed for gasoline-related contaminants of interest (COIs) including gasoline hydrocarbons (TPH-Gx), lead, benzene, toluene, ethyl benzene, xylenes (BTEX) and other gasoline-related volatile organic compounds (VOCs).

PRELIMINARY SCREENING OF COIs

The Site data were initially screened using the following criteria:

- Background: The maximum concentration of lead found in surface and subsurface soil (7.95 mg/kg) was screened against the background concentration of lead (17 mg/kg) as published by Washington Department of Ecology (Ecology 1994). Concentrations of lead were below background; therefore, lead was eliminated from further consideration.
- Detection and Reporting Limit: COIs that were not detected were removed from further consideration unless the maximum analytical reporting limit concentration was greater than the default MTCA standard Method B Cleanup Level (CUL). If a MTCA Method B CUL was not available, the more conservative default published MTCA Method A CUL values were used in this preliminary screen. The preliminary screening is presented in Tables F-1 through F-6. On this basis the following chemicals were eliminated from consideration:
  - Hexane, MTBE, 1,2-EDB and 1,2-DCE were eliminated from Property surface and subsurface soils.
  - All chemicals were eliminated from ROW surface soil.
  - All chemicals except for TPH-G, ethylbenzene, and total xylenes were eliminated from ROW subsurface soil.

Table F-7 lists the COIs retained after the preliminary screening for background and detection limits.

EXPOSURE POINT CONCENTRATIONS

When determining the potential for health impacts from site-related chemicals it is assumed that receptors have equal access to the entire site. Therefore, the concentration to which a person is exposed should represent a reasonable exposure concentration. The preferred Exposure Point Concentration (EPC) as defined in MTCA guidance is the 95th percentile upper confidence limit on the arithmetic mean (95UCL) of both detected and non-detected analyte concentrations.

Site data were initially input into Ecology's statistical calculator (MTCAStat 97). The non-detect values were reported at the method reporting limit (MRL). Therefore as per Ecology guidance, analyte concentrations reported as not detect were included at ½ the MRL. The MTCAStat 97 program was not able to calculate the EPCs due to the data distribution or number of censored data. Therefore, the statistical analysis was performed using US EPA's ProUCL Version 5.0.00

statistical software (EPA 2013). The non-detect values were reported at the full method reporting limit (MRL). The ProUCL program recommends the preferred statistical method for calculating the 95UCL.

The recommended 95UCL value was generally selected as the EPC. Where the preferred statistical method produced an EPC greater than the maximum detected, the maximum concentration detected was used as the EPC, consistent with Ecology guidance. Finally, if there were insufficient data for ProUCL to calculate an EPC, then as per the ProUCL technical guide and Ecology guidance, the maximum detected concentration was selected as the EPC. Summary statistics for the analytical data in each exposure medium are provided in Table F-8.

2 HUMAN HEALTH RISK EVALUATION

In accordance with MTCA guidance, the potential for unacceptable human health impacts from chemicals present at the Site is evaluated by comparing the EPCs (concentrations to which current and future Site users will be exposed) to site-specific MTCA modified Method B cleanup levels (CULs). These risk-based values represent concentrations below which no unacceptable human health effects are anticipated. Following are the primary elements of the human health risk evaluation.

- Hazard Identification and Selection of Contaminants of Potential Concern (COPCs)
- Exposure Assessment
- Risk Characterization
- Uncertainty Analysis
- Discussion
- Summary of Human Health Risks

HAZARD IDENTIFICATION AND SELECTION OF COPCS

A Contaminant of Potential Concern (COPC) is a site-related chemical wherein the EPC exceeds its respective risk-based screening value (CUL). The development of MTCA modified Method B CULs and screening results are presented in Section 2 of this technical memorandum.

EXPOSURE ASSESSMENT

Assessing exposure at the Site consists of developing a conceptual human exposure model (CHEM), which includes identification of exposure media and identifying potentially exposed populations and exposure pathways as presented below.

CONCEPTUAL HUMAN EXPOSURE MODEL (CHEM)

The CHEM delineates contaminant sources, release mechanisms, transport routes, exposure media, potential receptor populations, and potential exposure routes. The CHEM for the

Former Plaid Pantry #324 Site is presented in Figure F-1. Justification and discussion of the potential exposure routes and receptors are provided in the following sub-sections.

POTENTIALLY EXPOSED POPULATION

- On-Property:
  - Current receptors include occupational workers at the various commercial businesses on the Property and their retail customers. The Property is zoned commercial and future use is likely to remain consistent with this zoning. Therefore, future occupational workers and retail store customers are also considered likely future receptors.
  - Other likely future receptors at the Property include an excavation/trenchworker and a construction worker, in the event that the Property is modified or re-developed.
- Adjacent Right-of-Way:
  - Exposures to contaminated soil in the right of way adjacent to the Property include a current and future highway maintenance worker and a future excavation/ trenchworker. The maintenance worker is intended to consider potential exposures to surface soil associated with routine road work such as re-paving or pavement repairs, sign and power pole installations, and shallow trenching.
- Adjacent Automotive Repair Facility:
  - This adjacent facility is not expected to be affected by Site impacts and was not evaluated in this risk assessment, other than to acknowledge its proximity to the Site with respect to the vapor intrusion pathway. Supplemental information is provided in the Risk Characterization and in Section 3 of this report.

IDENTIFICATION OF POTENTIAL EXPOSURE PATHWAYS

This sub-section evaluates potential pathways for human exposures to the identified COPCs. Potential exposure pathways were identified as:

- Incidental ingestion of surface and/or subsurface soil.
- Inhalation of soil and dust particulates.
- Dermal contact with soil.
- Inhalation of volatiles from soil into indoor air.

Complete pathways of exposure require a receptor, a pathway, and a source. No COPCs were identified for surface soil in the right-of-way, and therefore no unacceptable human health impacts are anticipated for the highway maintenance worker.

The complete exposure pathways which will be quantitatively addressed are:

- Inhalation of volatiles from soil to indoor air by current and future occupational workers and retail store customers.

- Ingestion and dermal contact with soil by a future construction worker or excavation worker.
- Ingestion of soil by current and future occupational workers and retail customers.

EXPOSURE ASSUMPTIONS

Exposure assumptions include body weight, averaging time, exposure frequency, exposure duration, and chemical bioavailability. Department of Ecology guidance provides default exposure assumptions used to calculate MTCA CULs. The most appropriate MTCA exposure and CUL values for the former Plaid Pantry #324 were determined to be site-specific considerations under the MTCA modified Method B approach. Site-specific exposure factors and CULs calculated using the MTCA modified B approach are appropriate because default inputs using standard MTCA method B CULs were developed in order to be protective for residential conditions. Since the Site use is commercial in nature and the current and future receptors identified in the CHEM were determined to be non-residential, MTCA method B was modified consistent with guidance to represent site-specific CULs protective of reasonably likely exposures [WAC 173-340-705(2)].

Table F-9 presents the default exposure assumptions used by MTCA Method B as well as the site-specific modifications made to these defaults for the reasonably likely current and future receptors identified in the CHEM.

EXPOSURE POINT CONCENTRATIONS

The Exposure Point Concentration (EPC) represents the reasonably likely concentration of a chemical in a medium of exposure to which a receptor will likely be exposed. The 95UCL represents the EPC for most constituents. In cases where the data set was small or the calculated 95UCL was greater than the maximum concentration detected, the maximum value detected was selected as the EPC. Table F-10 presents the EPCs for the selected COPCs. The methodology for statistically deriving these EPCs is discussed in Section 1 of this memo.

MTCA CUL SCREENING

Potential human health impacts associated with exposure to COPCs at the Site were evaluated by estimating the potential for both non-carcinogenic and carcinogenic health effects. The following sections discuss this assessment of non-carcinogenic hazards and carcinogenic risks associated with exposure to COPCs at the Site.

NON-CARCINOGENS

Non-carcinogenic hazard is estimated as the ratio of the average daily dose (ADD) of the non-carcinogenic chemical through a specific exposure route to the chronic RfD for that exposure route. Under MTCA, Risk Based CULs (RBCs) are calculated for each media, receptor, and selected exposure pathways. Therefore, the HI is calculated as follows:

$$HQ = \frac{EPC}{MTCA\ CUL}$$

Where:

HQ = Hazard Quotient (unitless)
EPC = Exposure Point Concentration (mg/kg for soil; ug/ m^3 for soil gas)
MTCA CUL = Risk-based Concentration (e.g. MTCA Method B or MTCA modified Method B CUL)

A Hazard Quotient is calculated for each non-carcinogenic COPC. Hazard Quotients greater than 1.0 indicate a potential for adverse health effects because the intake exceeds the allowable risk based concentration. The sum of all individual chemical-specific Hazard Quotients is termed the Hazard Index (HI) and is calculated under each exposure pathway and for each receptor. Thus, an HI less than 1.0 is not anticipated to produce unacceptable human health effects.

CARCINOGENS

Carcinogenic risk is presented as the potential for exposure to produce an increased risk of developing cancer. The excess lifetime carcinogenic risk is the incremental increase in the probability of developing cancer compared to a background probability of developing cancer with no exposure to Site-related contaminants. The potential for cancer is evaluated in terms of excess cancer risk (ECR). The EPA accepts a risk range of one in ten thousand (1E-04) to one in one million (1E-06); however, Ecology considers an ECR greater than one in one million (1E-06) to be unacceptable for all receptors except occupational/industrial workers. In that case, an ECR greater than one in one hundred thousand (1E-05) is considered to be unacceptable. An ECR of 1E-06 is defined as an increase of one additional case of cancer (above background) in one million people who are exposed to a carcinogen.

MTCA modified Method B CUL values are calculated for each media, receptor, and selected exposure pathways to represent a concentration at or below which no unacceptable ECR is anticipated. ECRs are calculated as follows:

$$ECR = \frac{\mathrm{EPC} * 0.000001}{MTCA\ CUL}$$

Where:

ECR = Excess Cancer Risk (unitless)
EPC = Exposure Point Concentration (mg/kg for soil; ug/ m^3 for soil gas)
MTCA CUL = Risk-based Concentration (e.g. MTCA Method B or MTCA Modified Method B CUL)

MTCA MODIFIED METHOD B SCREENING

Potential human health risks were characterized for the following current and reasonably likely future Site receptors:

- Current and future occupational worker
- Current and future retail customer

- Future construction worker
- Future trenchworker (Property and ROW)
- Current and future highway maintenance worker

Complete pathways of exposure for the occupational worker and the retail customer are incidental ingestion of soil and inhalation of volatiles intruding from soil into indoor air. The Site is predominantly covered with buildings, the parking lot, and the adjacent sidewalk/roadway ROW. There are several small landscaped areas on the Site, however the soil ingestion pathway and the inhalation of particulates are considered to be relatively insignificant under current conditions.

Potential pathways of exposure for both the construction worker and the highway maintenance worker include ingestion and dermal contact with surface soil. No COIs were identified in surface soil in the ROW, therefore there is no complete pathway of exposure for the highway maintenance worker.

Site Trenchworkers on the Property and in the ROW were identified as potential future receptors. Complete pathways of exposure are ingestion and dermal contact with soil.

Standard (default) MTCA Method B CULs are calculated based on residential receptors. None of the current or reasonably like future receptors at this Site are residential. Therefore, site-specific MTCA modified Method B CULs were calculated using occupational exposure inputs.

Calculating MTCA Modified Method B for COIs Excluding TPH

MTCA Method B exposure factors, modified with site-specific exposure parameters, were used to calculate MTCA modified Method B CULs for the Site. Default MTCA B values as well as the site-specific modifications are presented in the Exposure Factors Table (Table F-9).

MTCA modified Method B CULs for the current and future occupational worker and the retail customer were calculated using the following equations:

[MTCA Equation 740-1] (noncarcinogens)

$$MTCA\ Modified\ B\ CUL = \frac{RfDo * ABW * UCF * HQ * AT}{SIR * AB * EF * ED}$$

Where:

RfD0 = Oral Reference Dose as defined in WAC 173-340-708 (mg/kg-day)
ABW = Average Body Weight (kg)
UCF = Unit conversion rate (mg/kg)
SIR = Soil Ingestion Rate (mg/day)
AB1 = Gastrointestinal Absorption Fraction (unitless)
EF = Exposure Frequency (unitless)
HQ = Hazard Quotient (unitless)
AT = Averaging Time (years)

ED = Exposure Duration (years)

[MTCA Equation 740-2] (carcinogens)

$$MTCA\ Modified\ B\ CUL = \frac{RISK * ABW * AT * UCF}{CPFo * SIR * AB * EF * ED}$$

Where:

RISK = Acceptable Risk Level (E-6)
ABW = Average Body Weight (kg)
UCF = Unit conversion rate (mg/kg)
CPFo = Oral Cancer Potency Factor as defined in WAC 173-340-708(8) (kg-day/mg)
SIR = Soil Ingestion Rate (mg/day)
AB1 = Gastrointestinal Absorption Fraction (unitless)
EF = Exposure Frequency (unitless)
HQ = Hazard Quotient (unitless)
AT = Averaging Time (years)
ED = Exposure Duration (years)

Both soil ingestion and dermal contact with soil were identified as significant and complete pathways for the trenchworker and the construction worker. MTCA modified B CULs for these receptors were calculated using the following equations:

[MTCA Equation 740-4] (noncarcinogens)

$$MTCA\ Modified\ B\ CUL = \frac{HQ * ABW * AT}{EF * ED[\left(\frac{1}{RfDo} * \frac{SIR * AB}{UCF}\right) + \left(\frac{1}{RfDd} * \frac{SA * AF * ABS}{UCF}\right)]}$$

Where,

RfD0 = Oral Reference Dose as defined in WAC 173-340-708 (mg/kg-day)
RfDd = Dermal Reference Dose defined by RfDo * GI (mg/kg-day)
ABW = Average Body Weight (kg)
UCF = Unit conversion rate (mg/kg)
SIR = Soil Ingestion Rate (mg/day)
AB1 = Gastrointestinal Absorption Fraction (unitless)
SA = Dermal Surface Area (cm2)
ABS= Dermal absorption Fraction (unitless)
AF= Adherence Factor (unitless)
EF = Exposure Frequency (unitless)
HQ = Hazard Quotient (unitless)
AT = Averaging Time (years)
ED = Exposure Duration (years)

[MTCA Equation 740-5] (carcinogens)

$$MTCA\ Modified\ B\ CUL = \frac{RISK * ABW * AT}{EF * ED[\left(\frac{SIR * CPFo * AB}{UCF}\right) + \left(\frac{SA * AF * CPFd * ABS}{UCF}\right)]}$$

Where,

RISK = Acceptable Risk Level (E-6)
ABW = Average Body Weight (kg)
UCF = Unit conversion rate (mg/kg)

CPFo = Oral Cancer Potency Factor as defined in WAC 173-340-708(8) (kg-day/mg)
CPFd = Dermal Cancer Potency Factor define as CPFo/GI (kg-day/mg
AB1 = Gastrointestinal Absorption Fraction (unitless)
ABS = Dermal Absorption Factor (unitless)
SIR = Soil Ingestion Rate (mg/day)
AF= Adherence Factor (unitless)
GI = Gastrointestinal Absorption conversion Factor (unitless)
EF = Exposure Frequency (unitless)
HQ = Hazard Quotient (unitless)
AT = Averaging Time (years)
ED = Exposure Duration (years)

MTCA Modified Method B soil gas cleanup numbers were calculated by first calculating an Air CUL. The Air CUL was calculated as follows:

[MTCA Equation 750-1] (noncarcinogens)

$$MTCA\ Modified\ B\ Air\ CUL = \frac{RfDi * ABW * UCF * HQ * AT}{BR * AB * EF * ED}$$

Where,

RfDi = Inhalation Reference Dose as defined in WAC 173-340-708) (mg/kg-day)
ABW = Average Body Weight (kg)
UCF = Unit conversion rate (mg/kg)
BR = Breathing Rate (mg^3/day)
AB1 = Gastrointestinal Absorption Fraction (unitless)
EF = Exposure Frequency (unitless)
HQ = Hazard Quotient (unitless)
AT = Averaging Time (years)
ED = Exposure Duration (years)

[MTCA Equation 750-2] (carcinogens)

$$MTCA\ Modified\ B\ Air\ CUL = \frac{RISK * ABW * AT * UCF}{CPFi * BR * AB * EF * ED}$$

Where,

RISK = Acceptable Risk Level (E-6)
ABW = Average Body Weight (kg)
UCF = Unit conversion rate (mg/kg)
BR = Breathing rate (m^3/day)
CPFi = Inhalation Cancer Potency Factor as defined in WAC 173-340-708(8) (kg-day/mg)
AB1 = Gastrointestinal Absorption Fraction (unitless)
EF = Exposure Frequency (unitless)
HQ = Hazard Quotient (unitless)
AT = Averaging Time (years)
ED = Exposure Duration (years)

In accordance with MTCA guidance, the air cleanup level was then multiplied by 10 to determine a soil gas screening value.

The MTCA modified Method B CULs are provided in Table F-11.

Calculating MTCA Modified Method B for TPH

The default MTCA modified Method B cleanup level for TPH was calculated using the MTCATPH calculator. The MTCATPH Calculator Output is provided in Attachment A. In order to provide representative data for contaminated soil, five samples (B-37, B-38, B-39, B-40, and B-41) were collected from the most highly-contaminated portions of the Site and analyzed using the EPH and VPH analytical method. After discussions with Mr. Hun Sean Park of Ecology, it was determined that use of the MTCATPH calculator was inappropriate for one of the samples (B-38) because of the low concentration of TPH. Therefore, only the remaining four samples were each run through the MTCATPH calculator to derive a cleanup level. The most stringent clean-up level was selected for each sample. The final cleanup value is derived by calculating the median of the four cleanup levels. This is identified as the default MTCA B cleanup value in Table F-11.

Ecology does not provide specific guidance for the vapor intrusion pathway for TPH. Therefore Oregon's RBCsTPH11a model was used to calculate receptor specific RBCs (CULs). Exposure factors used in the RBCsTPH11a model were modified to be consistent with the values presented in the Exposure Factors Table. The model was run for each of five samples using the available EPH and VPH values (B-37, B-38, B-39, B-40, and B-41). The changes made to the RBCsTPH11a and the resulting RBCs are provided in Attachment B.

Consistent with Ecology guidance, the median concentration was selected for each receptor-pathway for which cleanup values were available. These TPH clean-up values are presented in Table F-9.

RISK CHARACTERIZATION

Exposure point concentrations calculated for each of the COIs were screened against the MTCA modified Method B CULs. The screening results are provided in Table F-12.

Property Receptors

Potential contaminant exposures on the Property are attributed to incidental ingestion of soil and inhalation of volatiles intruding into indoor air from soil. Current and future occupational workers, retail customers, and future construction and excavation workers were identified as the potential receptors on the Site. The MTCA screening demonstrated that contaminant concentrations (EPCs) are below the modified Method B CULs and therefore no unacceptable human health impacts are anticipated for these receptors through the direct contact pathway.

The Risk Characterization for current and future occupational workers and retail customers is summarized as follows:

- No unacceptable cancer or noncancer health effects are anticipated from incidental ingestion of soil. The ECRs of 2E-10 (occupational worker) and 5E-13 (retail

customer) and the HIs of 0.02 (occupational worker) and 0.01 (retail customer) did not exceed the regulatory standard of ECR ≤ 1E-06 and HI = 1.

- Modified Method B CULs for soil gas were screened against all soil gas data collected on the Property (seven locations including "worst case" samples collected from zones of greatest contaminant concentrations) as well as a sub-set of three soil gas samples (SG-1, SG-2, and SG-7) collected nearest the existing Property building.
  - When the EPCs for the entire seven-sample soil gas data set (SG-1 through SG-7) were screened against MTCA Modified Method B CULs, both the ECRs and the HIs for these receptors exceeded the regulatory standards. For the occupational worker the ECR was calculated to be 7E-03 and the HI 250, with all constituents exceeding their respective CULs. The ECR for the retail customer was calculated to be 8E-05 and the HI was 17, with benzene, ethyl benzene 1,2,4-Trimethylbenzene and gasoline (TPH-Gx) exceeding the MTCA Modified Method B CULs. This scenario represents potential vapor intrusion risks for the entire Property, including all "developable areas" and is unlikely to be representative of soil gas conditions beneath the current Property building.
  -
  - In order to represent current Property building conditions, three of the seven soil gas samples (SG-1, SG-2, and SG-7) were collected adjacent to the existing commercial/retail building. Among these three samples, the maximum vapor concentration detected was screened against the MTCA modified Method B CULs. Using this soil gas data, no unacceptable health risks are identified for vapor intrusion with regard to occupational workers or retail customers. Under these current building conditions, the ECRs of 5E-07 (occupational worker) and 7E-09 (retail customer and the HIs of 0.009 (occupational worker) and 0.002 (retail customer) did not exceed the regulatory standard of ECR ≤ 1E-06 and HI = 1.
  - One of the seven soil gas samples (SG-3) was collected on the northern portion of the Property, immediately adjacent to known soil gasoline contamination and approximately 10 feet south of a neighboring commercial building (currently used as an automotive repair shop). Soil gas concentrations at SG-3 for gasoline and benzene exceed modified Method B CULs and are addressed as part of the assessment of future developable portions of the Site (above). However, risk characterization was not conducted specifically for that adjacent off-Property building since similar gasoline-related chemicals are likely to be routinely used by workers at that auto repair facility, which should exempt that facility from Ecology's vapor intrusion assessment guidance (see off-Property receptor discussion below).

The risk characterization for the future Property Construction and Excavation/Trench Worker is summarized below.

- No unacceptable excess cancer risk or noncancer health impacts were identified for the future Construction Worker. The total ECR from exposure to site related

surface soils was 2E-09 and the HI was calculated to be 0.01. Neither of these values exceed the regulatory standard of ECR ≤ 1E-06 and HI = 1, respectively.

- No unacceptable excess cancer risk or noncancer health impacts were identified for the future Excavation/ Trench Worker. The total ECR from exposure to site related surface soils was 2E-10 and the HI was calculated to be 0.00005. Neither of these values exceed the regulatory standard of ECR ≤ 1E-06 and HI = 1, respectively.

"OFF-PROPERTY" RECEPTORS

RIGHT OF WAY (16TH AVENUE)

Soil gasoline impacts originating at the Property extend beyond the Property margins to the east, beneath a small portion of the adjacent 16th Avenue roadway. Potential contaminant exposures at the ROW are attributed to incidental ingestion and dermal contact with soil by (future) excavation/trench workers and maintenance workers. The risk screening determined that none of the EPCs exceeded their respective MTCA modified Method B CULs for these receptors. Therefore, no unacceptable human health impacts are anticipated for the ROW receptor.

The risk characterization for the future Right-of-Way Excavation/Trench Worker is summarized below.

- No unacceptable excess cancer risk or noncancer health impacts were identified for the future Excavation/Trench Worker. The total ECR from exposure to site related surface soils was 2E-12 and the HI was calculated to be 0.0000002. Neither of these values exceed the regulatory standard of ECR ≤ 1E-06 and HI = 1, respectively.
- No COIs were identified in the surface soil of the ROW. Therefore, the exposure pathway for the current and future highway maintenance worker is incomplete. No unacceptable excess cancer risks or noncancer health impacts are expected for this receptor.

ADJACENT AUTO REPAIR SHOP

Soil gas sampling at the SG-3 location identified gasoline and benzene concentrations exceeding modified Method B screening levels. It is likely that workers in the adjacent automotive repair shop are routinely exposed to the same gasoline-related chemicals (as are being addressed at the subject Property) during their routine job activities. Since the chemicals used in such a workplace are likely to include the same gasoline substances identified as COIs at the subject Property, the source and significance of sub-slab vapors (if present) could be difficult to establish. Furthermore, Ecology's soil vapor intrusion guidance likely does not apply to such a facility where gasoline-related chemicals are routinely used (Ecology 2009).

UNCERTAINTY ANALYSIS

Risk assessment is a complex process requiring the integration of contaminant release information, fate and transport of chemicals, toxicity information, and risk characterization. Inherent in each of these steps are varying degrees of uncertainty that may influence the results of the risk assessment process. Uncertainties associated with the different components of a risk assessment can affect the degree of confidence that can be placed on the risk assessment results.

DATA COLLECTION AND EVALUATION

Several sources of uncertainty are associated with the raw data collection. A primary source of these uncertainties lies with the design and execution of the sampling plan. A sampling plan should be designed in such a way as to be representative of site conditions, thus eliminating significant gaps in the data. Four of the seven soil gas sampling locations were intentionally located in or very near the source area where concentrations were expected to be the greatest. Use of this data would likely overestimate the risk on a site-wide basis. Sampling locations nearest the existing Property building are likely more representative of soil gas conditions likely to contribute to indoor air concentrations in the building.

The sampling plan also delineates the protocol for the laboratory analysis of the samples, as this is limited to samples collected from the site and is dependent upon the homogeneity of the samples collected. Limits of detection add to the uncertainty of the data.

HUMAN HEALTH EXPOSURE ASSESSMENT

There are several sources of uncertainty in the exposure assessment that can affect the estimates of exposure and therefore the risk characterization. In all exposure assessments there are uncertainties associated with the sampling data and how well the data actually represent the site conditions. Additionally, there are uncertainties associated with how well the exposure assumptions represent actual exposure conditions. One of the primary uncertainties associated with the exposure assessment is the determination of how many and how often people may be on-site. Assumptions regarding use are expected to overestimate rather than underestimate exposures and, therefore, risks. Also, there are uncertainties associated with the probability of adverse effects in a human population that is highly variable (e.g., due to sex, age, genetic predisposition, activity level, and/or lifestyle).

Standard (default) MTCA Method B CULs were established based on residential exposures. Residential exposure scenarios are not directly applicable to Site conditions due to current usage and commercial zoning limitations which also limit future development to commercial/retail use. To address the reasonably likely site-specific receptors, EPA's standard default exposure parameters for the occupational worker, the construction worker and the trench worker were used to calculate the MTCA Modified Method B CULs (EPA 2011). Professional judgment was used to develop exposure parameters for the current and

future retail customer. The selected site-specific exposure parameters were designed to be conservative and protective, but serve as a source of uncertainty in the exposure assessment.

TOXICITY ASSESSMENT

Toxicity values have an inherent uncertainty. Large amounts of data are required for an accurate evaluation; however, data are often limited. A chronic RfD used for a non-carcinogenic effect is an estimate of daily intake to which a population may be exposed, which is unlikely to result in an adverse effect. The uncertainty in this value may span an order of magnitude (EPA 1989). For carcinogenic compounds, a slope factor is used as there is believed to be essentially no level of exposure that does not pose some level of risk. In the derivation of the slope factor, which is an upper bound estimate, the weight of evidence provides an indication of the strength of evidence that a chemical has the potential to be a human carcinogen. They are generally derived using the 95 percent UCL from the linearized multistage model for assessing carcinogenicity.

Other sources of uncertainty in the toxicity assessment include:

- The quality of studies used as the basis for developing toxicity factors.
- Potential differences in toxicity and absorption efficiency between humans and laboratory animals.
- Derivation of dermal toxicity values from oral toxicity values.
- Route to route extrapolation.
- The validity of the critical underlying assumption in the dose-response model for carcinogens that there is no threshold for carcinogens.

Generally, a conservative approach is used in selecting variables for the risk calculations due to the aforementioned uncertainties. Estimates of excess cancer risk for some chemicals are likely to be overestimates of actual risk, and in some cases may be underestimates. In particular, when EPA carcinogenic slope factors for the dose-response model are derived from animal data, the slope factors are based on the upper 95th percentile risk estimates and often overestimate potential excess cancer risk.

Additional uncertainties stem from the current state of the science and our growing but limited understanding of the carcinogenic process. Where there are multiple chemicals, we are not yet able to evaluate additive effects or account for chemical interactions. EPA has developed new guidelines for how carcinogenic chemicals are evaluated, however, not all chemicals have been reviewed under this process. These new guidelines consider early childhood exposures to certain chemicals as more significant than lifetime adult exposures. Where once it was automatically assumed that evidence for or against carcinogenicity for a given pathway translated to all pathways of exposure, research has shown this may not be the case for all chemicals. All of these gaps in our current understanding have the potential to overestimate or underestimate risks.

RISK CHARACTERIZATION

The uncertainties in the risk characterization are associated with:

- The validity of adding risks or hazard quotients for multiple chemicals.
- The validity of adding risks or hazard quotients across pathways.
- The validity of the critical underlying assumptions in the dose-response model for carcinogens that there is no threshold for carcinogenesis.
- The probability of adverse effects in a human population that is highly variable in genetic disposition, age, activity level, and lifestyle.

Uncertainties associated with the different components of a risk assessment can affect the degree of confidence that can be placed on the risk assessment results. Conservative assumptions were used throughout this risk assessment so as to minimize the impact of the uncertainties associated with the risk assessment process and likely overestimate the potential risk so as to be protective for current and future receptors.

3 SUMMARY AND DISCUSSION OF HUMAN HEALTH RISK ASSESSMENT RESULTS

Representative Exposure Point Concentrations for Site COIs were compared to MTCA modified Method B Cleanup Levels which were calculated for anticipated Site receptors. A summary of the risk characterization for the Site is summarized below and presented in Table F-13.

- Ingestion of soil by current and future occupational workers and retail customers is not expected to result in unacceptable cancer risk or noncancer human health impacts.
- Ingestion and dermal contact with soil on the Property by a future construction worker or a future trench worker is not expected to result in unacceptable cancer risk or noncancer human health impacts.
- When all Site soil gas data are considered including data from “worst case locations” where no buildings currently exist, calculations indicate that inhalation of volatiles from soil intruding into indoor air poses excess cancer risk and a potential for noncancer health impacts. However, this dataset is highly skewed towards the worst case due the intentionally biased selection of sampling locations for more than half of the dataset (four of seven sample locations). These worst case samples are located in the parking lot under asphalt (potential “developable portions” of the Property) but do not represent current under-building conditions.
- The three soil gas samples collected adjacent to the existing Property building better represent current conditions, and no unacceptable cancer risk or noncancer human health impacts are anticipated for vapor intrusion based on these data.
- Ingestion and dermal contact with soil in the roadway ROW by a future trench worker is not expected to result in unacceptable cancer risk or noncancer human health impacts.

- No COPCs were identified in the ROW surface soil (0 to 3 feet bgs). Therefore the exposure pathway for this medium was incomplete and the highway maintenance worker was not quantitatively evaluated. No unacceptable cancer risks or human health impacts are expected.

The results of the risk evaluation determined that for the subject Property, retail store (occupational) workers and store customers were identified as current and reasonably likely future receptors. No unacceptable human health effects are expected from direct contact with soil for either of these receptors. Additionally, potential future receptors at the Property include construction workers and excavation/trench workers, for which no unacceptable human health effects are expected. Future roadway maintenance workers and excavation/trench workers in the ROW also have no unacceptable human health effects expected based on this evaluation.

Vapor intrusion risks are not anticipated for the current building configuration based on the MTCA modified Method B screening values developed during this assessment. When the most representative near-building soil gas samples are considered, no unacceptable cancer risks or noncancer human health impacts from the vapor intrusion pathway are anticipated for store (occupational) workers and the retail store customers.

The only significant potential future health risks identified are related to possible vapor intrusion from gasoline contaminated soil vapors migrating into indoor air if the Property is re-developed to include a new building constructed over contaminated soil areas. The risk characterization demonstrated that when all soil gas data across the Site was considered, significant cancer risks and noncancer health impacts could be anticipated for a future building located on contaminated portions of the Property. Vapor intrusion risks are not anticipated for the adjacent ROW since building construction in the ROW is not likely.

One of seven soil gas samples was collected near contaminated soils on the subject Property, near an adjacent off-Property building currently used for automotive repairs. Gasoline and benzene vapor concentrations in this sample exceed modified Method B screening criteria, but in accordance with published guidance (Ecology 2009), vapor intrusion assessment into that neighboring building is not likely applicable because of its use for automotive repairs which are likely to involve the same gasoline-related chemicals which are present as COIs at the subject Property.

Tables

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Table F-9: Exposure Assumptions for MTCA Modified Method B
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Table F-11: MTCA Modified Method B CULs
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Table F-13: Risk Characterization Summary

Figures Figure F-1: Conceptual Human Health Exposure Model

Attachments Attachment F-A: Site-Specific Cleanup Level Calculations for Soil
Attachment F-B: Site-Specific Cleanup Level Calculations for Soil Vapor

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TABLES

TABLE F-1
Preliminary Screening of On-Site Surface Soil
Former Plaid Pantry #324
White Center/King County, Washington

Sample ID	Gasoline Range Organics				Benzene				Toluene				Ethylbenzene				Total Xylenes				Methyl t-butyl ether				1,2-Dibromoethane				1,2-Dichlororethane				Naphthalene				Hexane			
	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL
S-10		310				0.23				0.85				2				16																						
B-5@4		1300			<	0.8	U	0.8		4.2				12				120																						
B6@4		1500				1.5				65				12				250																						
B6@9	<	2	U	2	<	0.02	U	0.02	<	0.02	U	0.02	<	0.02	U	0.02	<	0.06	U	0.06																				
B7@4	<	2	U	2	<	0.02	U	0.02	<	0.02	U	0.02	<	0.02	U	0.02	<	0.06	U	0.06																				
B-10@4		8				0.06				0.22				0.17				0.92																						
B-12@4		150			<	0.02	U	0.02		0.27			<	0.02	U	0.02		3.6																						
B-15/4	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15	<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05	<	0.05	U	0.05	<	0.125	U	0.25
B-16/4	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15													<	0.05	U	0.05	<	0.125	U	0.25
B-17/4	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15													<	0.05	U	0.05	<	0.125	U	0.25
B-18/4		54			<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15	<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05		0.092			<	0.125	U	0.25
B-19/4	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15	<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05	<	0.05	U	0.05	<	0.125	U	0.25
B-20/4	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15	<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05	<	0.05	U	0.05	<	0.125	U	0.25
B-21/4	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15	<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05	<	0.05	U	0.05	<	0.125	U	0.25
B-22/4	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15													<	0.05	U	0.05	<	0.125	U	0.25
B-24/4		2			<	0.02	U	0.02	<	0.02	U	0.02	<	0.02	U	0.02	<	0.06	U	0.06																				
B25/4		2			<	0.02	U	0.02	<	0.02	U	0.02	<	0.02	U	0.02	<	0.06	U	0.06																				
B-26/4		27				0.23				0.15				0.76				3.8																						
B-27/4		1000				0.9				24				20				100																						
B-37 (4.5-5)		2120				1.6				14				18				160			<	0.2	U	0.4	<	0.2	U	0.4	<	0.1	U	0.2		6.2						
B-38 (4.5-5)		22				0.34				0.73				0.32				1.9			<	0.2	U	0.4	<	0.2	U	0.4	<	0.1	U	0.2		0.095						
Count		21				21				21				21				21				7				7				7				10				8		
Detects		12				7				9				8				9				0				0				0				3				0		
%detects		57%				33%				43%				38%				43%				0%				0%				0%				30%				0%		
max MRL		2				0.8				0.05				0.05				0.15				0.4				0.4				0.2				0.05				0.25		
Max detected		2120				1.6				65				20				250																6.2						
Min detected		2				0.02				0.02				0.02				0.06																0.05						

Sample ID	Gasoline Range Organics				Benzene				Toluene				Ethylbenzene				Total Xylenes			
	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL
S-10		310	1			0.23	1			0.85	1			2	1			16	1	
B-5@4		1300	1			0.8	0			4.2	1			12	1			120	1	
B6@4		1500	1			1.5	1			65	1			12	1			250	1	
B6@9		2	0			0.02	0			0.02	0			0.02	0			0.06	0	
B7@4		2	0			0.02	0			0.02	0			0.02	0			0.06	0	
B-10@4		8	1			0.06	1			0.22	1			0.17	1			0.92	1	
B-12@4		150	1			0.02	0			0.27	1			0.02	0			3.6	1	
B-15/4		2	0			0.03	0			0.05	0			0.05	0			0.15	0	
B-16/4		2	0			0.03	0			0.05	0			0.05	0			0.15	0	
B-17/4		2	0			0.03	0			0.05	0			0.05	0			0.15	0	
B-18/4		54	1			0.03	0			0.05	0			0.05	0			0.15	0	
B-19/4		2	0			0.03	0			0.05	0			0.05	0			0.15	0	
B-20/4		2	0			0.03	0			0.05	0			0.05	0			0.15	0	
B-21/4		2	0			0.03	0			0.05	0			0.05	0			0.15	0	
B-22/4		2	0			0.03	0			0.05	0			0.05	0			0.15	0	
B-24/4		2	1			0.02	0			0.02	0			0.02	0			0.06	0	
B25/4		2	1			0.02	0			0.02	0			0.02	0			0.06	0	
B-26/4		27	1			0.23	1			0.15	1			0.76	1			3.8	1	
B-27/4		1000	1			0.9	1			24	1			20	1			100	1	
B-37 (4.5-5)		2120	1			1.6	1			14	1			18	1			160	1	
B-38 (4.5-5)		22	1			0.34	1			0.73	1			0.32	1			1.9	1	

Sample ID	Naphthalene			
	Symbol	value	qualifier	MRL
S-10		0.05	0	
B-5@4		0.05	0	
B6@4		0.05	0	
B6@9		0.092	1	
B7@4		0.05	0	
B-10@4		0.05	0	
B-12@4		0.05	0	
B-15/4		0.05	0	
B-16/4		6.2	1	
B-17/4		0.095	1	
B-18/4				
B-19/4				
B-20/4				
B-21/4				
B-22/4				
B-24/4				
B25/4				
B-26/4				
B-27/4				
B-37 (4.5-5)				
B-38 (4.5-5)				

TABLE F-2
Preliminary Screening of Surface and Subsurface Soil
Former Plaid Pantry #324
White Center/King County, Washington

Sample ID	Gasoline Range Organics				Benzene				Toluene				Ethylbenzene				Total Xylenes				Methyl t-butyl ether				1,2-Dibromoethane				1,2-Dichlororethane				Naphthalene				Hexane				Total Lead			
	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL
S-4	<	2	U	2	<	0.02	U	0.02	<	0.02	U	0.02	<	0.02	U	0.02	<	0.06	U	0.06																								
S-5	<	2	U	2	<	0.02	U	0.02	<	0.02	U	0.02	<	0.02	U	0.02	<	0.06	U	0.06																								
S-6	<	2	U	2	<	0.02	U	0.02	<	0.02	U	0.02	<	0.02	U	0.02	<	0.06	U	0.06																								
S-7	<	2	U	2	<	0.02	U	0.02	<	0.02	U	0.02	<	0.02	U	0.02	<	0.06	U	0.06																								
S-8	<	2	U	2	<	0.02	U	0.02	<	0.02	U	0.02	<	0.02	U	0.02	<	0.06	U	0.06																								
S-9	<	2	U	2	<	0.02	U	0.02	<	0.02	U	0.02	<	0.02	U	0.02	<	0.06	U	0.06																								
S-10		310				0.23				0.85				2				16																								
B1-5		1400				4.8				92				55				580			<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05		13								7.95			
B1-8		11			<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05		0.21			<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05	<	0.05	U	0.05						2.38			
B2-9	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15	<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05	<	0.05	U	0.05						2.46			
B3-8		390				0.86				28				21				136			<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05	<	5	U	5						4.11			
B4-5		2			<	0.03	U	0.03		0.065				0.059				0.303			<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05		0.057								2.61			
B4-8	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15	<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05	<	0.05	U	0.05									
B-5@4		1300			<	0.8	U	0.8		4.2				12				120																								
B-5@7	<	2	U	2	<	0.02	U	0.02	<	0.02	U	0.02	<	0.02	U	0.02	<	0.06	U	0.06																								
B-5@12	<	2	U	2	<	0.02	U	0.02	<	0.02	U	0.02	<	0.02	U	0.02	<	0.06	U	0.06																								
B6@4		1500				1.5				65				12				250																								
B6@9	<	2	U	2	<	0.02	U	0.02	<	0.02	U	0.02	<	0.02	U	0.02	<	0.06	U	0.06																								
B7@4	<	2	U	2	<	0.02	U	0.02	<	0.02	U	0.02	<	0.02	U	0.02	<	0.06	U	0.06																								
B-7@8		580				0.5				6.1				9.2				38																								
B-7@11	<	2	U	2	<	0.02	U	0.02	<	0.02	U	0.02	<	0.02	U	0.02	<	0.06	U	0.06																								
B-8@6		1200				0.73				16				17				150																								
B-8@9		18				0.03				1				0.5				0.78																								
B-9@5		950				1.5				42				14				120																								
B-9@10		2100				9.9				99				31				200																								
B-9@12	<	2	U	2	<	0.02	U	0.02		0.03			<	0.01	U	0.02	<	0.06	U	0.06																								
B-10@4		8				0.06				0.22				0.17				0.92																								
B10@6		6				0.07				0.4				0.24				0.74																								
B-10@10		76			<	0.02	U	0.02		0.45				0.57				3.9																								
B-12@4		150			<	0.02	U	0.02		0.27			<	0.02	U	0.02		3.6																								
B-12@8	<	2	U	2	<	0.02	U	0.02	<	0.02	U	0.02	<	0.02	U	0.02	<	0.06	U	0.06																								
B-13@5		140			<	0.02	U	0.02		1.8				1.6				11																								
B-13@12		3				0.12				0.26				0.06				0.30																								
B-15/4	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15	<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05	<	0.05	U	0.05	<	0.125	U	0.25				
B-15/8	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15	<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05	<	0.05	U	0.05	<	0.125	U	0.25				
B-15/12	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15	<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05	<	0.05	U	0.05	<	0.125	U	0.25				
B-16/4	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15																								
B-16/8		120			<	0.03	U	0.03	<	0.05	U	0.05		0.33				0.98																								
B-16/11	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15																								
B-17/4	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15																								
B-17/7		46			<	0.03	U	0.03	<	0.05	U	0.05		0.06			<	0.15	U	0.15																								
B-17/10		90			<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15																								
B-17/13	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15																								
B-18/4		54			<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15	<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05		0.092			<	0.125	U	0.25				
B-18/8	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15	<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05	<	0.05	U	0.05	<	0.125	U	0.25				
B-18/12	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15	<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05	<	0.05	U	0.05	<	0.125	U	0.25				
B-19/4	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15	<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05	<	0.05	U	0.05	<	0.125	U	0.25				
B-19/8	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15	<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05	<	0.05	U	0.05	<	0.125	U	0.25				
B-19/12	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15	<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05	<	0.05	U	0.05	<	0.125	U	0.25				
B-20/4	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15	<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05	<	0.05	U	0.05	<	0.125	U	0.25				
B-20/6		93			<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15	<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05	<	0.05	U	0.05	<	0.125	U	0.25				
B-20/10	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15	<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05	<	0.05	U	0.05	<	0.125	U	0.25				
B-21/4	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15	<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05	<	0.05	U	0.05	<	0.125	U	0.25				
B-21/9	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15	<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05	<	0.05	U	0.05	<	0.125	U	0.25				
B-22/4	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15																								
B-22/7		93			<	0.03	U	0.03	<	0.05	U	0.05		0.12				0.1																								
B-23/5	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15	<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05	<	0.05	U	0.05	<	0.125	U	0.25				
B-23/10	<	2	U	2	<	0.03	U	0.03	<	0.05	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15	<	0.025	U	0.05	<	0.025	U	0.05	<	0.025	U	0.05	<	0.05	U	0.05	<	0.125	U	0.25				
B-24/4		2			<	0.02	U	0.02	<	0.02	U	0.02	<	0.02	U	0.02	<	0.06	U	0.06																								
B-24/8		990				0.5				15				17				96																								
B25/4		2			<	0.02	U	0.02	<	0.02	U	0.02	<	0.02	U	0.02	<	0.06	U	0.06																								
B-25/8	<	2	U	2	<	0.02	U	0.02	<	0.02	U	0.02	<	0.02	U	0.02	<	0.06	U	0.06																								
B-26/4		27				0.23				0.15				0.76				3.8																								
B-26/8		130				0.25				4.4				2				13																								
B-26/12		17				0.6				0.99				0.37				2																								
B-27/4		1000				0.9				24				20				100																								
B-27/8		12			<	0.02	U	0.02		0.21				0.17				1.1																								
B-27/12		5			<	0.02	U	0.02		0.26				0.08				0.45																								
B-28/8		1420				3.38				51				21				126																								
B-28/13		14				0.88				1.3				0.23				1.4																								
B-29/8		1420				0.57				32				27				147																								
B-32/CS-1 (5-5.5)	<	1.47	U	5.9	<	0.004115	U	0.015	<	0.0147	U	0.059	<	0.00735	U	0.029	<	0.02205	U	0.088																								
B-32/CS-1 (7-7.5)		4210			<	0.097	U	0.286		20				62				318																								
B-32/CS-1 (9-9.5)		11				0.014				1				0.28				1.3																								
B-32/CS-1 (11-11.5)		10				0.02				1.3				0.43				0.61																								
B-33/CS-2 (5-5.5)	<	1.25	U	5.01	<	0.003505	U	0.0125	<	0.0125	U	0.0501	<	0.00625	U	0.025	<	0.0188	U	0.0751																								
B-33/CS-2 (7-7.5)		1700				1				21				26				117																								
B-33/CS-2 (9-9.5)		42				0.48				4				0.67				4																								
B-33/CS-2 (11-11.5)		23				0.61				3.7				0.33				2																								
B-34/CS-3 (5-5.5)		2660				1.1				51				45				282																								
B-34/CS-3 (7-7.5)		2900				6.5				146				49				295																								
B-34/CS-3 (9-9.5)		13				0.8				1.4				0.21				1.3																								
B-34/CS-3 (11-11.5)		36				2.6				4.2				0.7				3.4																								
B-35/CS-4 (5-5.5)		5960				6.3				170				108				623																								
B-35/CS-4 (7-7.5)		3700				8.3				159				57				332																								
B-35/CS-4 (9-9.5)		29				1.7				3.6				0.53				3.1																								
B-35/CS-4 (11-11.5)		327				2.2				0.7				4.4				2																								

TABLE F-2
Preliminary Screening of Surface and Subsurface Soil
Former Plaid Pantry #324
White Center/King County, Washington

Sample ID	Gasoline Range Organics				Benzene				Toluene				Ethylbenzene				Total Xylenes				Methyl t-butyl ether				1,2-Dibromoethane				1,2-Dichlororethane				Naphthalene				Hexane				Total Lead			
	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL
B-37 (4.5-5)		2120				1.6				14				18				160			<	0.2	U	0.4	<	0.2	U	0.4	<	0.1	U	0.2		6.2										
B-38 (4.5-5)		22				0.34				0.73				0.32				1.9			<	0.2	U	0.4	<	0.2	U	0.4	<	0.1	U	0.2		0.095										
B-39 (7-7.5)		5970				11				96				122				234			<	0.355	U	0.71	<	0.355	U	0.71	<	0.18	U	0.36		22										
B-40 (8-8.5)		2520				6.6				115				37				232			<	0.245	U	0.49	<	0.245	U	0.49	<	0.125	U	0.25		9										
B-41 (8-8.5)		2910				0.45				51				49				286			<	0.295	U	0.59	<	0.295	U	0.59	<	0.15	U	0.3		9.6										
MDLs for ND analytes are listed in the value column - not all MDL results were available																																												
results are in mg/kg																																												
Count		92				92				92				92				92				27				27				27				36				25				5		
Detects		55				38				47				48				49				0				0				0				11				0				5		
%detects		60%				41%				51%				52%				53%				0%				0%				0%				31%				0%				100%		
max MRL		5.9				0.8				0.059				0.05				0.15				0.71				0.71				0.36				5				0.25				0		
Max detected		5970				11				170				122				623																22								7.95		
Min detected		1.25				0.003505				0.0125				0.00625				0.0188																0.05								2.38		
																																										3.9020		

TABLE F-2
Preliminary Screening of Surface and Subsurface Soil
Former Plaid Pantry #324
White Center/King County, Washington

Sample ID	Gasoline Range Organics				Benzene				Toluene				Ethylbenzene				Total Xylenes				Naphthalene				Total Lead			
	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL
S-4		2	0			0.02	0			0.02	0			0.02	0			0.06	0			13	1			7.95	1	
S-5		2	0			0.02	0			0.02	0			0.02	0			0.06	0			0.05	0			2.38	1	
S-6		2	0			0.02	0			0.02	0			0.02	0			0.06	0			0.05	0			2.46	1	
S-7		2	0			0.02	0			0.02	0			0.02	0			0.06	0			5	0			4.11	1	
S-8		2	0			0.02	0			0.02	0			0.02	0			0.06	0			0.057	1			2.61	1	
S-9		2	0			0.02	0			0.02	0			0.02	0			0.06	0			0.05	0					
S-10		310	1			0.23	1			0.85	1			2	1			16	1			0.05	0					
B1-5		1400	1			4.8	1			92	1			55	1			580	1			0.05	0					
B1-8		11	1			0.03	0			0.05	0			0.05	0			0.21	1			0.05	0					
B2-9		2	0			0.03	0			0.05	0			0.05	0			0.15	0			0.05	0					
B3-8		390	1			0.86	1			28	1			21	1			136	1			1	1					
B4-5		2	1			0.03	0			0.065	1			0.059	1			0.303	1			0.05	0					
B4-8		2	0			0.03	0			0.05	0			0.05	0			0.15	0			0.05	0					
B-5@4		1300	1			0.8	0			4.2	1			12	1			120	1			0.32	1					
B-5@7		2	0			0.02	0			0.02	0			0.02	0			0.06	0			0.05	0					
B-5@12		2	0			0.02	0			0.02	0			0.02	0			0.06	0			0.05	0					
B6@4		1500	1			1.5	1			65	1			12	1			250	1			0.092	1					
B6@9		2	0			0.02	0			0.02	0			0.02	0			0.06	0			0.05	0					
B7@4		2	0			0.02	0			0.02	0			0.02	0			0.06	0			0.05	0					
B-7@8		580	1			0.5	1			6.1	1			9.2	1			38	1			0.05	0					
B-7@11		2	0			0.02	0			0.02	0			0.02	0			0.06	0			0.05	0					
B-8@6		1200	1			0.73	1			16	1			17	1			150	1			0.05	0					
B-8@9		18	1			0.03	1			1	1			0.5	1			0.78	1			0.05	0					
B-9@5		950	1			1.5	1			42	1			14	1			120	1			0.05	0					
B-9@10		2100	1			9.9	1			99	1			31	1			200	1			0.05	0					
B-9@12		2	0			0.02	0			0.03	1			0.01	0			0.06	0			0.05	0					
B-10@4		8	1			0.06	1			0.22	1			0.17	1			0.92	1			0.05	0					
B10@6		6	1			0.07	1			0.4	1			0.24	1			0.74	1			0.05	0					
B-10@10		76	1			0.02	0			0.45	1			0.57	1			3.9	1			0.32	1					
B-12@4		150	1			0.02	0			0.27	1			0.02	0			3.6	1			0.05	0					
B-12@8		2	0			0.02	0			0.02	0			0.02	0			0.06	0			0.05	0					
B-13@5		140	1			0.02	0			1.8	1			1.6	1			11	1			6.2	1					
B-13@12		3	1			0.12	1			0.26	1			0.06	1			0.30	1			0.095	1					
B-15/4		2	0			0.03	0			0.05	0			0.05	0			0.15	0			22	1					
B-15/8		2	0			0.03	0			0.05	0			0.05	0			0.15	0			9	1					
B-15/12		2	0			0.03	0			0.05	0			0.05	0			0.15	0			9.6	1					
B-16/4		2	0			0.03	0			0.05	0			0.05	0			0.15	0									
B-16/8		120	1			0.03	0			0.05	0			0.33	1			0.98	1									
B-16/11		2	0			0.03	0			0.05	0			0.05	0			0.15	0									
B-17/4		2	0			0.03	0			0.05	0			0.05	0			0.15	0									
B-17/7		46	1			0.03	0			0.05	0			0.06	1			0.15	0									
B-17/10		90	1			0.03	0			0.05	0			0.05	0			0.15	0									
B-17/13		2	0			0.03	0			0.05	0			0.05	0			0.15	0									
B-18/4		54	1			0.03	0			0.05	0			0.05	0			0.15	0									
B-18/8		2	0			0.03	0			0.05	0			0.05	0			0.15	0									
B-18/12		2	0			0.03	0			0.05	0			0.05	0			0.15	0									
B-19/4		2	0			0.03	0			0.05	0			0.05	0			0.15	0									
B-19/8		2	0			0.03	0			0.05	0			0.05	0			0.15	0									
B-19/12		2	0			0.03	0			0.05	0			0.05	0			0.15	0									
B-20/4		2	0			0.03	0			0.05	0			0.05	0			0.15	0									
B-20/6		93	1			0.03	0			0.05	0			0.05	0			0.15	0									
B-20/10		2	0			0.03	0			0.05	0			0.05	0			0.15	0									
B-21/4		2	0			0.03	0			0.05	0			0.05	0			0.15	0									
B-21/9		2	0			0.03	0			0.05	0			0.05	0			0.15	0									
B-22/4		2	0			0.03	0			0.05	0			0.05	0			0.15	0									
B-22/7		93	1			0.03	0			0.05	0			0.12	1			0.1	1									
B-23/5		2	0			0.03	0			0.05	0			0.05	0			0.15	0									
B-23/10		2	0			0.03	0			0.05	0			0.05	0			0.15	0									
B-24/4		2	1			0.02	0			0.02	0			0.02	0			0.06	0									
B-24/8		990	1			0.5	1			15	1			17	1			96	1									
B25/4		2	1			0.02	0			0.02	0			0.02	0			0.06	0									
B-25/8		2	0			0.02	0			0.02	0			0.02	0			0.06	0									
B-26/4		27	1			0.23	1			0.15	1			0.76	1			3.8	1									
B-26/8		130	1			0.25	1			4.4	1			2	1			13	1									
B-26/12		17	1			0.6	1			0.99	1			0.37	1			2	1									
B-27/4		1000	1			0.9	1			24	1			20	1			100	1									
B-27/8		12	1			0.02	0			0.21	1			0.17	1			1.1	1									
B-27/12		5	1			0.02	0			0.26	1			0.08	1			0.45	1									
B-28/8		1420	1			3.38	1			51	1			21	1			126	1									
B-28/13		14	1			0.88	1			1.3	1			0.23	1			1.4	1									
B-29/8		1420	1			0.57	1			32	1			27	1			147	1									
B-32/CS-1 (5-5.5)		1.47	0			0.004115	0			0.0147	0			0.00735	0			0.02205	0									
B-32/CS-1 (7-7.5)		4210	1			0.097	0			20	1			62	1			318	1									
B-32/CS-1 (9-9.5)		11	1			0.014	1			1	1			0.28	1			1.3	1									
B-32/CS-1 (11-11.5)		10	1			0.02	1			1.3	1			0.43	1			0.61	1									
B-33/CS-2 (5-5.5)		1.25	0			0.003505	0			0.0125	0			0.00625	0			0.0188	0									
B-33/CS-2 (7-7.5)		1700	1			1	1			21	1			26	1			117	1									
B-33/CS-2 (9-9.5)		42	1			0.48	1			4	1			0.67	1			4	1									
B-33/CS-2 (11-11.5)		23	1			0.61	1			3.7	1			0.33	1			2	1									
B-34/CS-3 (5-5.5)		2660	1			1.1	1			51	1			45	1			282	1									
B-34/CS-3 (7-7.5)		2900	1			6.5	1			146	1			49	1			295	1									
B-34/CS-3 (9-9.5)		13	1			0.8	1			1.4	1			0.21	1			1.3	1									
B-34/CS-3 (11-11.5)		36	1			2.6	1			4.2	1			0.7	1			3.4	1									
B-35/CS-4 (5-5.5)		5960	1			6.3	1			170	1			108	1			623	1									
B-35/CS-4 (7-7.5)		3700	1			8.3	1			159	1			57	1			332	1									
B-35/CS-4 (9-9.5)		29	1			1.7	1			3.6	1			0.53	1			3.1	1									
B-35/CS-4 (11-11.5)		327	1			2.2	1			0.7	1			4.4	1			2	1									
B-37 (4.5-5)		2120	1			1.6	1			14	1			18	1			160	1									
B-38 (4.5-5)		22	1			0.34	1			0.73	1			0.32	1			1.9	1									
B-39 (7-7.5)		5970	1			11	1			96	1			122	1			234	1									
B-40 (8-8.5)		2520	1			6.6	1			115	1			37	1			232	1									
B-41 (8-8.5)		2910	1			0.45	1			51	1			49	1			286	1									

TABLE F-3
Preliminary Screening of Right of Way Surface Soil
Former Plaid Pantry #324
White Center/King County, Washington

Sample ID	Gasoline Range Organics				Benzene				Toluene				Ethylbenzene				Total Xylenes			
	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL
ROW-1/3	<	5	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.025	U	0.05	<	0.075	U	0.15
ROW-2/3	<	5	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.025	U	0.05	<	0.075	U	0.15
ROW-2/3 (duplicate)	<	5	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.025	U	0.05	<	0.075	U	0.15
ROW-3/3	<	5	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.025	U	0.05	<	0.075	U	0.15
ROW-4/3	<	5	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.025	U	0.05	<	0.075	U	0.15
ROW-5/3	<	5	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.025	U	0.05	<	0.075	U	0.15
ROW-6/3	<	5	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.025	U	0.05	<	0.075	U	0.15
ROW-7/3	<	5	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.025	U	0.05	<	0.075	U	0.15
ROW-8/3	<	5	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.025	U	0.05	<	0.075	U	0.15
ROW-8/7	<	5	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.025	U	0.05	<	0.075	U	0.15
ROW-8/10	<	5	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.025	U	0.05	<	0.075	U	0.15
ROW-9/3	<	5	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.025	U	0.05	<	0.075	U	0.15
ROW-9/7	<	5	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.025	U	0.05	<	0.075	U	0.15
ROW-9/10	<	5	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.025	U	0.05	<	0.075	U	0.15
ROW-10/3	<	5	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.025	U	0.05	<	0.075	U	0.15
ROW-10/8	<	5	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.025	U	0.05	<	0.075	U	0.15
ROW-10/10	<	5	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.025	U	0.05	<	0.075	U	0.15

MDLs for ND analytes are listed in the value column - not all MDL results were available
results are in mg/kg

Count	17	17	17	17	17
Detects	0	0	0	0	0
%detects	0%	0%	0%	0%	0%
max MRL	10	0.02	0.05	0.05	0.15
Max detected					
Min detected					

TABLE F-4
Preliminary Screening of Right of Way Surface and Subsurface Soil
Former Plaid Pantry #324
White Center/King County, Washington

Sample ID	Gasoline Range Organics				Benzene				Toluene				Ethylbenzene				Total Xylenes			
	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	Table
ROW-1/3	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-1/9		67			<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-1/10		780			<	0.01	U	0.02	<	0.025	U	0.05		1.6				3.9		
ROW-2/3	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-2/3 (duplicate)	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-2/10		200			<	0.01	U	0.02	<	0.025	U	0.05		0.24				0.28		
ROW-3/3	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-3/9		35			<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-3/12		300			<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-4/3	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-4/10		260			<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-4/11	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-5/3	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-5/10	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-6/3	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-6/8.5	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-6/10	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-7/3	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-7/8	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-7/10	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-7/14	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-8/3	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-8/7	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-8/10	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-8/14	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-8/14 (duplicate)	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-9/3	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-9/7	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-9/10	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-9/15	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-10/3	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-10/8	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-10/10	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-10/15	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15
ROW-10/15 (duplicate)	<	10	U	10	<	0.01	U	0.02	<	0.025	U	0.05	<	0.05	U	0.05	<	0.15	U	0.15

MDLs for ND analytes are listed in the value column - not all MDL results were available

results are in mg/kg

Count	35	35	35	35	35
Detects	6	0	0	2	2
%detects	17%	0%	0%	6%	6%
max MRL	10	0.02	0.05	0.05	0.15
Max detected	780			1.6	3.9
Min detected	10	0.01	0.025	0.05	0.15

TABLE F-4
Preliminary Screening of Right of Way Surface and Subsurface Soil
Former Plaid Pantry #324
White Center/King County, Washington

Sample ID	Gasoline Range Organics				Ethylbenzene				Total Xylenes			
	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL
ROW-1/3		10	0			0.05	0			0.15	0	
ROW-1/9		67	1			0.05	0			0.15	0	
ROW-1/10		780	1			1.6	1			3.9	1	
ROW-2/3		10	0			0.05	0			0.15	0	
ROW-2/3 (duplicate)		10	0			0.05	0			0.15	0	
ROW-2/10		200	1			0.24	1			0.28	1	
ROW-3/3		10	0			0.05	0			0.15	0	
ROW-3/9		35	1			0.05	0			0.15	0	
ROW-3/12		300	1			0.05	0			0.15	0	
ROW-4/3		10	0			0.05	0			0.15	0	
ROW-4/10		260	1			0.05	0			0.15	0	
ROW-4/11		10	0			0.05	0			0.15	0	
ROW-5/3		10	0			0.05	0			0.15	0	
ROW-5/10		10	0			0.05	0			0.15	0	
ROW-6/3		10	0			0.05	0			0.15	0	
ROW-6/8.5		10	0			0.05	0			0.15	0	
ROW-6/10		10	0			0.05	0			0.15	0	
ROW-7/3		10	0			0.05	0			0.15	0	
ROW-7/8		10	0			0.05	0			0.15	0	
ROW-7/10		10	0			0.05	0			0.15	0	
ROW-7/14		10	0			0.05	0			0.15	0	
ROW-8/3		10	0			0.05	0			0.15	0	
ROW-8/7		10	0			0.05	0			0.15	0	
ROW-8/10		10	0			0.05	0			0.15	0	
ROW-8/14		10	0			0.05	0			0.15	0	
ROW-8/14 (duplicate)		10	0			0.05	0			0.15	0	
ROW-9/3		10	0			0.05	0			0.15	0	
ROW-9/7		10	0			0.05	0			0.15	0	
ROW-9/10		10	0			0.05	0			0.15	0	
ROW-9/15		10	0			0.05	0			0.15	0	
ROW-10/3		10	0			0.05	0			0.15	0	
ROW-10/8		10	0			0.05	0			0.15	0	
ROW-10/10		10	0			0.05	0			0.15	0	
ROW-10/15		10	0			0.05	0			0.15	0	
ROW-10/15 (duplicate)		10	0			0.05	0			0.15	0	

MDLs for ND analytes are listed in the value column - not all MDL results were available
results are in mg/kg

Count	35
Detects	
%detects	
max MRL	
Max detected	
Min detected	

TABLE F-5
Preliminary Screening of Soil Gas
Former Plaid Pantry #324
White Center/King County, Washington

Sample ID	Location	Depth (inches)	Sampling Date	Benzene				Toluene				Ethylbenzene				Total Xylenes				Hexane				1,3,5-Trimethylbenzene				1,2,4-Trimethylbenzene				Gasoline Range Hydrocarbons			
				Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL
SG-1	SG-1	60	3/4/2014		4 8				5 3			<	2.6	U	5.2	<	5	U	10		22			<	2.95	U	5.9	<	2.95	U	5.9		1000		
SG-2	SG-2	60	3/4/2014		6.6				9.1			<	2 55	U	5.1	<	5	U	10		15			<	2.9	U	5.8	<	2.9	U	5.8		940		
SG-3	SG-3	120	3/4/2014		260				5000				1900				13000				1800				1200				3000				82000		
SG-4	SG-4	120	3/4/2014		2400				18000				9300				41000				18000				18000				34000				700000		
SG-5	SG-5	120	3/4/2014		100000				480000				97000				560000				250000				29000				86000				8600000		
SG-6	SG-6	60	3/4/2014		12				16				5.5				29				47			<	2.85	U	5.7	<	2.85	U	5.7		2000		
SG-7	SG-7	60	3/4/2014		8 9				9.4			<	2.6	U	5.2	<	5	U	10		37			<	2.95	U	5.9	<	2.95	U	5.9		1500		

NOTES:
units are ug/m3
all results are reported to MRL only

	Benzene		Toluene		Ethylbenzene		Total Xylenes		Hexane		1,3,5-Trimethylbenzene		1,2,4-Trimethylbenzene		Gasoline Range Hydrocarbons	
	value	qualifier	value	qualifier	value	qualifier	value	qualifier	value	qualifier	value	qualifier	value	qualifier	value	qualifier
	4.8	1	5.3	1	5.2	0	10	0	22	1	5.9	0	5.9	0	1000	1
	6.6	1	9.1	1	5.1	0	10	0	15	1	5.8	0	5.8	0	940	1
	260	1	5000	1	1900	1	13000	1	1800	1	1200	1	3000	1	82000	1
	2400	1	18000	1	9300	1	41000	1	18000	1	18000	1	34000	1	700000	1
	100000	1	480000	1	97000	1	560000	1	250000	1	29000	1	86000	1	8600000	1
	12	1	16	1	5.5	1	29	1	47	1	5.7	0	5.7	0	2000	1
	8.9	1	9.4	1	5.2	0	10	0	37	1	5.9	0	5.9	0	1500	1
COUNT	7		7		7		7		7		7		7		7	
DETECTS	7		7		4		4		7		3		3		7	
% DETECTS	100%		100%		57%		57%		100%		43%		43%		100%	
MAX	100000		480000		97000		560000		250000		29000		86000		8,600,000	
MIN	4.8		5.3		5.1		10		15		5.7		5.7		940	
MEAN	14670 33		71862 83		15460.1		87722.7		38560.1		6889.04		17574.8		1341063	
mean of detects	14670		71863		27051		153507		38560		16067		4100		1341063	
EPC	12		16		43017		560000		250000		16709		44771		8,600,000	
BASIS	MEDIAN		MEDIAN		KM(T)		MAX		MAX		KM(T)		KM(T)		MAX	

TABLE F-6
Preliminary Screening of Soil Gas Near On-Site Building
Former Plaid Pantry #324
White Center/King County, Washington

Sample ID	Location	Depth (inches)	Sampling Date	Benzene				Toluene				Ethylbenzene				Total Xylenes				Hexane				1,3,5-Trimethylbenzene				1,2,4-Trimethylbenzene				Gasoline Range Hydrocarbons			
				Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL	Symbol	value	qualifier	MRL
SG-1	SG-1	60	3/4/2014		4.8				5.3			<	2.6	U	5.2	<	5	U	10		22			<	2.95	U	5.9	<	2.95	U	5.9		1000		
SG-2	SG-2	60	3/4/2014		6.6				9.1			<	2.55	U	5.1	<	5	U	10		15			<	2.9	U	5.8	<	2.9	U	5.8		940		
SG-7	SG-7	60	3/4/2014		8.9				9.4			<	2.6	U	5.2	<	5	U	10		37			<	2.95	U	5.9	<	2.95	U	5.9		1500		

NOTES:
units are ug/m3
all results are reported to MRL only

	Benzene		Toluene		Ethylbenzene		Total Xylenes		Hexane		1,3,5-Trimethylbenzene		1,2,4-Trimethylbenzene		Gasoline Range Hydrocarbons	
	value	qualifier	value	qualifier	value	qualifier	value	Symbol	value	qualifier	value	qualifier	value	qualifier	value	qualifier
	4.8	1	5.3	1	5.2	0	10		22	1	5.9	0	5.9	0	1000	1
	6.6	1	9.1	1	5.1	0	10		15	1	5.8	0	5.8	0	940	1
	8.9	1	9.4	1	5.2	0	10		37	1	5.9	0	5.9	0	1500	1
COUNT	3		3		3		3		3		3		3		3	
DETECTS	3		3		0		0		3		0		0		3	
% DETECTS	100%		100%		0%		0%		100%		0%		0%		100%	
MAX	8.9		9.1		NA		NA		22		NA		NA		1,500	
MIN	4.8		9.4		NA		NA		15		NA		NA		940	
MEAN	6.8		7.9		NA		NA		24.7		NA		NA		1146.7	
mean of detects	NA		NA		NA		NA		NA		NA		NA		NA	
epc	8.9		9.4		NA		NA		24.7		NA		NA		1,500	
BASIS	NA		NA		NA		NA		NA		NA		NA		NA	

TABLE F-7
Chemicals of Interest
Former Plaid Pantry #324
White Center/King County, Washington

COIs	On-Site Surface Soil	On-Site Surface and Subsurface Soil	ROW Surface Soil	ROW Surface and Subsurface Soil	Soil Gas
TPH-G	X	X		X	X
Benzene	X	X			X
Ethylbenzene	X	X		X	X
Toluene	X	X			X
Xylenes	X	X		X	X
Naphthalene	X	X			
Hexane					X
1.3.5-Trimethylbenzene					X
1,2,4-Trimethylbenzene					X

NOTES:

COIs = Chemicals of Interest

ROW = Right of Way

TABLE F-8
Summary of Statistics and Exposure Point Concentrations
Former Plaid Pantry #324
White Center/King County, Washington

Constitutent	Number of samples	Detects	% detects	Maximum concentration (mg/Kg)	Miniumum concentration (mg/Kg)	Mean of Detected	Mean	EPC	Basis
SURFACE SOIL									
Gasoline	21	12	57%	2120	2	541.3	309.71	558.5	KM(BCA)
Benzene	21	7	33%	1.6	0.02	0.694	0.26	0.437	KM(t)
Ethylbenzene	21	8	38%	20	0.02	8.156	3.12	5.622	KM(t)
Toluene	21	9	43%	65	0.02	12.16	5.22	11.03	KM(t)
Xylenes	21	9	43%	250	0.05	72.91	31.28	57.74	KM(t)
Naphthalene	10	3	30%	6.2		2.129	0.66	1.982	KM(t)
SURFACE AND SUBSURFACE SOIL									
Gasoline	92	55	60%	5970	1.25	924.4	553.04	1339	KM (Chebyshev)
Benzene	92	38	41%	11	0.004	2.085	0.87	1.236	KM(t)
Ethylbenzene	92	48	52%	122	0.006	17.62	9.21	23.3	KM (Chebyshev)
Toluene	92	47	51%	170	0.0125	28.74	14.69	37.87	KM (Chebyshev)
Xylenes	92	49	53%	623	0.02	102.5	54.62	132.5	KM (Chebyshev)
Naphthalene	36	11	31%	22	0.05	5.608	1.8	3.103	KM(t)
Lead	5	5	100%	7.95	2.38	3.902	3.9	7.95	MAX
ROW-SURFACE AND SUBSURFACE SOIL									
Gasoline	35	6	17%	780	10	273.7	51.06	99.73	KM(t)
Ethylbenzene	35	2	6%	1.6	0.05	0.92	0.08	0.294	Chebyshev
Xylenes	35	2	6%	3.9	0.15	2.09	0.19	1.193	KM (Chebyshev)
SOIL GAS - All Soil Gas Data									
Benzene	7	7	100%	1.0E+05	4.8	1.5E+04	1.5E+04	1.0E+05	MAX[1]
Toluene	7	7	100%	4.8E+05	5.3	7.2E+04	7.2E+04	4.8E+05	MAX[1]
Ethylbenzene	7	4	57%	9.7E+04	5.1	1.5E+04	2.7E+04	4.3E+04	KM(t)
Total Xylenes	7	4	57%	5.6E+05	10	1.1E+05	1.1E+05	2.0E+05	KM(t)
Hexane	11	11	100%	2.5E+05	15	3.9E+04	3.9E+04	2.5E+05	MAX[1]
1.3.5-trimethylbenzene	7	3	43%	2.9E+04	5.7	6.9E+03	1.6E+04	1.7E+04	KM(t)
1,2,4-trimethylbenzene	7	3	43%	8.6E+04	5.7	4.1E+03	4.5E+04	8.6E+04	KM(t)
TPH-G	7	7	100%	8.6E+06	940	1.3E+06	1.3E+06	8.6E+06	MAX[1]
SOIL GAS - Soil Gas Data Near Building (SG-1, SG-2, SG-7)									
Benzene	3	3	100%	8.9E+00	4.8	6.8E+00	6.8E+00	8.9E+00	MAX
Toluene	3	3	100%	9.1E+00	9.4	7.9E+00	7.9E+00	9.1E+00	MAX
Hexane	3	3	100%	2.2E+01	15	2.5E+01	2.5E+01	2.2E+01	MAX
TPH-G	3	3	100%	1.5E+03	940	1.1E+03	1.1E+03	9.4E+02	MAX

NOTES:

[1] statistically calculated 95 UCL> MAX, therefore per guidance MAX concentration selected for EPC

TABLE F-9

Exposure Assumptions for MTCA Modified Method B

Former Plaid Pantry #324

White Center/King County, Washington

Parameter	Definition	Default Method B[a]	Modified Method B	Units	Comments	Receptors
RfDi	Inhalation Reference Dose	Chemical-Specific	Chemical-Specific	mg/kg-day		Occupational worker, trenchworker, retail customer, highway maintenance worker, construction worker
RfDo	Oral Reference Dose	Chemical-Specific	Chemcal-Specific	mg/kg-day		Occupational worker, trenchworker, retail customer, highway maintenance worker, construction worker
RfDd	Dermal Reference Dose	RfDo* GI	as defined by MTCA	mg/kg-day		Trenchworker, highway maintenance worker, construction worker
CPFi	Inhalation Cancer Potency Factor	Chemical-Specific	Chemical-Specific	kg-day/mg		Occupational worker, trenchworker, retail customer, highway maintenance worker, construction worker
CPFo	Oral Cancer Potency Factor	Chemical-Specific	Chemical-Specific	kg-day/mg		Occupational worker, trenchworker, retail customer, highway maintenance worker, construction worker
CPFd	Dermal Cancer Potentcy Factor	RfDo* GI	as defined by MTCA	mg/kg-day		Trenchworker, highway maintenance worker, construction worker
GI	Gastrointestinal Absorption	0.2 for inorganic; 0.8 for VOCs; all others 0.5	as defined by MTCA B	unitless		Trenchworker, highway maintenance worker, construction worker
ABW	Average Body Weight (nc)	16	16	kg		Retail customer
			70	kg		Occupational worker, trenchworker, highway maintenance, construction worker
ABW	Average Body Weight (c)	16	16	kg		Retail customer
			70			Occupational worker, trenchworker, highway maintenance, construction worker
AT	Averaging Time (nc)	6	AT=ED	yrs	ingestion	Occupational worker,retail customer (ingestion only); trenchworker, construction worker, highway maintenance worker (ingestion and dermal)
					inhalation	
AT	Averaging Time (c)	75	75	yrs		Occupational worker, trenchworker, retail customer, highway maintenance worker, construction worker
UFC2	Unit Conversion Factor	1,000	1,000	ug/mg		Occupational worker, trenchworker, retail customer, highway maintenance worker, construction worker
SIR	Soil Ingestion Rate	200	50	mg/day		Occupational worker, retail customer
			330			Highway maintenance worker, trenchworker, construction worker
AB1	GI Absorption	1	1	unitless		Occupational worker, trenchworker, retail customer, highway maintenance worker, construction worker
UFC1	Unit Conversion Factor	1,000,000	1,000,000	mg/kg		Occupational worker, trenchworker, retail customer, highway maintenance worker, construction worker
BR	Breathing Rate	10	10	m^3/day		Retail customer
			20			Occupational worker
			7			Highway maintenance worker, trenchworker, construction worker
ABS_i	Inhalation Absorption Fraction	1	1	unitless		Occupational worker, trenchworker, retail customer, highway maintenance worker, construction worker
ABSd	Dermal Absoprtion Fraction	0.1 for inorganics; 0.0005 for VOC with vp>benzene; 0.03 for VOC with vp<benzene; 0.1 for all others	as defined by MTCA	unitless		Trenchworker, highway maintenance worker, construction worker

TABLE F-9

Exposure Assumptions for MTCA Modified Method B

Former Plaid Pantry #324

White Center/King County, Washington

Parameter	Definition	Default Method B[a]	Modified Method B	Units	Comments	Receptors
AF	Adherence Factor	0.2	0.3	unitless		Trenchworker, highway maintenance worker, construction worker
SA	Skin Surface Area	2200	3300	cm^2		Trenchworker, highway maintenance worker, construction worker
ED^1	Exposure Duration	6	11	years	urban residential (DEQ)	Retail customer
			25		inhalation/ingestion	Occupational worker
			1			Highway maintenance worker, construction worker, trenchworker
ED^1	Exposure Duration (c)	30	11	years	urban residential (DEQ)	Retail customer
			25		inhalation/ingestion	Occupational worker
			1			Trenchworker, highway maintenance worker, construction worker
ED^2	Exposure Duration (nc/c)	365	52	days/year	4 days/wk * 13 weeks/yr	Retail customer
			250			Occupational worker, construction worker
			9			Highway maintenance worker, trenchworker
ED^3	Exposure Duration (nc/c)		0.025	hours/day		Retail customer
			8			Occupational worker, highway maintenance worker, trenchworker, construction worker
EF	Exposure Frequency	1	1	unitless	ingestion	Occupational worker, trenchworker, retail customer, highway maintenance worker, construction worker
		1			inhalation	
HQ	Hazard Quotient	1	1	unitless		Occupational worker, trenchworker, retail customer, highway maintenance worker, construction worker
RISK	Acceptable Cancer Risk Level	1.00E-06	1.00E-06	unitless		Occupational worker, trenchworker, retail customer, highway maintenance worker, construction worker

NOTES:

[a] Default MTCA B used for residental exposures

ED^1 = Exposure duration (years)

ED^2 = Exposure duration (days/year)

ED^3 = Exposure duration (hours/day)

mg/kg = milligram per kilogram

m^3/day = Cubic meters per day

c = carcinogen

nc = noncarginogen

shaded cells indicate parameters that differ from the MTCA Method B defaults

TABLE F-10
Exposure Point Concentrations
Former Plaid Pantry #324
White Center/King County, Washington

Constitutent	Number of samples	Detects	% detects	Maximum concentration (mg/Kg)	Miniumum concentration (mg/Kg)	Mean of Detected	Mean	EPC	Basis
SURFACE SOIL									
Gasoline	21	12	57%	2120	2	541.3	309.71	558.5	KM(BCA)
Benzene	21	7	33%	1.6	0.02	0.694	0.26	0.437	KM(t)
Ethylbenzene	21	8	38%	20	0.02	8.156	3.12	5.622	KM(t)
Toluene	21	9	43%	65	0.02	12.16	5.22	11.03	KM(t)
Xylenes	21	9	43%	250	0.05	72.91	31.28	57.74	KM(t)
Naphthalene	10	3	30%	6.2		2.129	0.66	1.982	KM(t)
SURFACE AND SUBSURFACE SOIL									
Gasoline	92	55	60%	5970	1.25	924.4	553.04	1339	KM (Chebyshev)
Benzene	92	38	41%	11	0.004	2.085	0.87	1.236	KM(t)
Ethylbenzene	92	48	52%	122	0.006	17.62	9.21	23.3	KM (Chebyshev)
Toluene	92	47	51%	170	0.0125	28.74	14.69	37.87	KM (Chebyshev)
Xylenes	92	49	53%	623	0.02	102.5	54.62	132.5	KM (Chebyshev)
Naphthalene	36	11	31%	22	0.05	5.608	1.8	3.103	KM(t)
ROW-SURFACE AND SUBSURFACE SOIL									
Gasoline	35	6	17%	780	10	273.7	51.06	99.73	KM(t)
Ethylbenzene	35	2	6%	1.6	0.05	0.92	0.08	0.294	Chebyshev
Xylenes	35	2	6%	3.9	0.15	2.09	0.19	1.193	KM (Chebyshev)
SOIL GAS - All Soil Gas Data									
Benzene	7	7	100%	1.0E+05	4.8	1.5E+04	1.5E+04	1.0E+05	MAX[1]
Toluene	7	7	100%	4.8E+05	5.3	7.2E+04	7.2E+04	4.8E+05	MAX[1]
Ethylbenzene	7	4	57%	9.7E+04	5.1	1.5E+04	2.7E+04	4.3E+04	KM(t)
Total Xylenes	7	4	57%	5.6E+05	10	1.1E+05	1.1E+05	2.0E+05	KM(t)
Hexane	11	11	100%	2.5E+05	15	3.9E+04	3.9E+04	2.5E+05	MAX[1]
1,3,5-Trimethylbenzene	7	3	43%	2.9E+04	5.7	6.9E+03	1.6E+04	1.7E+04	KM(t)
1,2,4-Trimethylbenzene	7	3	43%	8.6E+04	5.7	4.1E+03	4.5E+04	8.6E+04	KM(t)
TPH-G	7	7	100%	8.6E+06	940	1.3E+06	1.3E+06	8.6E+06	MAX[1]
SOIL GAS - Soil Gas Data Near Building (SG-1, SG-2, SG-7)									
Benzene	3	3	100%	8.9E+00	4.8	6.8E+00	6.8E+00	8.9E+00	MAX
Toluene	3	3	100%	9.1E+00	9.4	7.9E+00	7.9E+00	9.1E+00	MAX
Hexane	3	3	100%	2.2E+01	15	2.5E+01	2.5E+01	2.2E+01	MAX
TPH-G	3	3	100%	1.5E+03	940	1.1E+03	1.1E+03	9.4E+02	MAX

NOTES:
[1] statistically calculated 95 UCL> MAX, therefore per guidance MAX concentration selected for EPC

TABLE F-11
MTCA Modified Method B CULs
Former Plaid Pantry #324
White Center/King County, Washington

COPC	CASN	c/nc	COFi)	CPFo	IUR	CPFi	RfD	RfC	RfDi	Occupational Worker			Trenchworker			Retail Customer			Highway Maintenance			Construction Worker			**MTCA B DEFAULT**		
										Direct Contact	Vapor Intrusion Pathway		Direct Contact	Vapor Intrusion Pathway		Direct Contact	Vapor Intrusion Pathway		Direct Contact	Vapor Intrusion Pathway		Direct Contact	Vapor Intrusion Pathway		Direct Contact	Vapor Intrusion Pathway	
										Soil[3] (mg/Kg)	Indoor Air CUL[4] (ug/m^3)	Soil Gas CUL[5] (ug/m^3)	Soil (mg/Kg)	Indoor Air CUL (ug/m^3)	Soil Gas CUL (ug/m^3)	Soil (mg/Kg)	Indoor Air CUL (ug/m^3)	Soil Gas CUL (ug/m^3)	Soil (mg/Kg)	Indoor Air CUL (ug/m^3)	Soil Gas CUL (ug/m^3)	Soil (mg/Kg)	Indoor Air CUL (ug/m^3)	Soil Gas CUL (ug/m^3)	Soil (mg/Kg)	Indoor Air CUL (ug/m^3)	Soil Gas CUL (ug/m^3)
1,2-Dibromoethane (EDB)	106-93-4	c	2	2.0E+00	6.0E-04	2.1E+00	9 0E-03		2.6E-03	2.3E+02	2.2E-02	2.2E-01	7.0E+02	NA	NA	8.1E+04	1.8E+01	1.8E+02	7.0E+02	NA	NA	2.5E+01	NA	NA	5.0E-01	4.8E-03	4 8E-02
1,2-Dichloroethane	107-06-2	c	2	9.1E-02	2.6E-05	9.1E-02	2 0E-02	7 0E-03	2.0E-03	5.1E+03	5.1E-01	5.1E+00	1.5E+04	NA	NA	1.8E+06	8.1E+02	8.1E+03	1.5E+04	NA	NA	5.6E+02	NA	NA	1.1E+01	2.2E-01	2.2E+00
Benzene	71-43-2	c	2	5.5E-02	7.8E-06	2.7E-02	4 0E-03		8.6E-03	8.4E+03	1.7E+00	1.7E+01	3.5E+04	NA	NA	2.9E+06	2.7E+03	2.7E+04	3.5E+04	NA	NA	9.2E+02	NA	NA	1 8E+01	7.3E-01	7.3E+00
Ethylbenzene	100-41-4	c	2	1.1E-02	2.5E-06	8 8E-03	1 0E-01		2.9E-01	4.2E+04	5.3E+00	5.3E+01	1.8E+05	NA	NA	1.5E+07	8.4E+03	8.4E+04	1.8E+05	NA	NA	4.6E+03	NA	NA	8 0E+03	2 3E+00	2.3E+01
Hexane		nc					6 0E-02		2.0E-01	3.7E+05	3.1E+03	3.1E+04	1.5E+06	NA	NA	1.3E+08	2.2E+06	2.2E+07	1.5E+06	NA	NA	4.1E+04	NA	NA	4 8E+03	3 2E+02	3.2E+03
Methyl-tert-butyl ether	1634-04-4	c	2	1.8E-03	2.6E-07	9.1E-04			8.6E-01	2.6E+05	5.1E+01	5.1E+02	7.8E+05	NA	NA	9.0E+07	8.1E+04	8.1E+05	7.8E+05	NA	NA	NA	NA	NA	4.4E+02	2 2E+01	2.2E+02
Naphthalene	91-20-3	c	2		3.4E-05	1 2E-01	2 0E-02	3 0E-03	8.6E-04	1.2E+05	0.0E+00	1.3E+02	4.6E+05	NA	NA	4.3E+07	9.3E+03	9.3E+04	4.6E+05	NA	NA	1.4E+04	NA	NA	1 6E+03	1.4E+00	1.4E+01
Xylenes	95-47-6	nc	2				2 0E-01		2.9E-02	1.2E+06	4.4E+02	4.4E+03	5.2E+06	NA	NA	4.3E+08	3.1E+05	3.1E+06	5.2E+06	NA	NA	1.9E+05	NA	NA	1 6E+04	4 6E+01	4.6E+02
Toluene	108-88-3	nc	2				8 0E-02	5.0E+00	1.4E+00	4.9E+05	2.2E+04	2.2E+05	2.1E+06	NA	NA	1.7E+08	1.5E+07	1.5E+08	1.9E+06	NA	NA	5.4E+04	NA	NA	6.4E+03	2 3E+03	2.3E+04
1,2,4-Trimethylbenzene	95-63-6	nc	2						2.0E-03	NA	3.1E+01	3.07E+02	NA	NA	NA	NA	2.2E+04	2.2E+05	NA	NA	NA	NA	NA	NA	NA	NA	3 2E+00	3.2E+01
1,3,5-Trimethylbenzene	108-67-8	nc	2				5 0E-02		1.7E-03	3.1E+05	2.6E+01	2.6E+02	1.3E+06	NA	NA	1.1E+08	1.8E+04	1.8E+05	1.2E+06	NA	NA	3.4E+04	NA	NA	4 0E+03	2.7E+00	2.7E+01
TPH-G[2]		na	2							2.8E+04	1.7E+04	1.7E+05	>MAX	NA	NA	4.8E+04	7.6E+05	7.6E+06	>MAX	NA	NA	6.5E+03	NA	NA	2 9E+03	2 6E+02	2.6E+03

NOTES:

COPC = Chemical of Potential Concern

CASN = Chemical Abstract Service (Registration) Number

IUR = Inhalation Unit Risk (ug/m^3)$^{-1}$

CPF = Inhalation Cancer Potency Factor (mg/kg-day)$^{-1}$

RfC = Inhalation Reference Concentration (ug/m^3)

RfDi = Inhalation Reference Dose (mg/kg-day)

ug/m^3 = Micrograms per cubic meter

mg/kg = Milligrams per kilogram

na = not applicable

>MAX = concentration exceeds maximum saturation level

[1] TPH calculations for soil done using MTCATPH 11.1; TPH calculations for air and soil gas done using RBDMTPH11a

[2] Soil Direct Contact calculated using Equations 740-1 (noncarcinogens) and 740-2 (carcinogens) for occupational workers and retail customers. Soil ingestion and dermal contact calculated using Equations 740-3 (noncarciongens) or 740-4 (carcinogens) for trenchworkers and highway maintenance workers as defined by MTCA

[3] Indoor Air CUL calculated using Equations 750-1(noncarcinogens) or 750-2 (carcinogens) defined by MTCA

Soil Gas CUL = (Indoor Air CUL/0.1)

TABLE F-12
Risk Characterization
Former Plaid Pantry #324
White Center/King County, Washington

COPC	Occupational Worker														
	Direct Contact with Surface Soil				NOTE	Vapor Intrusion via soil gas[1]				NOTE	Vapor Intrusion via soil gas[2]				NOTE
	EPC	MTCA modified B	COC?	Potential Risk		EPC	MTCA modified B	COC?	Potential Risk		EPC	MTCA modified B	COC?	Potential Risk	
Benzene	4.4E-01	8.4E+03	no	5E-11	ECR	1.0E+05	1.7E+01	**YES**	6E-03	ECR	8.9E+00	1.7E+01	no	5E-07	ECR
Ethylbenzene	5.6E+00	4.2E+04	no	1E-10	ECR	4.3E+04	5.3E+01	**YES**	8E-04	ECR	NA	5.3E+01	NA	NA	ECR
Hexane	NA	3.7E+05	NA	NA	HI	2.5E+05	6.1E+04	**YES**	4.1	HI	3.7E+01	6.1E+04	no	0.0	HI
Naphthalene	2.0E+00	1.2E+05	no	0.00002	HI	NA	2.6E+02	NA	NA	NA	NA	2.6E+02	NA	NA	NA
Xylenes	5.8E+01	1.2E+06	no	0.00005	HI	2.0E+05	8.9E+03	**YES**	22.6	HI	NA	8.9E+03	NA	NA	HI
Toluene	1.1E+01	4.9E+05	no	0.00002	HI	4.8E+05	4.4E+05	**YES**	1.1	HI	9.4E+00	4.4E+05	no	0.0	HI
1,2,4-Trimethylbenzene	NA	NA	NA	NA	HI	8.6E+04	6.1E+02	**YES**	140.2	HI	NA	6.1E+02	NA	NA	HI
1,3,5-Trimethylbenzene	NA	3.1E+05	NA	NA	HI	1.7E+04	5.2E+02	**YES**	31.9	HI	NA	5.2E+02	NA	NA	HI
TPH-G[2]	5.6E+02	2.8E+04	no	0.02	HI	8.6E+06	1.7E+05	**YES**	50.6	HI	1.5E+03	1.7E+05	no	0.0	HI

COPC	Retail Customer														
	Direct Contact with Surface Soil				NOTE	Vapor Intrusion via soil gas[1]				NOTE	Vapor Intrusion via soil gas[2]				NOTE
	EPC	MTCA modified B	COC?	Potential Risk		EPC	MTCA modified B	COC?	Potential Risk		EPC	MTCA modified B	COC?	Potential Risk	
Benzene	4.4E-01	2.9E+06	no	1E-13	ECR	1.0E+05	1.3E+03	**YES**	7E-05	ECR	8.9E+00	1.3E+03	no	7E-09	ECR
Ethylbenzene	5.6E+00	1.5E+07	no	4E-13	ECR	4.3E+04	4.2E+03	**YES**	1E-05	ECR	NA	4.2E+03	NA	NA	ECR
Hexane	NA	1.3E+08	NA	NA	HI	2.5E+05	2.2E+06	no	0.12	HI	3.7E+01	2.2E+06	no	0.00	HI
Naphthalene	2.0E+00	4.3E+07	no	5E-08	HI	NA	9.3E+03	NA	NA	HI	NA	9.3E+03	NA	NA	HI
Xylenes	5.8E+01	4.3E+08	no	1E-07	HI	2.0E+05	3.1E+05	no	0.64	HI	NA	3.1E+05	NA	NA	HI
Toluene	1.1E+01	1.7E+08	no	6E-08	HI	4.8E+05	1.5E+07	no	0.03	HI	9.4E+00	1.5E+07	no	0.00	HI
1,2,4-Trimethylbenzene	NA	NA	NA	NA	HI	8.6E+04	2.2E+04	**YES**	4.0	HI	NA	2.2E+04	NA	NA	HI
1,3,5-Trimethylbenzene	NA	1.1E+08	NA	NA	HI	1.7E+04	1.8E+04	no	0.91	HI	NA	1.8E+04	NA	NA	HI
TPH-G[2]	5.6E+02	4.8E+04	no	0.01	HI	8.6E+06	7.6E+05	**YES**	11.3	HI	1.5E+03	7.6E+05	no	0.0	HI

COPC	Construction Worker				
	Ingestion and Dermal Contact with Surface and Subsurface Soil				NOTE
	EPC	MTCA modified B	COC?	Potential Risk	
Benzene	4.4E-01	9.2E+02	no	4.74E-10	ECR
Ethylbenzene	5.6E+00	4.6E+03	no	1.22E-09	ECR
Naphthalene	2.0E+00	1.4E+04	no	0.000147	HI
Xylenes	5.8E+01	1.9E+05	no	0.000311	HI
Toluene	1.1E+01	5.4E+04	no	0.001068	HI
TPH-G[2]	5.6E+02	6.5E+03	no	0.008883	HI

TABLE F-12
Risk Characterization
Former Plaid Pantry #324
White Center/King County, Washington

COPC	Property Trenchworker				
	Ingestion and Dermal Contact with Surface and Subsurface Soil				NOTE
	EPC	MTCA modified B	COC?	Potential Risk	
Benzene	1.2E+00	3.5E+04	no	4E-11	ECR
Ethylbenzene	2.3E+01	1.8E+05	no	1E-10	ECR
Naphthalene	3.1E+00	4.6E+05	no	7E-06	HI
Xylenes	1.3E+02	5.2E+06	no	3E-05	HI
Toluene	3.8E+01	2.1E+06	no	2E-05	HI
TPH-G[2]	1.3E+03	>MAX	no	NA	HI

COPC	ROW Trenchworker				
	Ingestion and Dermal Contact with Surface and				NOTE
	EPC	MTCA modified B	COC?	Potential Risk	
Ethylbenzene	2.3E+01	1.8E+05	no	1E-10	ECR
Xylenes	1.3E+02	5.2E+06	no	3E-05	HI
TPH-G[2]	1.3E+03	>MAX	no	NA	HI

COPC	ROW Maintenance Worker				
	Ingestion and Dermal Contact with ROW Surface and Subsurface Soil				NOTE
	EPC	MTCA modified B	COC?	Potential Risk	
Ethylbenzene	2.9E-01	1.8E+05	no	2E-12	ECR
Xylenes	1.2E+00	5.2E+06	no	2E-07	HI
TPH-G[2]	1.0E+02	>MAX	no	NA	HI

NOTES:

COPC = Chemical of Potential Concern

EPC = Exposure Point Concentration

COC = Chemical of Concern

ROW = Right of Way

ECR = Excess Cancer Risk (carcinogens)

HI = Hazard Index (noncarcinogens)

NA = Not available

>MAX = concentration exceeds maximum saturation limit

[1]Dataset consists of all soil gas data

[2]Dataset consists of soil gas samples near building (SG-1, SG-2, SG-7)

TABLE F-13
Risk Characterization Summary
Former Plaid Pantry #324
White Center/King County, Washington

Receptor	Pathway	ECR	HI
Occupational Worker	Soil Ingestion	2E-10	0.02
	Vapor Intrusion -ALL Soil Gas	**7E-03**	**250**
	Vapor Intrusion	5E-07	0.009
Retail Customer	Soil Ingestion	5E-13	0.01
	Vapor Intrusion -ALL Soil Gas	**8E-05**	**17.0**
	Vapor Intrusion	7E-09	0.002
Construction Worker	Ingestion of and Dermal Contact with Soil	2E-09	0.01
On-Site Trenchworker	Ingestion of and Dermal Contact with Soil	2E-10	0.00005
ROW Trenchworker	Ingestion of and Dermal Contact with Soil	2E-12	0.0000002
ROW Maintenance Worker	Ingestion of and Dermal Contact with Soil	NA	NA

NOTES:

ROW = Right of Way

ECR = Excess Cancer Risk (carcinogens), regulatory standard ECR≤ 1E-06

HI = Hazard Index (noncarcinogens), regulatory standard HI = 1

FIGURES

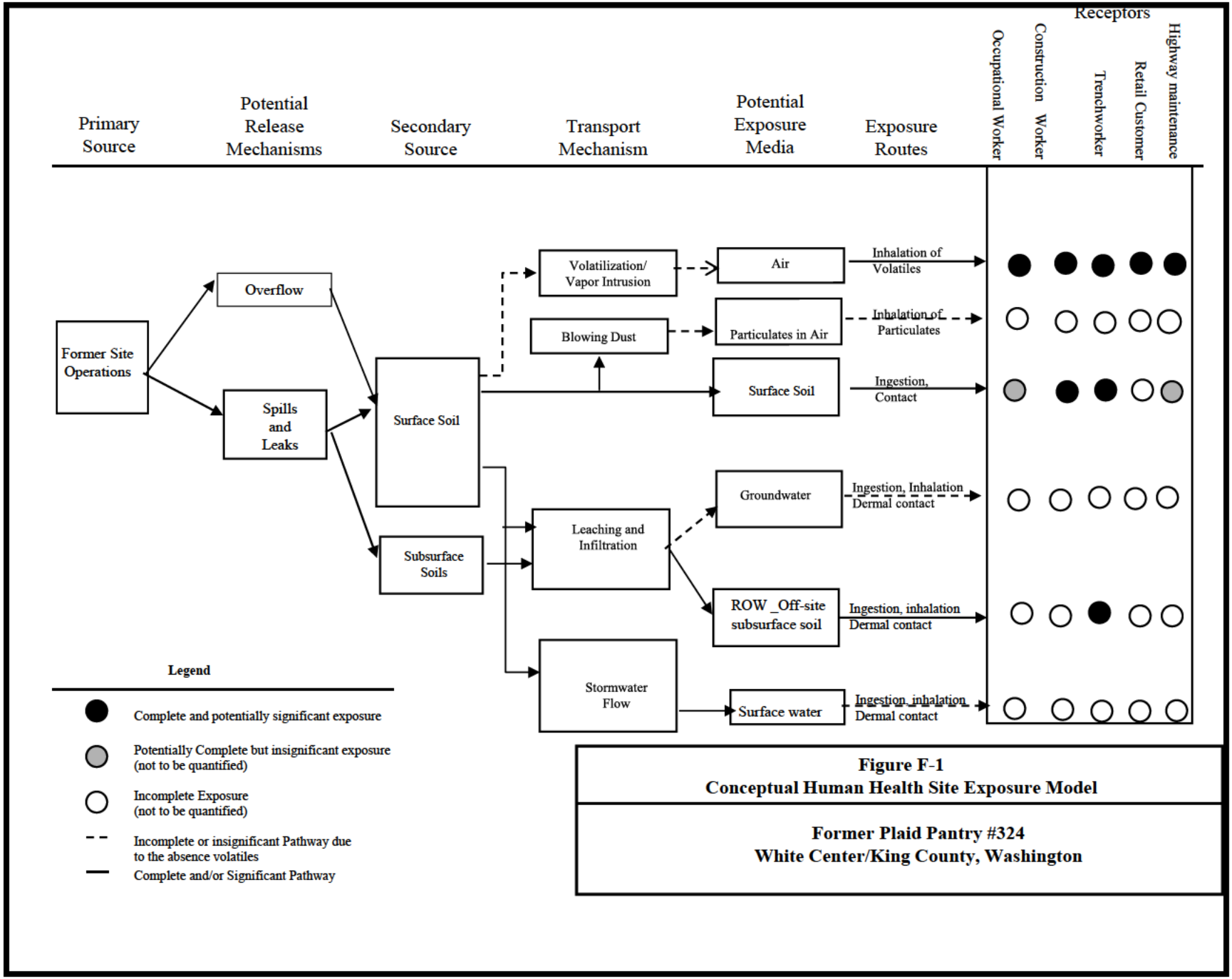

Figure F-1
Conceptual Human Health Site Exposure Model

Former Plaid Pantry #324
White Center/King County, Washington

Attachment A

ATTACHMENT F-A

Total Petroleum Hydrocarbon Calculations - Direct Contact

Former Plaid Pantry #324

White Center/King County, Washington

	B-37	B-39	B-40	B-41
ALIPHATICS				
>5-6	134	26.2	332	98.3
>6-8	256	64.4	392	10.2
>8-10	19.5	60.8	15.2	23.1
>10-12	830	73.4	118	156
>12-16	142	19.7	15.2	43.3
>16-21	33	5.74	2.77	9.82
>21-34	2.65	2.775	2.77	2.72
AROMATICS				
>8-10	193.9	77.5	440.6	247.1
>10-12	536.8	137.95	363.2	489.2
>12-13		54.4	127	284
>12-16	22.8	11.8	11.3	9.37
>16-21	27.6	7.66	7	7.47
>21-34	2.65	2.775	2.77	2.72
Benzene	4.82	0.556	10.6	2.92
Toluene	29.6	9.64	133	70.7
Ethylbenzene	28	14.3	40.3	60.5
Xylenes	205.1	71.2	92.1	360.4
Naphthalene	26.2	6.05	14.8	21.8
1-methyl				
2-methyl				
n-hexane				
MTBE	13	0.231	16.5	8.96
EDB				
EDC				
BaPAnthracene				
B(b)fluoranthene				
B(k)fluoranthene				
BaP				
Chrysene				
Dibenzo (a,h)				
Indeno (1,2,3				
Most stringent direct contact soil concentration	2649.87	2921.79	3661.47	2915.36
	HI=1	HI= 1	ECR=1E-06	HI = 1
units are mg/Kg	ECR = 3E-07	1.00E-07	0.88	

2918.595	median concentration

A2. 1B Worksheet for Calculating Soil Cleanup Levels for Protection of Human Health: (Soil Direct Contact Pathway)

Method B: Unrestricted Land Use (WAC 173-340-740)

Date: 4/18/2014
Site Name: Plaid Pantry #324
Sample Name: B-37

Chemical of Concern or EC group	Current Condition				Adjusted Condition			
	Measured Soil Conc @dry basis	HQ	RISK	Pass or Fail?	Soil Conc being tested	HQ	RISK	Pass or Fail?
	mg/kg	unitless	unitless		mg/kg	unitless	unitless	
Petroleum EC Fraction								
AL_EC >5-6	134	1.07E-03			1.42E+02	1.13E-03		
AL_EC >6-8	256	2.04E-03			2.71E+02	2.15E-03		
AL_EC >8-10	19.5	8.80E-03			2.06E+01	9.29E-03		
AL_EC >10-12	830	3.74E-01			8.77E+02	3.96E-01		
AL_EC >12-16	142	8.52E-02			1.50E+02	9.00E-02		
AL_EC >16-21	33	2.97E-04			3.49E+01	3.14E-04		
AL_EC >21-34	2.65	2.39E-05			2.80E+00	2.52E-05		
AR_EC >8-10	193.9	2.62E-02			2.05E+02	2.77E-02		
AR_EC >10-12	536.8	3.63E-01			5.67E+02	3.84E-01		
AR_EC >12-16	22.8	8.21E-03			2.41E+01	8.67E-03		
AR_EC >16-21	27.6	1.66E-02			2.92E+01	1.75E-02		
AR_EC >21-34	2.65	1.19E-03			2.80E+00	1.26E-03		
Benzene	4.82	1.51E-02	2.65E-07		5.09E+00	1.59E-02	2.80E-07	
Toluene	29.6	4.93E-03			3.13E+01	5.21E-03		
Ethylbenzene	28	3.75E-03			2.96E+01	3.96E-03		
Total Xylenes	205.1	1.38E-02			2.17E+02	1.45E-02		
Naphthalene	26.2	2.16E-02			2.77E+01	2.29E-02		
1-Methyl Naphthalene	0				0.00E+00	0.00E+00		
2-Methyl Naphthalene	0				0.00E+00	0.00E+00		
n-Hexane	0				0.00E+00	0.00E+00		
MTBE	13				1.37E+01			
Ethylene Dibromide (EDB)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0		0.00E+00	*For*	0.00E+00		0.00E+00	*For*
Benzo(b)fluoranthene	0		0.00E+00	*all*	0.00E+00		0.00E+00	*all*
Benzo(k)fluoranthene	0		0.00E+00	*cPAHs*	0.00E+00		0.00E+00	*cPAHs*
Benzo(a)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Chrysene	0		0.00E+00		0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	Σ Risk=	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	**2507.62**	9.46E-01	2.65E-07		2.65E+03	1.00E+00	2.80E-07	

TEST CURRENT CONDITION

Measured TPH Soil Conc, mg/kg= 2507.620
HI= 9.463E-01
RISK= 2.654E-07
Pass or Fail? Pass
Check Residual Saturation (WAC340-747(10))

CALCULATE PROTECTIVE CONDITION

This tool allows the user to calculate protective TPH soil concentration based on various soil quality criteria. The Workbook uses the same composition ratio as for the measured data.

Calculate Protective TPH Soil Conc

Selected Criterion: @HI=1
Most Stringent? YES
Protctive TPH Soil Conc, mg/kg = 2649.87
HI = 1.00E+00
RISK = 2.80E-07

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of human health. The Workbook uses the same composition ratio as for the measured data.

Test Adjusted TPH Soil

Tested TPH Soil Conc, mg/kg =
HI =
RISK =
Pass or Fail?

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 04/18/14
Site Name: Plaid Pantry #324
Sample Name: B-37

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6	134	5.34%
AL_EC >6-8	256	10.21%
AL_EC >8-10	19.5	0.78%
AL_EC >10-12	830	33.10%
AL_EC >12-16	142	5.66%
AL_EC >16-21	33	1.32%
AL_EC >21-34	2.65	0.11%
AR_EC >8-10	193.9	7.73%
AR_EC >10-12	536.8	21.41%
AR_EC >12-16	22.8	0.91%
AR_EC >16-21	27.6	1.10%
AR_EC >21-34	2.65	0.11%
Benzene	4.82	0.19%
Toluene	29.6	1.18%
Ethylbenzene	28	1.12%
Total Xylenes	205.1	8.18%
Naphthalene	26.2	1.04%
1-Methyl Naphthalene		0.00%
2-Methyl Naphthalene		0.00%
n-Hexane		0.00%
MTBE	13	0.52%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene		0.00%
Benzo(b)fluoranthene		0.00%
Benzo(k)fluoranthene		0.00%
Benzo(a)pyrene		0.00%
Chrysene		0.00%
Dibenz(a,h)anthracene		0.00%
Indeno(1,2,3-cd)pyrene		0.00%
Sum	2507.62	100.00%

Notes for Data Entry | Set Default Hydrogeology
Clear All Soil Concentration Data Entry Cells
Restore All Soil Concentration Data cleared

REMARK:
Enter site-specific information here.....

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.001	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here: ug/L

A2. 1B Worksheet for Calculating Soil Cleanup Levels for Protection of Human Health: (Soil Direct Contact Pathway)
Method B: Unrestricted Land Use (WAC 173-340-740)

Date: 4/18/2014
Site Name: Plaid Pantry #324
Sample Name: B-38

Chemical of Concern or EC group	Current Condition				Adjusted Condition			
	Measured Soil Conc @dry basis	HQ	RISK	Pass or Fail?	Soil Conc being tested	HQ	RISK	Pass or Fail?
	mg/kg	unitless	unitless		mg/kg	unitless	unitless	
Petroleum EC Fraction								
AL_EC >5-6	1.12	8.91E-06			7.25E+01	5.77E-04		
AL_EC >6-8	1.12	8.91E-06			7.25E+01	5.77E-04		
AL_EC >8-10	1.12	5.05E-04			7.25E+01	3.27E-02		
AL_EC >10-12	1.12	5.05E-04			7.25E+01	3.27E-02		
AL_EC >12-16	2.705	1.62E-03			1.75E+02	1.05E-01		
AL_EC >16-21	2.705	2.43E-05			1.75E+02	1.58E-03		
AL_EC >21-34	2.705	2.43E-05			1.75E+02	1.58E-03		
AR_EC >8-10	0.559	7.56E-05			3.62E+01	4.90E-03		
AR_EC >10-12	0.8395	5.68E-04			5.44E+01	3.68E-02		
AR_EC >12-16	2.705	9.74E-04			1.75E+02	6.30E-02		
AR_EC >16-21	2.705	1.62E-03			1.75E+02	1.05E-01		
AR_EC >21-34	2.705	1.22E-03			1.75E+02	7.88E-02		
Benzene	0.2805	8.78E-04	1.54E-08		1.82E+01	5.68E-02	1.00E-06	
Toluene	0.2805	4.67E-05			1.82E+01	3.02E-03		
Ethylbenzene	0.2805	3.76E-05			1.82E+01	2.43E-03		
Total Xylenes	0.2805	1.88E-05			1.82E+01	1.22E-03		
Naphthalene	0.2805	2.32E-04			1.82E+01	1.50E-02		
1-Methyl Naphthalene	0				0.00E+00	0.00E+00		
2-Methyl Naphthalene	0				0.00E+00	0.00E+00		
n-Hexane	0				0.00E+00	0.00E+00		
MTBE	0.2805				1.82E+01			
Ethylene Dibromide (EDB)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0		0.00E+00	*For*	0.00E+00		0.00E+00	*For*
Benzo(b)fluoranthene	0		0.00E+00	*all*	0.00E+00		0.00E+00	*all*
Benzo(k)fluoranthene	0		0.00E+00	*cPAHs*	0.00E+00		0.00E+00	*cPAHs*
Benzo(a)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Chrysene	0		0.00E+00		0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	Σ Risk=	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	**23.7915**	8.37E-03	1.54E-08		1.54E+03	5.42E-01	1.00E-06	

TEST CURRENT CONDITION

Measured TPH Soil Conc, mg/kg= 23.792
HI= 8.370E-03
RISK= 1.545E-08
Pass or Fail? Pass

CALCULATE PROTECTIVE CONDITION

This tool allows the user to calculate protective TPH soil concentration based on various soil quality criteria. The Workbook uses the same composition ratio as for the measured data.

Calculate Protective TPH Soil Conc

Selected Criterion: @Benzene Risk=1E-6
Most Stringent? YES
Protctive TPH Soil Conc, mg/kg = 1540.37
HI = 5.42E-01
RISK = 1.00E-06

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of human health. The Workbook uses the same composition ratio as for the measured data.

Test Adjusted TPH Soil

Tested TPH Soil Conc, mg/kg =
HI =
RISK =
Pass or Fail?

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 04/18/14
Site Name: Plaid Pantry #324
Sample Name: B-38

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6	1.12	4.71%
AL_EC >6-8	1.12	4.71%
AL_EC >8-10	1.12	4.71%
AL_EC >10-12	1.12	4.71%
AL_EC >12-16	2.705	11.37%
AL_EC >16-21	2.705	11.37%
AL_EC >21-34	2.705	11.37%
AR_EC >8-10	0.559	2.35%
AR_EC >10-12	0.8395	3.53%
AR_EC >12-16	2.705	11.37%
AR_EC >16-21	2.705	11.37%
AR_EC >21-34	2.705	11.37%
Benzene	0.2805	1.18%
Toluene	0.2805	1.18%
Ethylbenzene	0.2805	1.18%
Total Xylenes	0.2805	1.18%
Naphthalene	0.2805	1.18%
1-Methyl Naphthalene		0.00%
2-Methyl Naphthalene		0.00%
n-Hexane		0.00%
MTBE	0.2805	1.18%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene		0.00%
Benzo(b)fluoranthene		0.00%
Benzo(k)fluoranthene		0.00%
Benzo(a)pyrene		0.00%
Chrysene		0.00%
Dibenz(a,h)anthracene		0.00%
Indeno(1,2,3-cd)pyrene		0.00%
Sum	23.7915	100.00%

Notes for Data Entry | Set Default Hydrogeology
Clear All Soil Concentration Data Entry Cells
Restore All Soil Concentration Data cleared

REMARK:
Enter site-specific information here.....

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.001	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here: ug/L

A2 Soil Cleanup Levels: Calculation and Summary of Results. Refer to WAC 173-340-720, 740, 745, 747, 750

Site Information

Date: 4/18/2014
Site Name: Plaid Pantry #324
Sample Name: B-38
Measured Soil TPH Concentration, mg/kg: **23.792**

1. Summary of Calculation Results

Exposure Pathway	Method/Goal	Protective Soil TPH Conc, mg/kg	With Measured Soil Conc		Does Measured Soil Conc Pass or Fail?
			RISK @	HI @	
Protection of Soil Direct Contact: Human Health	Method B	1,540	1.54E-08	8.37E-03	Pass
	Method C	39,675	2.07E-09	6.00E-04	Pass
Protection of Method B Ground Water Quality (Leaching)	Potable GW: Human Health Protectior	2	6.21E-05	1.86E+00	Fail
	NA	NA	NA	NA	NA

2. Results for Protection of Soil Direct Contact Pathway: Human Health

	Method B: Unrestricted Land Use	Method C: Industrial Land Use
Protective Soil Concentration, TPH mg/kg	**1,540.37**	**39,674.88**
Most Stringent Criterion	**Risk of Benzene= 1E-6**	**HI =1**

Soil Criteria	Protective Soil Concentration @Method B				Protective Soil Concentration @Method C			
	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @
HI =1	*NO*	2.84E+03	1.85E-06	1.00E+00	YES	3.97E+04	3.45E-06	1.00E+00
Total Risk=1E-5	*NO*	1.54E+04	1.00E-05	5.42E+00	*NO*	1.15E+05	1.00E-05	2.90E+00
Risk of Benzene= 1E-6	YES	1.54E+03	1.00E-06	5.42E-01				
Risk of cPAHs mixture= 1E-6	NA	NA	NA	NA				
EDB	NA	NA	NA	NA				
EDC	NA	NA	NA	NA				

NA

3. Results for Protection of Ground Water Quality (Leaching Pathway)

3.1. Protection of Potable Ground Water Quality (Method B): Human Health Protection

Most Stringent Criterion	**Benzene MCL = 5 ug/L**
Protective Ground Water Concentration, ug/L	**31.74**
Protective Soil Concentration, mg/kg	**2.39**

Ground Water Criteria	Protective Potable Ground Water Concentration @Method B				Protective Soil Conc, mg/kg
	Most Stringent?	TPH Conc, ug/L	RISK @	HI @	
HI=1	*NO*	1.62E+02	3.30E-05	1.00E+00	1.26E+01
Total Risk = 1E-5	*NO*	5.04E+01	1.00E-05	3.05E-01	3.80E+00
Total Risk = 1E-6	YES	4.81E+00	1.00E-06	3.01E-02	3.83E-01
Risk of cPAHs mixture= 1E-5	NA	NA	NA	NA	NA
Benzene MCL = 5 ug/L	YES	3.17E+01	6.29E-06	1.92E-01	2.39E+00
MTBE = 20 ug/L	*NO*	9.42E+01	1.89E-05	5.76E-01	7.21E+00

3.2 Protection of Ground Water Quality for TPH Ground Water Concentration previously adjusted and entered

Ground Water Criteria	Protective Ground Water Concentration			Protective Soil Conc, mg/kg
	TPH Conc, ug/L	Risk @	HI @	
NA	NA	NA	NA	**NA**

A2. 1B Worksheet for Calculating Soil Cleanup Levels for Protection of Human Health: (Soil Direct Contact Pathway)

Method B: Unrestricted Land Use (WAC 173-340-740)

Date: 4/18/2014
Site Name: Plaid Pantry #324
Sample Name: B-39

Chemical of Concern or EC group	Current Condition				Adjusted Condition			
	Measured Soil Conc @dry basis	HQ	RISK	Pass or Fail?	Soil Conc being tested	HQ	RISK	Pass or Fail?
	mg/kg	unitless	unitless		mg/kg	unitless	unitless	
Petroleum EC Fraction								
AL_EC >5-6	26.2	2.09E-04			1.21E+02	9.59E-04		
AL_EC >6-8	64.4	5.13E-04			2.96E+02	2.36E-03		
AL_EC >8-10	60.8	2.74E-02			2.80E+02	1.26E-01		
AL_EC >10-12	73.4	3.31E-02			3.38E+02	1.52E-01		
AL_EC >12-16	19.7	1.18E-02			9.06E+01	5.44E-02		
AL_EC >16-21	5.74	5.17E-05			2.64E+01	2.38E-04		
AL_EC >21-34	2.775	2.50E-05			1.28E+01	1.15E-04		
AR_EC >8-10	77.5	1.05E-02			3.56E+02	4.82E-02		
AR_EC >10-12	137.95	9.33E-02			6.34E+02	4.29E-01		
AR_EC >12-16	54.4	1.96E-02			2.50E+02	9.01E-02		
AR_EC >16-21	7.66	4.60E-03			3.52E+01	2.11E-02		
AR_EC >21-34	2.775	1.25E-03			1.28E+01	5.74E-03		
Benzene	0.5556	1.74E-03	3.06E-08		2.56E+00	7.99E-03	1.41E-07	
Toluene	9.64	1.61E-03			4.43E+01	7.38E-03		
Ethylbenzene	14.3	1.92E-03			6.58E+01	8.81E-03		
Total Xylenes	71.2	4.78E-03			3.27E+02	2.20E-02		
Naphthalene	6.05	5.00E-03			2.78E+01	2.30E-02		
1-Methyl Naphthalene	0				0.00E+00	0.00E+00		
2-Methyl Naphthalene	0				0.00E+00	0.00E+00		
n-Hexane	0				0.00E+00	0.00E+00		
MTBE	0.231				1.06E+00			
Ethylene Dibromide (EDB)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0		0.00E+00	*For*	0.00E+00		0.00E+00	*For*
Benzo(b)fluoranthene	0		0.00E+00	*all*	0.00E+00		0.00E+00	*all*
Benzo(k)fluoranthene	0		0.00E+00	*cPAHs*	0.00E+00		0.00E+00	*cPAHs*
Benzo(a)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Chrysene	0		0.00E+00		0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	Σ Risk=	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	**635.2766**	2.17E-01	3.06E-08		2.92E+03	1.00E+00	1.41E-07	

TEST CURRENT CONDITION

Measured TPH Soil Conc, mg/kg= 635.277
HI= 2.174E-01
RISK= 3.059E-08
Pass or Fail? Pass

CALCULATE PROTECTIVE CONDITION

This tool allows the user to calculate protective TPH soil concentration based on various soil quality criteria. The Workbook uses the same composition ratio as for the measured data.

Calculate Protective TPH Soil Conc

Selected Criterion: @HI=1
Most Stringent? YES
Protctive TPH Soil Conc, mg/kg = 2921.79
HI = 1.00E+00
RISK = 1.41E-07

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of human health. The Workbook uses the same composition ratio as for the measured data.

Test Adjusted TPH Soil

Tested TPH Soil Conc, mg/kg = 2921.79
HI = 1.00E+00
RISK = 1.41E-07
Pass or Fail? Pass
Check Residual Saturation (WAC340-747(10))

A2. 1B Worksheet for Calculating Soil Cleanup Levels for Protection of Human Health: (Soil Direct Contact Pathway)
Method B: Unrestricted Land Use (WAC 173-340-740)

Date: 4/18/2014
Site Name: Plaid Pantry #324
Sample Name: B-39

Chemical of Concern or EC group	Current Condition				Adjusted Condition			
	Measured Soil Conc @dry basis	HQ	RISK	Pass or Fail?	Soil Conc being tested	HQ	RISK	Pass or Fail?
	mg/kg	unitless	unitless		mg/kg	unitless	unitless	
Petroleum EC Fraction								
AL_EC >5-6	26.2	2.09E-04			1.21E+02	9.59E-04		
AL_EC >6-8	64.4	5.13E-04			2.96E+02	2.36E-03		
AL_EC >8-10	60.8	2.74E-02			2.80E+02	1.26E-01		
AL_EC >10-12	73.4	3.31E-02			3.38E+02	1.52E-01		
AL_EC >12-16	19.7	1.18E-02			9.06E+01	5.44E-02		
AL_EC >16-21	5.74	5.17E-05			2.64E+01	2.38E-04		
AL_EC >21-34	2.775	2.50E-05			1.28E+01	1.15E-04		
AR_EC >8-10	77.5	1.05E-02			3.56E+02	4.82E-02		
AR_EC >10-12	137.95	9.33E-02			6.34E+02	4.29E-01		
AR_EC >12-16	54.4	1.96E-02			2.50E+02	9.01E-02		
AR_EC >16-21	7.66	4.60E-03			3.52E+01	2.11E-02		
AR_EC >21-34	2.775	1.25E-03			1.28E+01	5.74E-03		
Benzene	0.5556	1.74E-03	3.06E-08		2.56E+00	7.99E-03	1.41E-07	
Toluene	9.64	1.61E-03			4.43E+01	7.38E-03		
Ethylbenzene	14.3	1.92E-03			6.58E+01	8.81E-03		
Total Xylenes	71.2	4.78E-03			3.27E+02	2.20E-02		
Naphthalene	6.05	5.00E-03			2.78E+01	2.30E-02		
1-Methyl Naphthalene	0				0.00E+00	0.00E+00		
2-Methyl Naphthalene	0				0.00E+00	0.00E+00		
n-Hexane	0				0.00E+00	0.00E+00		
MTBE	0.231				1.06E+00			
Ethylene Dibromide (EDB)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0		0.00E+00	*For*	0.00E+00		0.00E+00	*For*
Benzo(b)fluoranthene	0		0.00E+00	*all*	0.00E+00		0.00E+00	*all*
Benzo(k)fluoranthene	0		0.00E+00	*cPAHs*	0.00E+00		0.00E+00	*cPAHs*
Benzo(a)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Chrysene	0		0.00E+00		0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	Σ Risk=	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	**635.2766**	2.17E-01	3.06E-08		2.92E+03	1.00E+00	1.41E-07	

TEST CURRENT CONDITION

Measured TPH Soil Conc, mg/kg= 635.277
HI= 2.174E-01
RISK= 3.059E-08
Pass or Fail? Pass

CALCULATE PROTECTIVE CONDITION

This tool allows the user to calculate protective TPH soil concentration based on various soil quality criteria. The Workbook uses the same composition ratio as for the measured data.

Calculate Protective TPH Soil Conc

Selected Criterion: @HI=1
Most Stringent? YES
Protctive TPH Soil Conc, mg/kg = 2921.79
HI = 1.00E+00
RISK = 1.41E-07

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of human health. The Workbook uses the same composition ratio as for the measured data.

Test Adjusted TPH Soil

Tested TPH Soil Conc, mg/kg =
HI =
RISK =
Pass or Fail?

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 04/18/14
Site Name: Plaid Pantry #324
Sample Name: B-39

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6	26.2	4.12%
AL_EC >6-8	64.4	10.14%
AL_EC >8-10	60.8	9.57%
AL_EC >10-12	73.4	11.55%
AL_EC >12-16	19.7	3.10%
AL_EC >16-21	5.74	0.90%
AL_EC >21-34	2.775	0.44%
AR_EC >8-10	77.5	12.20%
AR_EC >10-12	137.95	21.71%
AR_EC >12-16	54.4	8.56%
AR_EC >16-21	7.66	1.21%
AR_EC >21-34	2.775	0.44%
Benzene	0.5556	0.09%
Toluene	9.64	1.52%
Ethylbenzene	14.3	2.25%
Total Xylenes	71.2	11.21%
Naphthalene	6.05	0.95%
1-Methyl Naphthalene		0.00%
2-Methyl Naphthalene		0.00%
n-Hexane		0.00%
MTBE	0.231	0.04%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene		0.00%
Benzo(b)fluoranthene		0.00%
Benzo(k)fluoranthene		0.00%
Benzo(a)pyrene		0.00%
Chrysene		0.00%
Dibenz(a,h)anthracene		0.00%
Indeno(1,2,3-cd)pyrene		0.00%
Sum	635.2766	100.00%

Notes for Data Entry | Set Default Hydrogeology
Clear All Soil Concentration Data Entry Cells
Restore All Soil Concentration Data cleared

REMARK:
Enter site-specific information here.....

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.001	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here: ug/L

A2. 1B Worksheet for Calculating Soil Cleanup Levels for Protection of Human Health: (Soil Direct Contact Pathway)
Method B: Unrestricted Land Use (WAC 173-340-740)

Date: 4/18/2014
Site Name: Plaid Pantry #324
Sample Name: B-40

Chemical of Concern or EC group	Current Condition				Adjusted Condition			
	Measured Soil Conc @dry basis	HQ	RISK	Pass or Fail?	Soil Conc being tested	HQ	RISK	Pass or Fail?
	mg/kg	unitless	unitless		mg/kg	unitless	unitless	
Petroleum EC Fraction								
AL_EC >5-6	332	2.64E-03			5.69E+02	4.53E-03		
AL_EC >6-8	392	3.12E-03			6.72E+02	5.35E-03		
AL_EC >8-10	15.2	6.86E-03			2.60E+01	1.17E-02		
AL_EC >10-12	118	5.32E-02			2.02E+02	9.12E-02		
AL_EC >12-16	15.2	9.12E-03			2.60E+01	1.56E-02		
AL_EC >16-21	2.77	2.49E-05			4.75E+00	4.27E-05		
AL_EC >21-34	2.77	2.49E-05			4.75E+00	4.27E-05		
AR_EC >8-10	440.6	5.96E-02			7.55E+02	1.02E-01		
AR_EC >10-12	363.2	2.46E-01			6.22E+02	4.21E-01		
AR_EC >12-16	127	4.57E-02			2.18E+02	7.83E-02		
AR_EC >16-21	7	4.20E-03			1.20E+01	7.20E-03		
AR_EC >21-34	2.77	1.25E-03			4.75E+00	2.14E-03		
Benzene	10.6	3.32E-02	5.84E-07		1.82E+01	5.68E-02	1.00E-06	
Toluene	133	2.22E-02			2.28E+02	3.80E-02		
Ethylbenzene	40.3	5.40E-03			6.90E+01	9.25E-03		
Total Xylenes	92.1	6.18E-03			1.58E+02	1.06E-02		
Naphthalene	14.8	1.22E-02			2.54E+01	2.09E-02		
1-Methyl Naphthalene	0				0.00E+00	0.00E+00		
2-Methyl Naphthalene	0				0.00E+00	0.00E+00		
n-Hexane	0				0.00E+00	0.00E+00		
MTBE	16.5				2.83E+01			
Ethylene Dibromide (EDB)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0		0.00E+00	*For*	0.00E+00		0.00E+00	*For*
Benzo(b)fluoranthene	0		0.00E+00	*all*	0.00E+00		0.00E+00	*all*
Benzo(k)fluoranthene	0		0.00E+00	*cPAHs*	0.00E+00		0.00E+00	*cPAHs*
Benzo(a)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Chrysene	0		0.00E+00		0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	Σ Risk=	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	**2125.81**	5.11E-01	5.84E-07		3.64E+03	8.75E-01	1.00E-06	

TEST CURRENT CONDITION

Measured TPH Soil Conc, mg/kg= 2125.810
HI= 5.106E-01
RISK= 5.837E-07
Pass or Fail? Pass
Check Residual Saturation (WAC340-747(10))

CALCULATE PROTECTIVE CONDITION

This tool allows the user to calculate protective TPH soil concentration based on various soil quality criteria. The Workbook uses the same composition ratio as for the measured data.

Calculate Protective TPH Soil Conc

Selected Criterion: @Benzene Risk=1E-6
Most Stringent? YES
Protctive TPH Soil Conc, mg/kg = 3642.11
HI = 8.75E-01
RISK = 1.00E-06

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of human health. The Workbook uses the same composition ratio as for the measured data.

Test Adjusted TPH Soil

Tested TPH Soil Conc, mg/kg = 3642.11
HI = 8.75E-01
RISK = 1.00E-06
Pass or Fail? Pass
Check Residual Saturation (WAC340-747(10))

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 04/18/14
Site Name: Plaid Pantry #324
Sample Name: B-40

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6	332	15.62%
AL_EC >6-8	392	18.44%
AL_EC >8-10	15.2	0.72%
AL_EC >10-12	118	5.55%
AL_EC >12-16	15.2	0.72%
AL_EC >16-21	2.77	0.13%
AL_EC >21-34	2.77	0.13%
AR_EC >8-10	440.6	20.73%
AR_EC >10-12	363.2	17.09%
AR_EC >12-16	127	5.97%
AR_EC >16-21	7	0.33%
AR_EC >21-34	2.77	0.13%
Benzene	10.6	0.50%
Toluene	133	6.26%
Ethylbenzene	40.3	1.90%
Total Xylenes	92.1	4.33%
Naphthalene	14.8	0.70%
1-Methyl Naphthalene		0.00%
2-Methyl Naphthalene		0.00%
n-Hexane		0.00%
MTBE	16.5	0.78%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene		0.00%
Benzo(b)fluoranthene		0.00%
Benzo(k)fluoranthene		0.00%
Benzo(a)pyrene		0.00%
Chrysene		0.00%
Dibenz(a,h)anthracene		0.00%
Indeno(1,2,3-cd)pyrene		0.00%
Sum	2125.81	100.00%

Notes for Data Entry | Set Default Hydrogeology
Clear All Soil Concentration Data Entry Cells
Restore All Soil Concentration Data cleared

REMARK:
Enter site-specific information here.....

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.001	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here: ug/L

A2. 1B Worksheet for Calculating Soil Cleanup Levels for Protection of Human Health: (Soil Direct Contact Pathway)
Method B: Unrestricted Land Use (WAC 173-340-740)

Date: 4/18/2014
Site Name: Plaid Pantry #324
Sample Name: B-41

Chemical of Concern or EC group	Current Condition				Adjusted Condition			
	Measured Soil Conc @dry basis	HQ	RISK	Pass or Fail?	Soil Conc being tested	HQ	RISK	Pass or Fail?
	mg/kg	unitless	unitless		mg/kg	unitless	unitless	
Petroleum EC Fraction								
AL_EC >5-6	98.3	7.82E-04			1.51E+02	1.20E-03		
AL_EC >6-8	10.2	8.12E-05			1.57E+01	1.25E-04		
AL_EC >8-10	23.1	1.04E-02			3.55E+01	1.60E-02		
AL_EC >10-12	156	7.04E-02			2.40E+02	1.08E-01		
AL_EC >12-16	43.3	2.60E-02			6.65E+01	3.99E-02		
AL_EC >16-21	9.82	8.84E-05			1.51E+01	1.36E-04		
AL_EC >21-34	2.72	2.45E-05			4.18E+00	3.76E-05		
AR_EC >8-10	247.1	3.34E-02			3.79E+02	5.13E-02		
AR_EC >10-12	489.2	3.31E-01			7.51E+02	5.08E-01		
AR_EC >12-16	284	1.02E-01			4.36E+02	1.57E-01		
AR_EC >16-21	7.47	4.48E-03			1.15E+01	6.88E-03		
AR_EC >21-34	2.72	1.22E-03			4.18E+00	1.88E-03		
Benzene	2.92	9.14E-03	1.61E-07		4.48E+00	1.40E-02	2.47E-07	
Toluene	70.7	1.18E-02			1.09E+02	1.81E-02		
Ethylbenzene	60.5	8.11E-03			9.29E+01	1.24E-02		
Total Xylenes	360.4	2.42E-02			5.53E+02	3.71E-02		
Naphthalene	21.8	1.80E-02			3.35E+01	2.76E-02		
1-Methyl Naphthalene	0				0.00E+00	0.00E+00		
2-Methyl Naphthalene	0				0.00E+00	0.00E+00		
n-Hexane	0				0.00E+00	0.00E+00		
MTBE	8.96				1.38E+01			
Ethylene Dibromide (EDB)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0		0.00E+00	*For*	0.00E+00		0.00E+00	*For*
Benzo(b)fluoranthene	0		0.00E+00	*all*	0.00E+00		0.00E+00	*all*
Benzo(k)fluoranthene	0		0.00E+00	*cPAHs*	0.00E+00		0.00E+00	*cPAHs*
Benzo(a)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Chrysene	0		0.00E+00		0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	Σ Risk=	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	**1899.21**	6.51E-01	1.61E-07		2.92E+03	1.00E+00	2.47E-07	

TEST CURRENT CONDITION

Measured TPH Soil Conc, mg/kg= 1899.210
HI= 6.513E-01
RISK= 1.608E-07
Pass or Fail? Pass
Check Residual Saturation (WAC340-747(10))

CALCULATE PROTECTIVE CONDITION

This tool allows the user to calculate protective TPH soil concentration based on various soil quality criteria. The Workbook uses the same composition ratio as for the measured data.

Calculate Protective TPH Soil Conc

Selected Criterion: @HI=1
Most Stringent? YES
Protctive TPH Soil Conc, mg/kg = 2916.07
HI = 1.00E+00
RISK = 2.47E-07

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of human health. The Workbook uses the same composition ratio as for the measured data.

Test Adjusted TPH Soil

Tested TPH Soil Conc, mg/kg = 2916.07
HI = 1.00E+00
RISK = 2.47E-07
Pass or Fail? Pass
Check Residual Saturation (WAC340-747(10))

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 04/18/14
Site Name: Plaid Pantry #324
Sample Name: B-41

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6	98.3	5.18%
AL_EC >6-8	10.2	0.54%
AL_EC >8-10	23.1	1.22%
AL_EC >10-12	156	8.21%
AL_EC >12-16	43.3	2.28%
AL_EC >16-21	9.82	0.52%
AL_EC >21-34	2.72	0.14%
AR_EC >8-10	247.1	13.01%
AR_EC >10-12	489.2	25.76%
AR_EC >12-16	284	14.95%
AR_EC >16-21	7.47	0.39%
AR_EC >21-34	2.72	0.14%
Benzene	2.92	0.15%
Toluene	70.7	3.72%
Ethylbenzene	60.5	3.19%
Total Xylenes	360.4	18.98%
Naphthalene	21.8	1.15%
1-Methyl Naphthalene		0.00%
2-Methyl Naphthalene		0.00%
n-Hexane		0.00%
MTBE	8.96	0.47%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene		0.00%
Benzo(b)fluoranthene		0.00%
Benzo(k)fluoranthene		0.00%
Benzo(a)pyrene		0.00%
Chrysene		0.00%
Dibenz(a,h)anthracene		0.00%
Indeno(1,2,3-cd)pyrene		0.00%
Sum	1899.21	100.00%

Notes for Data Entry | Set Default Hydrogeology
Clear All Soil Concentration Data Entry Cells
Restore All Soil Concentration Data cleared

REMARK:
Enter site-specific information here.....

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.001	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here: ug/L

ATTACHMENT A

ProUCL Statistics

ROW Surface and Subsurface Soils

Former Plaid Pantry #324

White Center, King County, Washington

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	4/21/2014 8:34:21 AM
From File	WorkSheet_a.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

TPHG

General Statistics

Total Number of Observations	35	Number of Distinct Observations	7
Number of Detects	6	Number of Non-Detects	29
Number of Distinct Detects	6	Number of Distinct Non-Detects	1
Minimum Detect	35	Minimum Non-Detect	10
Maximum Detect	780	Maximum Non-Detect	10
Variance Detects	72471	Percent Non-Detects	82.86%
Mean Detects	273.7	SD Detects	269.2
Median Detects	230	CV Detects	0.984
Skewness Detects	1.645	Kurtosis Detects	3.19
Mean of Logged Detects	5.164	SD of Logged Detects	1.115

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.834	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.294	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.362	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	55.2	Standard Error of Mean	26.33
SD	142.2	95% KM (BCA) UCL	99.2
95% KM (t) UCL	99.73	95% KM (Percentile Bootstrap) UCL	98.49
95% KM (z) UCL	98.52	95% KM Bootstrap t UCL	124.4
90% KM Chebyshev UCL	134.2	95% KM Chebyshev UCL	170
97.5% KM Chebyshev UCL	219.7	99% KM Chebyshev UCL	317.2

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.245	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.711	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.177	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.339	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.256	k star (bias corrected MLE)	0.739
Theta hat (MLE)	217.9	Theta star (bias corrected MLE)	370.3
nu hat (MLE)	15.07	nu star (bias corrected)	8.869
MLE Mean (bias corrected)	273.7	MLE Sd (bias corrected)	318.3

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.151	nu hat (KM)	10.54
Approximate Chi Square Value (10.54, α)	4.285	Adjusted Chi Square Value (10.54, β)	4.097
95% Gamma Approximate KM-UCL (use when n>=50)	135.8	95% Gamma Adjusted KM-UCL (use when n<50)	142.1

ATTACHMENT A

ProUCL Statistics

ROW Surface and Subsurface Soils

Former Plaid Pantry #324

White Center, King County, Washington

UCL Statistics for Data Sets with Non-Detects

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	46.92
Maximum	780	Median	0.01
SD	147	CV	3.133
k hat (MLE)	0.117	k star (bias corrected MLE)	0.126
Theta hat (MLE)	399.9	Theta star (bias corrected MLE)	371.4
nu hat (MLE)	8.214	nu star (bias corrected)	8.843
MLE Mean (bias corrected)	46.92	MLE Sd (bias corrected)	132
		Adjusted Level of Significance (β)	0.0425
Approximate Chi Square Value (8.84, α)	3.232	Adjusted Chi Square Value (8.84, β)	3.073
95% Gamma Approximate UCL (use when n>=50)	128.4	95% Gamma Adjusted UCL (use when n<50)	135

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.958	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.215	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.362	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	50.51	Mean in Log Scale	0.751
SD in Original Scale	146	SD in Log Scale	2.926
95% t UCL (assumes normality of ROS data)	92.23	95% Percentile Bootstrap UCL	95.49
95% BCA Bootstrap UCL	117.1	95% Bootstrap t UCL	159.8
95% H-UCL (Log ROS)	2285		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	2.793	95% H-UCL (KM -Log)	54.06
KM SD (logged)	1.158	95% Critical H Value (KM-Log)	2.654
KM Standard Error of Mean (logged)	0.214		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	51.06	Mean in Log Scale	2.219
SD in Original Scale	145.6	SD in Log Scale	1.425
95% t UCL (Assumes normality)	92.68	95% H-Stat UCL	53.11

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	99.73	95% KM (Percentile Bootstrap) UCL	98.49

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

Ethylbenzene

General Statistics

Total Number of Observations	35	Number of Distinct Observations	4
Number of Detects	2	Number of Non-Detects	33
Number of Distinct Detects	2	Number of Distinct Non-Detects	2
Minimum Detect	0.24	Minimum Non-Detect	0.025
Maximum Detect	1.6	Maximum Non-Detect	0.05
Variance Detects	0.925	Percent Non-Detects	94.29%
Mean Detects	0.92	SD Detects	0.962
Median Detects	0.92	CV Detects	1.045
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-0.479	SD of Logged Detects	1.341

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only
Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.0761	Standard Error of Mean	0.0631
SD	0.264	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.183	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.18	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.265	95% KM Chebyshev UCL	0.351
97.5% KM Chebyshev UCL	0.47	99% KM Chebyshev UCL	0.704

Gamma GOF Tests on Detected Observations Only
Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	1.409	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.653	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	5.635	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.0833	nu hat (KM)	5.833
		Adjusted Level of Significance (β)	0.0425
Approximate Chi Square Value (5.83, α)	1.555	Adjusted Chi Square Value (5.83, β)	1.453
95% Gamma Approximate KM-UCL (use when n>=50)	0.286	95% Gamma Adjusted KM-UCL (use when n<50)	0.306

Gamma (KM) may not be used when k hat (KM) is < 0.1

Lognormal GOF Test on Detected Observations Only
Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0533	Mean in Log Scale	-12 55
SD in Original Scale	0.272	SD in Log Scale	5.784
95% t UCL (assumes normality of ROS data)	0.131	95% Percentile Bootstrap UCL	0.139
95% BCA Bootstrap UCL	0.229	95% Bootstrap t UCL	5.197
95% H-UCL (Log ROS)	1685765		

ATTACHMENT A

ProUCL Statistics

ROW Surface and Subsurface Soils

Former Plaid Pantry #324

White Center, King County, Washington

UCL Statistics for Data Sets with Non-Detects

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0658	Mean in Log Scale	-4.08
SD in Original Scale	0.27	SD in Log Scale	0.955
95% t UCL (Assumes normality)	0.143	95% H-Stat UCL	0.0395

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (BCA) UCL N/A

Warning: One or more Recommended UCL(s) not available!

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

Xylene

General Statistics

Total Number of Observations	35	Number of Distinct Observations	3
Number of Detects	2	Number of Non-Detects	33
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	0.28	Minimum Non-Detect	0.15
Maximum Detect	3.9	Maximum Non-Detect	0.15
Variance Detects	6.552	Percent Non-Detects	94.29%
Mean Detects	2.09	SD Detects	2.56
Median Detects	2.09	CV Detects	1.225
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	0.044	SD of Logged Detects	1.862

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only
Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.261	Standard Error of Mean	0.149
SD	0.624	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.513	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.506	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.709	95% KM Chebyshev UCL	0.912
97.5% KM Chebyshev UCL	1.193	99% KM Chebyshev UCL	1.746

Gamma GOF Tests on Detected Observations Only
Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.85	k star (bias corrected MLE)	N/A
Theta hat (MLE)	2.46	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	3.398	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.174	nu hat (KM)	12.21
		Adjusted Level of Significance (β)	0.0425
Approximate Chi Square Value (12.21, α)	5.368	Adjusted Chi Square Value (12.21, β)	5.154
95% Gamma Approximate KM-UCL (use when n>=50)	0.594	95% Gamma Adjusted KM-UCL (use when n<50)	0.618

Lognormal GOF Test on Detected Observations Only
Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.12	Mean in Log Scale	-16.75
SD in Original Scale	0.659	SD in Log Scale	8.272
95% t UCL (assumes normality of ROS data)	0.308	95% Percentile Bootstrap UCL	0.342
95% BCA Bootstrap UCL	0.462	95% Bootstrap t UCL	55.7
95% H-UCL (Log ROS)	3.546E+16		

ATTACHMENT A

ProUCL Statistics

ROW Surface and Subsurface Soils

Former Plaid Pantry #324

White Center, King County, Washington

UCL Statistics for Data Sets with Non-Detects

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.19	Mean in Log Scale	-2.44
SD in Original Scale	0.646	SD in Log Scale	0.698
95% t UCL (Assumes normality)	0.375	95% H-Stat UCL	0.143

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL	1.193

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

ATTACHMENT A
ProUCL Statistics
Surface and Subsurface Soils
Former Plaid Pantry #324
White Center/King County, Washington

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	4/21/2014 8:22:41 AM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

TPHG

General Statistics

Total Number of Observations	92	Number of Distinct Observations	52
Number of Detects	55	Number of Non-Detects	37
Number of Distinct Detects	50	Number of Distinct Non-Detects	3
Minimum Detect	2	Minimum Non-Detect	1.25
Maximum Detect	5970	Maximum Non-Detect	2
Variance Detects	2087788	Percent Non-Detects	40.22%
Mean Detects	924.4	SD Detects	1445
Median Detects	120	CV Detects	1.563
Skewness Detects	2.039	Kurtosis Detects	4.125
Mean of Logged Detects	4.926	SD of Logged Detects	2.418

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.687	**Normal GOF Test on Detected Observations Only**	
5% Shapiro Wilk P Value	1.243E-14	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.268	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.119	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	553.1	Standard Error of Mean	125.8
SD	1196	95% KM (BCA) UCL	773
95% KM (t) UCL	762.2	95% KM (Percentile Bootstrap) UCL	763.6
95% KM (z) UCL	760.1	95% KM Bootstrap t UCL	811.1
90% KM Chebyshev UCL	930.6	95% KM Chebyshev UCL	1102
97.5% KM Chebyshev UCL	1339	99% KM Chebyshev UCL	1805

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.585	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.85	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.16	**Kolmogrov-Smirnoff GOF**	
5% K-S Critical Value	0.129	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.353	k star (bias corrected MLE)	0.346
Theta hat (MLE)	2620	Theta star (bias corrected MLE)	2674
nu hat (MLE)	38.81	nu star (bias corrected)	38.03
MLE Mean (bias corrected)	924.4	MLE Sd (bias corrected)	1572

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.214	nu hat (KM)	39.36
Approximate Chi Square Value (39.36, α)	25.99	Adjusted Chi Square Value (39.36, β)	25.81
95% Gamma Approximate KM-UCL (use when n>=50)	837.7	95% Gamma Adjusted KM-UCL (use when n<50)	843.4

ATTACHMENT A
ProUCL Statistics
Surface and Subsurface Soils
Former Plaid Pantry #324
White Center/King County, Washington

UCL Statistics for Data Sets with Non-Detects

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	552.6
Maximum	5970	Median	11
SD	1203	CV	2.176
k hat (MLE)	0.148	k star (bias corrected MLE)	0.15
Theta hat (MLE)	3746	Theta star (bias corrected MLE)	3685
nu hat (MLE)	27.15	nu star (bias corrected)	27.59
MLE Mean (bias corrected)	552.6	MLE Sd (bias corrected)	1427
		Adjusted Level of Significance (β)	0.0474
Approximate Chi Square Value (27.59, α)	16.61	Adjusted Chi Square Value (27.59, β)	16.48
95% Gamma Approximate UCL (use when n>=50)	918	95% Gamma Adjusted UCL (use when n<50)	925.5

Lognormal GOF Test on Detected Observations Only

Lilliefors Test Statistic	0.151	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.119	Detected Data Not Lognormal at 5% Significance Level	

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	553.1	Mean in Log Scale	2.562
SD in Original Scale	1203	SD in Log Scale	3.642
95% t UCL (assumes normality of ROS data)	761.4	95% Percentile Bootstrap UCL	751.4
95% BCA Bootstrap UCL	804	95% Bootstrap t UCL	835
95% H-UCL (Log ROS)	84032		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	553	Mean in Log Scale	2.936
SD in Original Scale	1203	SD in Log Scale	3.069
95% t UCL (Assumes normality)	761.4	95% H-Stat UCL	9884

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL	1339

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

ATTACHMENT A
ProUCL Statistics
Surface and Subsurface Soils
Former Plaid Pantry #324
White Center/King County, Washington

UCL Statistics for Data Sets with Non-Detects

Benzene

General Statistics

Total Number of Observations	92	Number of Distinct Observations	38
Number of Detects	38	Number of Non-Detects	54
Number of Distinct Detects	35	Number of Distinct Non-Detects	6
Minimum Detect	0.014	Minimum Non-Detect	0.00351
Maximum Detect	11	Maximum Non-Detect	0.8
Variance Detects	8.439	Percent Non-Detects	58.7%
Mean Detects	2.085	SD Detects	2.905
Median Detects	0.83	CV Detects	1.393
Skewness Detects	1.847	Kurtosis Detects	2.503
Mean of Logged Detects	-0 296	SD of Logged Detects	1.683

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.697	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.938	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.29	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.144	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.866	Standard Error of Mean	0.223
SD	2.107	95% KM (BCA) UCL	1.251
95% KM (t) UCL	1.236	95% KM (Percentile Bootstrap) UCL	1.247
95% KM (z) UCL	1.232	95% KM Bootstrap t UCL	1.368
90% KM Chebyshev UCL	1.534	95% KM Chebyshev UCL	1.837
97.5% KM Chebyshev UCL	2.257	99% KM Chebyshev UCL	3.081

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.678	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.803	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.131	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.15	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.6	k star (bias corrected MLE)	0.57
Theta hat (MLE)	3.477	Theta star (bias corrected MLE)	3.659
nu hat (MLE)	45.56	nu star (bias corrected)	43.3
MLE Mean (bias corrected)	2.085	MLE Sd (bias corrected)	2.762

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.169	nu hat (KM)	31.1
Approximate Chi Square Value (31.10, α)	19.36	Adjusted Chi Square Value (31.10, β)	19.21
95% Gamma Approximate KM-UCL (use when n>=50)	1.392	95% Gamma Adjusted KM-UCL (use when n<50)	1.402

ATTACHMENT A
ProUCL Statistics
Surface and Subsurface Soils
Former Plaid Pantry #324
White Center/King County, Washington

UCL Statistics for Data Sets with Non-Detects

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.867
Maximum	11	Median	0.01
SD	2.118	CV	2.443
k hat (MLE)	0.263	k star (bias corrected MLE)	0.261
Theta hat (MLE)	3.301	Theta star (bias corrected MLE)	3.317
nu hat (MLE)	48.33	nu star (bias corrected)	48.09
MLE Mean (bias corrected)	0.867	MLE Sd (bias corrected)	1.696
		Adjusted Level of Significance (β)	0.0474
Approximate Chi Square Value (48.09, α)	33.17	Adjusted Chi Square Value (48.09, β)	32.97
95% Gamma Approximate UCL (use when n>=50)	1.257	95% Gamma Adjusted UCL (use when n<50)	1.264

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.953	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.938	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.119	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.144	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.874	Mean in Log Scale	-2.923
SD in Original Scale	2.116	SD in Log Scale	2.764
95% t UCL (assumes normality of ROS data)	1.24	95% Percentile Bootstrap UCL	1.273
95% BCA Bootstrap UCL	1.345	95% Bootstrap t UCL	1.385
95% H-UCL (Log ROS)	8.775		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-3.152	95% H-UCL (KM -Log)	5.17
KM SD (logged)	2.68	95% Critical H Value (KM-Log)	4.29
KM Standard Error of Mean (logged)	0.357		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.873	Mean in Log Scale	-2.676
SD in Original Scale	2.116	SD in Log Scale	2.331
95% t UCL (Assumes normality)	1.24	95% H-Stat UCL	2.652

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	1.236	95% GROS Approximate Gamma UCL	1.257
95% Approximate Gamma KM-UCL	1.392		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

Ethylbenzene

General Statistics

Total Number of Observations	92	Number of Distinct Observations	45
Number of Detects	48	Number of Non-Detects	44
Number of Distinct Detects	40	Number of Distinct Non-Detects	5
Minimum Detect	0.059	Minimum Non-Detect	0.00625
Maximum Detect	122	Maximum Non-Detect	0.05
Variance Detects	746.6	Percent Non-Detects	47.83%
Mean Detects	17.63	SD Detects	27.32
Median Detects	2	CV Detects	1.55
Skewness Detects	2.22	Kurtosis Detects	5.405
Mean of Logged Detects	0.983	SD of Logged Detects	2.419

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.691	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.947	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.26	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.128	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	9.203	Standard Error of Mean	2.257
SD	21.42	95% KM (BCA) UCL	12.97
95% KM (t) UCL	12.95	95% KM (Percentile Bootstrap) UCL	13.32
95% KM (z) UCL	12.92	95% KM Bootstrap t UCL	14.45
90% KM Chebyshev UCL	15.97	95% KM Chebyshev UCL	19.04
97.5% KM Chebyshev UCL	23.3	99% KM Chebyshev UCL	31.66

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.768	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.849	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.205	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.138	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.355	k star (bias corrected MLE)	0.347
Theta hat (MLE)	49.61	Theta star (bias corrected MLE)	50.8
nu hat (MLE)	34.12	nu star (bias corrected)	33.32
MLE Mean (bias corrected)	17.63	MLE Sd (bias corrected)	29.93

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.185	nu hat (KM)	33.96
Approximate Chi Square Value (33.96, α)	21.63	Adjusted Chi Square Value (33.96, β)	21.47
95% Gamma Approximate KM-UCL (use when n>=50)	14.45	95% Gamma Adjusted KM-UCL (use when n<50)	14.55

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UCL Statistics for Data Sets with Non-Detects

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	9.205
Maximum	122	Median	0.06
SD	21.54	CV	2.34
k hat (MLE)	0.19	k star (bias corrected MLE)	0.191
Theta hat (MLE)	48.5	Theta star (bias corrected MLE)	48.23
nu hat (MLE)	34.92	nu star (bias corrected)	35.11
MLE Mean (bias corrected)	9.205	MLE Sd (bias corrected)	21.07
		Adjusted Level of Significance (β)	0.0474
Approximate Chi Square Value (35.11, α)	22.56	Adjusted Chi Square Value (35.11, β)	22.4
95% Gamma Approximate UCL (use when n>=50)	14.33	95% Gamma Adjusted UCL (use when n<50)	14.43

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.893	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.947	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.17	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.128	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	9.209	Mean in Log Scale	-1.939
SD in Original Scale	21.54	SD in Log Scale	3.785
95% t UCL (assumes normality of ROS data)	12.94	95% Percentile Bootstrap UCL	13.07
95% BCA Bootstrap UCL	13.8	95% Bootstrap t UCL	14.22
95% H-UCL (Log ROS)	1873		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	9.209	Mean in Log Scale	-1.472
SD in Original Scale	21.54	SD in Log Scale	3.135
95% t UCL (Assumes normality)	12.94	95% H-Stat UCL	157

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL	23.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
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UCL Statistics for Data Sets with Non-Detects

Toluene

General Statistics

Total Number of Observations	92	Number of Distinct Observations	45
Number of Detects	47	Number of Non-Detects	45
Number of Distinct Detects	41	Number of Distinct Non-Detects	4
Minimum Detect	0.03	Minimum Non-Detect	0.0125
Maximum Detect	170	Maximum Non-Detect	0.05
Variance Detects	2070	Percent Non-Detects	48.91%
Mean Detects	28.74	SD Detects	45.5
Median Detects	4.2	CV Detects	1.583
Skewness Detects	1.86	Kurtosis Detects	2.625
Mean of Logged Detects	1.516	SD of Logged Detects	2.357

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.677	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.946	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.265	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.129	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	14.69	Standard Error of Mean	3.713
SD	35.23	95% KM (BCA) UCL	21.48
95% KM (t) UCL	20.86	95% KM (Percentile Bootstrap) UCL	20.94
95% KM (z) UCL	20.79	95% KM Bootstrap t UCL	23.28
90% KM Chebyshev UCL	25.83	95% KM Chebyshev UCL	30.87
97.5% KM Chebyshev UCL	37.87	99% KM Chebyshev UCL	51.63

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.184	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.847	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.165	**Kolmogrov-Smirnoff GOF**	
5% K-S Critical Value	0.139	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.363	k star (bias corrected MLE)	0.354
Theta hat (MLE)	79.17	Theta star (bias corrected MLE)	81.18
nu hat (MLE)	34.12	nu star (bias corrected)	33.27
MLE Mean (bias corrected)	28.74	MLE Sd (bias corrected)	48.3

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.174	nu hat (KM)	31.97
Approximate Chi Square Value (31.97, α)	20.05	Adjusted Chi Square Value (31.97, β)	19.9
95% Gamma Approximate KM-UCL (use when n>=50)	23.42	95% Gamma Adjusted KM-UCL (use when n<50)	23.6

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UCL Statistics for Data Sets with Non-Detects

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	14.69
Maximum	170	Median	0.0475
SD	35.43	CV	2.412
k hat (MLE)	0.18	k star (bias corrected MLE)	0.181
Theta hat (MLE)	81.74	Theta star (bias corrected MLE)	81.12
nu hat (MLE)	33.06	nu star (bias corrected)	33.31
MLE Mean (bias corrected)	14.69	MLE Sd (bias corrected)	34.51
		Adjusted Level of Significance (β)	0.0474
Approximate Chi Square Value (33.31, α)	21.11	Adjusted Chi Square Value (33.31, β)	20.96
95% Gamma Approximate UCL (use when n>=50)	23.17	95% Gamma Adjusted UCL (use when n<50)	23.34

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.944	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.946	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.109	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.129	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	14.7	Mean in Log Scale	-1.452
SD in Original Scale	35.42	SD in Log Scale	3.759
95% t UCL (assumes normality of ROS data)	20.83	95% Percentile Bootstrap UCL	21.14
95% BCA Bootstrap UCL	22.75	95% Bootstrap t UCL	22.68
95% H-UCL (Log ROS)	2674		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-1 354	95% H-UCL (KM -Log)	492.9
KM SD (logged)	3.376	95% Critical H Value (KM-Log)	5.247
KM Standard Error of Mean (logged)	0.356		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	14.69	Mean in Log Scale	-1.207
SD in Original Scale	35.42	SD in Log Scale	3.279
95% t UCL (Assumes normality)	20.83	95% H-Stat UCL	374.9

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL	37.87

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

Xylene

General Statistics

Total Number of Observations	92	Number of Distinct Observations	49
Number of Detects	49	Number of Non-Detects	43
Number of Distinct Detects	45	Number of Distinct Non-Detects	4
Minimum Detect	0.1	Minimum Non-Detect	0.0188
Maximum Detect	623	Maximum Non-Detect	0.15
Variance Detects	21843	Percent Non-Detects	46.74%
Mean Detects	102.5	SD Detects	147.8
Median Detects	11	CV Detects	1.442
Skewness Detects	1.838	Kurtosis Detects	3.618
Mean of Logged Detects	2.571	SD of Logged Detects	2.622

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.726	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.947	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.272	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.127	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	54.6	Standard Error of Mean	12.47
SD	118.4	95% KM (BCA) UCL	76.53
95% KM (t) UCL	75.32	95% KM (Percentile Bootstrap) UCL	75.43
95% KM (z) UCL	75.11	95% KM Bootstrap t UCL	81.63
90% KM Chebyshev UCL	92	95% KM Chebyshev UCL	108.9
97.5% KM Chebyshev UCL	132.5	99% KM Chebyshev UCL	178.7

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.221	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.855	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.224	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.137	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.33	k star (bias corrected MLE)	0.323
Theta hat (MLE)	310.8	Theta star (bias corrected MLE)	317.1
nu hat (MLE)	32.32	nu star (bias corrected)	31.67
MLE Mean (bias corrected)	102.5	MLE Sd (bias corrected)	180.3

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.213	nu hat (KM)	39.15
Approximate Chi Square Value (39.15, α)	25.82	Adjusted Chi Square Value (39.15, β)	25.65
95% Gamma Approximate KM-UCL (use when n>=50)	82.79	95% Gamma Adjusted KM-UCL (use when n<50)	83.35

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UCL Statistics for Data Sets with Non-Detects

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	54.59
Maximum	623	Median	0.302
SD	119	CV	2.18
k hat (MLE)	0.159	k star (bias corrected MLE)	0.161
Theta hat (MLE)	342.8	Theta star (bias corrected MLE)	338.4
nu hat (MLE)	29.31	nu star (bias corrected)	29.68
MLE Mean (bias corrected)	54.59	MLE Sd (bias corrected)	135.9
		Adjusted Level of Significance (β)	0.0474
Approximate Chi Square Value (29.68, α)	18.25	Adjusted Chi Square Value (29.68, β)	18.1
95% Gamma Approximate UCL (use when n>=50)	88.82	95% Gamma Adjusted UCL (use when n<50)	89.52

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.887	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.947	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.205	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.127	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	54.62	Mean in Log Scale	-0.459
SD in Original Scale	119	SD in Log Scale	4.036
95% t UCL (assumes normality of ROS data)	75.24	95% Percentile Bootstrap UCL	75.65
95% BCA Bootstrap UCL	78.52	95% Bootstrap t UCL	80.84
95% H-UCL (Log ROS)	29738		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	54.61	Mean in Log Scale	-0.0442
SD in Original Scale	119	SD in Log Scale	3.413
95% t UCL (Assumes normality)	75.23	95% H-Stat UCL	2158

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL	132.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

Naphthalene

General Statistics

Total Number of Observations	36	Number of Distinct Observations	12
Number of Detects	11	Number of Non-Detects	25
Number of Distinct Detects	10	Number of Distinct Non-Detects	2
Minimum Detect	0.057	Minimum Non-Detect	0.05
Maximum Detect	22	Maximum Non-Detect	5
Variance Detects	51.99	Percent Non-Detects	69.44%
Mean Detects	5.608	SD Detects	7.211
Median Detects	1	CV Detects	1.286
Skewness Detects	1.308	Kurtosis Detects	1.285
Mean of Logged Detects	0.187	SD of Logged Detects	2.26

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.798	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.85	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.284	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.267	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	1.75	Standard Error of Mean	0.801
SD	4.582	95% KM (BCA) UCL	3.332
95% KM (t) UCL	3.103	95% KM (Percentile Bootstrap) UCL	3.13
95% KM (z) UCL	3.067	95% KM Bootstrap t UCL	4.227
90% KM Chebyshev UCL	4.152	95% KM Chebyshev UCL	5.241
97.5% KM Chebyshev UCL	6.751	99% KM Chebyshev UCL	9.719

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.609	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.796	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.223	**Kolmogrov-Smirnoff GOF**	
5% K-S Critical Value	0.272	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.424	k star (bias corrected MLE)	0.369
Theta hat (MLE)	13.22	Theta star (bias corrected MLE)	15.2
nu hat (MLE)	9.33	nu star (bias corrected)	8.119
MLE Mean (bias corrected)	5.608	MLE Sd (bias corrected)	9.231

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.146	nu hat (KM)	10.5
Approximate Chi Square Value (10.50, α)	4.256	Adjusted Chi Square Value (10.50, β)	4.076
95% Gamma Approximate KM-UCL (use when n>=50)	4.316	95% Gamma Adjusted KM-UCL (use when n<50)	4.506

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UCL Statistics for Data Sets with Non-Detects

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	1.72
Maximum	22	Median	0.01
SD	4.658	CV	2.707
k hat (MLE)	0.2	k star (bias corrected MLE)	0.202
Theta hat (MLE)	8.61	Theta star (bias corrected MLE)	8.53
nu hat (MLE)	14.39	nu star (bias corrected)	14.52
MLE Mean (bias corrected)	1.72	MLE Sd (bias corrected)	3.831
		Adjusted Level of Significance (β)	0.0428
Approximate Chi Square Value (14.52, α)	6.93	Adjusted Chi Square Value (14.52, β)	6.692
95% Gamma Approximate UCL (use when n>=50)	3.605	95% Gamma Adjusted UCL (use when n<50)	3.733

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.88	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.22	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.267	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.718	Mean in Log Scale	-4.92
SD in Original Scale	4.658	SD in Log Scale	4.363
95% t UCL (assumes normality of ROS data)	3.03	95% Percentile Bootstrap UCL	3.131
95% BCA Bootstrap UCL	3.602	95% Bootstrap t UCL	4.22
95% H-UCL (Log ROS)	23298		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-2.016	95% H-UCL (KM -Log)	2.467
KM SD (logged)	1.889	95% Critical H Value (KM-Log)	3.554
KM Standard Error of Mean (logged)	0.331		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.8	Mean in Log Scale	-2.377
SD in Original Scale	4.646	SD in Log Scale	2.239
95% t UCL (Assumes normality)	3.108	95% H-Stat UCL	5.316

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	3.103	95% GROS Adjusted Gamma UCL	3.733
95% Adjusted Gamma KM-UCL	4.506		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
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UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	4/21/2014 7:21:47 AM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

TPHG

General Statistics

Total Number of Observations	21	Number of Distinct Observations	11
Number of Detects	12	Number of Non-Detects	9
Number of Distinct Detects	11	Number of Distinct Non-Detects	1
Minimum Detect	2	Minimum Non-Detect	2
Maximum Detect	2120	Maximum Non-Detect	2
Variance Detects	549253	Percent Non-Detects	42.86%
Mean Detects	541.3	SD Detects	741.1
Median Detects	102	CV Detects	1.369
Skewness Detects	1.185	Kurtosis Detects	0.0974
Mean of Logged Detects	4.47	SD of Logged Detects	2.543

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.762	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.289	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.256	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	310.1	Standard Error of Mean	136.5
SD	599.1	95% KM (BCA) UCL	558.5
95% KM (t) UCL	545.6	95% KM (Percentile Bootstrap) UCL	540
95% KM (z) UCL	534.7	95% KM Bootstrap t UCL	674.5
90% KM Chebyshev UCL	719.8	95% KM Chebyshev UCL	905.3
97.5% KM Chebyshev UCL	1163	99% KM Chebyshev UCL	1669

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.449	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.811	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.169	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.263	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.366	k star (bias corrected MLE)	0.33
Theta hat (MLE)	1479	Theta star (bias corrected MLE)	1640
nu hat (MLE)	8.784	nu star (bias corrected)	7.921
MLE Mean (bias corrected)	541.3	MLE Sd (bias corrected)	942.1

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.268	nu hat (KM)	11.26
Approximate Chi Square Value (11.26, α)	4.741	Adjusted Chi Square Value (11.26, β)	4.419
95% Gamma Approximate KM-UCL (use when n>=50)	736.3	95% Gamma Adjusted KM-UCL (use when n<50)	789.9

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UCL Statistics for Data Sets with Non-Detects

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	309.3
Maximum	2120	Median	2
SD	614.3	CV	1.986
k hat (MLE)	0.149	k star (bias corrected MLE)	0.16
Theta hat (MLE)	2072	Theta star (bias corrected MLE)	1937
nu hat (MLE)	6.268	nu star (bias corrected)	6.706
MLE Mean (bias corrected)	309.3	MLE Sd (bias corrected)	774
		Adjusted Level of Significance (β)	0.0383
Approximate Chi Square Value (6.71, α)	2.011	Adjusted Chi Square Value (6.71, β)	1.82
95% Gamma Approximate UCL (use when n>=50)	1032	95% Gamma Adjusted UCL (use when n<50)	1140

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.916	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.164	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.256	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	309.4	Mean in Log Scale	1.594
SD in Original Scale	614.3	SD in Log Scale	4.106
95% t UCL (assumes normality of ROS data)	540.6	95% Percentile Bootstrap UCL	553.6
95% BCA Bootstrap UCL	576.9	95% Bootstrap t UCL	701.8
95% H-UCL (Log ROS)	32584257		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	2.851	95% H-UCL (KM -Log)	11615
KM SD (logged)	2.623	95% Critical H Value (KM-Log)	5.231
KM Standard Error of Mean (logged)	0.598		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	309.7	Mean in Log Scale	2.554
SD in Original Scale	614.1	SD in Log Scale	2.949
95% t UCL (Assumes normality)	540.8	95% H-Stat UCL	45946

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (BCA) UCL	558.5	95% GROS Adjusted Gamma UCL	1140
95% Adjusted Gamma KM-UCL	789.9		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

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UCL Statistics for Data Sets with Non-Detects

Benzene

General Statistics

Total Number of Observations	21	Number of Distinct Observations	9
Number of Detects	7	Number of Non-Detects	14
Number of Distinct Detects	6	Number of Distinct Non-Detects	3
Minimum Detect	0.06	Minimum Non-Detect	0.02
Maximum Detect	1.6	Maximum Non-Detect	0.8
Variance Detects	0.412	Percent Non-Detects	66.67%
Mean Detects	0.694	SD Detects	0.642
Median Detects	0.34	CV Detects	0.924
Skewness Detects	0.684	Kurtosis Detects	-1.639
Mean of Logged Detects	-0.866	SD of Logged Detects	1.193

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.838	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.281	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.335	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.247	Standard Error of Mean	0.11
SD	0.467	95% KM (BCA) UCL	0.421
95% KM (t) UCL	0.437	95% KM (Percentile Bootstrap) UCL	0.427
95% KM (z) UCL	0.428	95% KM Bootstrap t UCL	0.578
90% KM Chebyshev UCL	0.578	95% KM Chebyshev UCL	0.727
97.5% KM Chebyshev UCL	0.935	99% KM Chebyshev UCL	1.344

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.372	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.726	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.208	**Kolmogrov-Smirnoff GOF**	
5% K-S Critical Value	0.319	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.136	k star (bias corrected MLE)	0.744
Theta hat (MLE)	0.611	Theta star (bias corrected MLE)	0.933
nu hat (MLE)	15.9	nu star (bias corrected)	10.42
MLE Mean (bias corrected)	0.694	MLE Sd (bias corrected)	0.805

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.279	nu hat (KM)	11.74
Approximate Chi Square Value (11.74, α)	5.054	Adjusted Chi Square Value (11.74, β)	4.72
95% Gamma Approximate KM-UCL (use when n>=50)	0.573	95% Gamma Adjusted KM-UCL (use when n<50)	0.614

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UCL Statistics for Data Sets with Non-Detects

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.238
Maximum	1.6	Median	0.01
SD	0.482	CV	2.026
k hat (MLE)	0.35	k star (bias corrected MLE)	0.331
Theta hat (MLE)	0.681	Theta star (bias corrected MLE)	0.718
nu hat (MLE)	14.68	nu star (bias corrected)	13.92
MLE Mean (bias corrected)	0.238	MLE Sd (bias corrected)	0.414
		Adjusted Level of Significance (β)	0.0383
Approximate Chi Square Value (13.92, α)	6.516	Adjusted Chi Square Value (13.92, β)	6.13
95% Gamma Approximate UCL (use when n>=50)	0.509	95% Gamma Adjusted UCL (use when n<50)	0.541

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.921	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.167	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.335	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.244	Mean in Log Scale	-3.281
SD in Original Scale	0.48	SD in Log Scale	2.109
95% t UCL (assumes normality of ROS data)	0.425	95% Percentile Bootstrap UCL	0.428
95% BCA Bootstrap UCL	0.476	95% Bootstrap t UCL	0.638
95% H-UCL (Log ROS)	2.679		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-2.872	95% H-UCL (KM -Log)	0.653
KM SD (logged)	1.574	95% Critical H Value (KM-Log)	3.43
KM Standard Error of Mean (logged)	0.375		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.259	Mean in Log Scale	-3.029
SD in Original Scale	0.48	SD in Log Scale	1.859
95% t UCL (Assumes normality)	0.439	95% H-Stat UCL	1.38

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.437	95% KM (Percentile Bootstrap) UCL	0.427

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

Ethylbenzene

General Statistics

Total Number of Observations	21	Number of Distinct Observations	9
Number of Detects	8	Number of Non-Detects	13
Number of Distinct Detects	7	Number of Distinct Non-Detects	2
Minimum Detect	0.17	Minimum Non-Detect	0.02
Maximum Detect	20	Maximum Non-Detect	0.05
Variance Detects	69.22	Percent Non-Detects	61.9%
Mean Detects	8.156	SD Detects	8.32
Median Detects	7	CV Detects	1.02
Skewness Detects	0.364	Kurtosis Detects	-1.911
Mean of Logged Detects	1.045	SD of Logged Detects	1.925

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.835	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.27	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.313	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	3.12	Standard Error of Mean	1.451
SD	6.22	95% KM (BCA) UCL	5.564
95% KM (t) UCL	5.622	95% KM (Percentile Bootstrap) UCL	5.544
95% KM (z) UCL	5.506	95% KM Bootstrap t UCL	6.31
90% KM Chebyshev UCL	7.472	95% KM Chebyshev UCL	9.444
97.5% KM Chebyshev UCL	12.18	99% KM Chebyshev UCL	17.56

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.548	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.756	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.272	**Kolmogrov-Smirnoff GOF**	
5% K-S Critical Value	0.307	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.588	k star (bias corrected MLE)	0.451
Theta hat (MLE)	13.86	Theta star (bias corrected MLE)	18.08
nu hat (MLE)	9.412	nu star (bias corrected)	7.216
MLE Mean (bias corrected)	8.156	MLE Sd (bias corrected)	12.15

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.252	nu hat (KM)	10.57
Approximate Chi Square Value (10.57, α)	4.298	Adjusted Chi Square Value (10.57, β)	3.995
95% Gamma Approximate KM-UCL (use when n>=50)	7.668	95% Gamma Adjusted KM-UCL (use when n<50)	8.251

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UCL Statistics for Data Sets with Non-Detects

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	3.113
Maximum	20	Median	0.01
SD	6.376	CV	2.048
k hat (MLE)	0.204	k star (bias corrected MLE)	0.207
Theta hat (MLE)	15.23	Theta star (bias corrected MLE)	15.04
nu hat (MLE)	8.585	nu star (bias corrected)	8.692
MLE Mean (bias corrected)	3.113	MLE Sd (bias corrected)	6.844
		Adjusted Level of Significance (β)	0.0383
Approximate Chi Square Value (8.69, α)	3.142	Adjusted Chi Square Value (8.69, β)	2.89
95% Gamma Approximate UCL (use when n>=50)	8.613	95% Gamma Adjusted UCL (use when n<50)	9.363

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.867	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.273	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.313	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	3.123	Mean in Log Scale	-2.637
SD in Original Scale	6.371	SD in Log Scale	3.532
95% t UCL (assumes normality of ROS data)	5.521	95% Percentile Bootstrap UCL	5.367
95% BCA Bootstrap UCL	6.116	95% Bootstrap t UCL	6.504
95% H-UCL (Log ROS)	8326		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-2.023	95% H-UCL (KM -Log)	101.8
KM SD (logged)	2.651	95% Critical H Value (KM-Log)	5.282
KM Standard Error of Mean (logged)	0.619		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	3.119	Mean in Log Scale	-2.104
SD in Original Scale	6.373	SD in Log Scale	2.799
95% t UCL (Assumes normality)	5.518	95% H-Stat UCL	196.9

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	5.622	95% KM (Percentile Bootstrap) UCL	5.544

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

Toluene

General Statistics

Total Number of Observations	21	Number of Distinct Observations	11
Number of Detects	9	Number of Non-Detects	12
Number of Distinct Detects	9	Number of Distinct Non-Detects	2
Minimum Detect	0.15	Minimum Non-Detect	0.02
Maximum Detect	65	Maximum Non-Detect	0.05
Variance Detects	460.7	Percent Non-Detects	57.14%
Mean Detects	12.16	SD Detects	21.46
Median Detects	0.85	CV Detects	1.765
Skewness Detects	2.286	Kurtosis Detects	5.417
Mean of Logged Detects	0.692	SD of Logged Detects	2.235

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.65	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.311	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.295	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	5.222	Standard Error of Mean	3.367
SD	14.55	95% KM (BCA) UCL	11.3
95% KM (t) UCL	11.03	95% KM (Percentile Bootstrap) UCL	10.72
95% KM (z) UCL	10.76	95% KM Bootstrap t UCL	25.42
90% KM Chebyshev UCL	15.32	95% KM Chebyshev UCL	19.9
97.5% KM Chebyshev UCL	26.25	99% KM Chebyshev UCL	38.72

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.541	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.795	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.266	**Kolmogrov-Smirnoff GOF**	
5% K-S Critical Value	0.299	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.369	k star (bias corrected MLE)	0.32
Theta hat (MLE)	32.93	Theta star (bias corrected MLE)	37.97
nu hat (MLE)	6.645	nu star (bias corrected)	5.763
MLE Mean (bias corrected)	12.16	MLE Sd (bias corrected)	21.49

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.129	nu hat (KM)	5.413
Approximate Chi Square Value (5.41, α)	1.347	Adjusted Chi Square Value (5.41, β)	1.2
95% Gamma Approximate KM-UCL (use when n>=50)	20.98	95% Gamma Adjusted KM-UCL (use when n<50)	23.56

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UCL Statistics for Data Sets with Non-Detects

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	5.216
Maximum	65	Median	0.01
SD	14.91	CV	2.858
k hat (MLE)	0.187	k star (bias corrected MLE)	0.192
Theta hat (MLE)	27.96	Theta star (bias corrected MLE)	27.21
nu hat (MLE)	7.837	nu star (bias corrected)	8.051
MLE Mean (bias corrected)	5.216	MLE Sd (bias corrected)	11.91
		Adjusted Level of Significance (β)	0.0383
Approximate Chi Square Value (8.05, α)	2.764	Adjusted Chi Square Value (8.05, β)	2.531
95% Gamma Approximate UCL (use when n>=50)	15.19	95% Gamma Adjusted UCL (use when n<50)	16.59

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.914	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.204	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.295	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	5.215	Mean in Log Scale	-3.316
SD in Original Scale	14.91	SD in Log Scale	4.181
95% t UCL (assumes normality of ROS data)	10.83	95% Percentile Bootstrap UCL	10.98
95% BCA Bootstrap UCL	14.55	95% Bootstrap t UCL	25.6
95% H-UCL (Log ROS)	424812		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-1 939	95% H-UCL (KM -Log)	117.6
KM SD (logged)	2.664	95% Critical H Value (KM-Log)	5.303
KM Standard Error of Mean (logged)	0.616		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	5.222	Mean in Log Scale	-1.986
SD in Original Scale	14.91	SD in Log Scale	2.785
95% t UCL (Assumes normality)	10.83	95% H-Stat UCL	206.7

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	11.03	95% GROS Adjusted Gamma UCL	16.59
95% Adjusted Gamma KM-UCL	23.56		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

Xylene

General Statistics

Total Number of Observations	21	Number of Distinct Observations	11
Number of Detects	9	Number of Non-Detects	12
Number of Distinct Detects	9	Number of Distinct Non-Detects	2
Minimum Detect	0.92	Minimum Non-Detect	0.06
Maximum Detect	250	Maximum Non-Detect	0.15
Variance Detects	8118	Percent Non-Detects	57.14%
Mean Detects	72.91	SD Detects	90.1
Median Detects	16	CV Detects	1.236
Skewness Detects	1.046	Kurtosis Detects	0.124
Mean of Logged Detects	2.882	SD of Logged Detects	2.155

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.815	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.292	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.295	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	31.28	Standard Error of Mean	15.34
SD	66.27	95% KM (BCA) UCL	55.97
95% KM (t) UCL	57.74	95% KM (Percentile Bootstrap) UCL	57.56
95% KM (z) UCL	56.51	95% KM Bootstrap t UCL	75.74
90% KM Chebyshev UCL	77.3	95% KM Chebyshev UCL	98.15
97.5% KM Chebyshev UCL	127.1	99% KM Chebyshev UCL	183.9

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.549	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.778	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.242	**Kolmogrov-Smirnoff GOF**	
5% K-S Critical Value	0.296	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.458	k star (bias corrected MLE)	0.379
Theta hat (MLE)	159.3	Theta star (bias corrected MLE)	192.3
nu hat (MLE)	8.237	nu star (bias corrected)	6.825
MLE Mean (bias corrected)	72.91	MLE Sd (bias corrected)	118.4

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.223	nu hat (KM)	9.358
Approximate Chi Square Value (9.36, α)	3.545	Adjusted Chi Square Value (9 36, β)	3.274
95% Gamma Approximate KM-UCL (use when n>=50)	82.59	95% Gamma Adjusted KM-UCL (use when n<50)	89.42

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UCL Statistics for Data Sets with Non-Detects

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	31.25
Maximum	250	Median	0.01
SD	67.92	CV	2.173
k hat (MLE)	0.158	k star (bias corrected MLE)	0.167
Theta hat (MLE)	198.2	Theta star (bias corrected MLE)	187.3
nu hat (MLE)	6.623	nu star (bias corrected)	7.01
MLE Mean (bias corrected)	31.25	MLE Sd (bias corrected)	76.5
		Adjusted Level of Significance (β)	0.0383
Approximate Chi Square Value (7.01, α)	2.176	Adjusted Chi Square Value (7.01, β)	1.975
95% Gamma Approximate UCL (use when n>=50)	100.7	95% Gamma Adjusted UCL (use when n<50)	110.9

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.887	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.232	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.295	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	31.31	Mean in Log Scale	-0.816
SD in Original Scale	67.9	SD in Log Scale	3.877
95% t UCL (assumes normality of ROS data)	56.86	95% Percentile Bootstrap UCL	57.33
95% BCA Bootstrap UCL	63.32	95% Bootstrap t UCL	76.01
95% H-UCL (Log ROS)	543974		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-0 373	95% H-UCL (KM -Log)	6291
KM SD (logged)	3.117	95% Critical H Value (KM-Log)	6.117
KM Standard Error of Mean (logged)	0.721		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	31.28	Mean in Log Scale	-0.42
SD in Original Scale	67.91	SD in Log Scale	3.249
95% t UCL (Assumes normality)	56.84	95% H-Stat UCL	13022

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	57.74	95% KM (Percentile Bootstrap) UCL	57.56

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

Naphthalene

General Statistics

Total Number of Observations	10	Number of Distinct Observations	4
Number of Detects	3	Number of Non-Detects	7
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.092	Minimum Non-Detect	0.05
Maximum Detect	6.2	Maximum Non-Detect	0.05
Variance Detects	12.43	Percent Non-Detects	70%
Mean Detects	2.129	SD Detects	3.526
Median Detects	0.095	CV Detects	1.656
Skewness Detects	1.732	Kurtosis Detects	N/A
Mean of Logged Detects	-0 972	SD of Logged Detects	2.422

Warning: Data set has only 3 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.75	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.385	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.512	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.674	Standard Error of Mean	0.713
SD	1.842	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.982	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.847	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	2.814	95% KM Chebyshev UCL	3.784
97.5% KM Chebyshev UCL	5.129	99% KM Chebyshev UCL	7.773

Gamma GOF Tests on Detected Observations Only
Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.384	k star (bias corrected MLE)	N/A
Theta hat (MLE)	5.551	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	2.301	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.134	nu hat (KM)	2.675
		Adjusted Level of Significance (β)	0.0267
Approximate Chi Square Value (2.67, α)	0.283	Adjusted Chi Square Value (2.67, β)	0.194
95% Gamma Approximate KM-UCL (use when n>=50)	6.368	95% Gamma Adjusted KM-UCL (use when n<50)	9.297

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.756	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.383	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.512	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

ATTACHMENT A

ProUCL Statistics

Surface Soil

Former Plaid Pantry #324

White Center/King County, Washington

UCL Statistics for Data Sets with Non-Detects

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.639	Mean in Log Scale	-7.844
SD in Original Scale	1.954	SD in Log Scale	5.741
95% t UCL (assumes normality of ROS data)	1.772	95% Percentile Bootstrap UCL	1.87
95% BCA Bootstrap UCL	2.499	95% Bootstrap t UCL	43.05
95% H-UCL (Log ROS)	1.108E+16		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-2 389	95% H-UCL (KM -Log)	1.726
KM SD (logged)	1.426	95% Critical H Value (KM-Log)	4.035
KM Standard Error of Mean (logged)	0.552		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.656	Mean in Log Scale	-2.874
SD in Original Scale	1.948	SD in Log Scale	1.74
95% t UCL (Assumes normality)	1.785	95% H-Stat UCL	4.076

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	1.982	95% KM (Percentile Bootstrap) UCL	N/A

Warning: One or more Recommended UCL(s) not available!

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Attachment B

ATTACHMENT B

Total Petroleum Hydrocarbon Calculations - Vapor

Former Plaid Pantry #324

White Center/King County, Washington

	B-37	B-38	B-39	B-40	B-41
ALIPHATICS					
>5-6	134	1.12	26.2	332	98.3
>6-8	256	1.12	64.4	392	10.2
>8-10	19.5	1.12	60.8	15.2	23.1
>10-12	830	1.12	73.4	118	156
>12-16	142	2.705	19.7	15.2	43.3
>16-21	33	2.705	5.74	2.77	9.82
>21-34	2.65	2.705	2.775	2.77	2.72
AROMATICS					
>8-10	193.9	0.559	77.5	440.6	247.1
>10-12	536.8	0.8395	137.95	363.2	489.2
>12-13		1.12	54.4	127	284
>12-16	22.8	2.705	11.8	11.3	9.37
>16-21	27.6	2.705	7.66	7	7.47
>21-34	2.65	2.705	2.775	2.77	2.72
Benzene	4.82	0.2805	0.556	10.6	2.92
Toluene	29.6	0.2805	9.64	133	70.7
Ethylbenzene	28	0.2805	14.3	40.3	60.5
Xylenes	205.1	0.2805	71.2	92.1	360.4
Naphthalene	26.2	0.2805	6.05	14.8	21.8
1-methyl					
2-methyl					
n-hexane					
MTBE	13	0.2805	0.231	16.5	8.96
EDB					
EDC					
BaPAnthracene					
B(b)fluoranthene					
B(k)fluoranthene					
BaP					
Chrysene					
Dibenzo (a,h)					
Indeno (1,2,3					
Most stringent direct contact soil concentration	2649.87	1512.19	2921.79	3661.47	2915.36

	2120	22	5970	2520	2910	MEDIAN VALUES
Occupational (mg/Kg)	2E+04	3E+04	2.5E+04	5.5E+04	2.8E+04	3E+04
VI (mg/Kg)	>Max	>Max	>MAX	>MAX	>MAX	>MAX
Soil gas (ug/m^3)	2E+05	9E+04	1.7E+05	2.5E+05	1.5E+05	2E+05
Air (ug/m^3)	2E+04	9E+03	2E+04	3E+04	2E+04	2E+04
trenchworker (mg/Kg)	>Max	>MAX	>MAX	>MAX	>MAX	>MAX
Highway Maintenance (mg/I	>Max	>Max	>MAX	>MAX	>MAX	>MAX
Customer (mg/Kg)	4E+04	4E+04	4.8E+04	1.1E+05	6.1E+04	5E+04
VI (mg/Kg)	>Max	>MAX	>MAX	>MAX	>MAX	>MAX
Soil Gas (ug/m^3)	9E+06	4E+06	7.6E+06	1.1E+07	6.7E+06	8E+06
Air (ug/m^3)	9E+05	4E+05	8E+05	1E+06	7E+05	8E+05
Construction Worker	4700	6500	6000	13000	7300	7E+03

ATTACHMENT B

Risk-Based Concentrations for Gasoline in Boring 37

Former Plaid Pantry #324

White Center/King County, Washington

Fuel Fraction	RBCss				RBCsi		RBCsg	
	Retail Customer	Occupational	Construction Worker	Excavation Worker/HWY Maintenance	Retail Customer	Occupational	Retail Customer	Occupational
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(ug/m3)	(ug/m3)
Aliphatic C5-C6	1.7E-05	3.7E-03	8.3E-04	7.3E-04	8.9E-04	6.8E-02	1.4E+08	3.1E+06
Aliphatic >C6-C8	5.5E-05	1.2E-02	2.7E-03	2.3E-03	5.3E-04	4.0E-02	1.4E+08	3.1E+06
Aliphatic >C8-C10	1.4E-02	1.5E-02	1.4E-02	1.2E-02	2.8E-05	2.1E-03	2.0E+07	4.4E+05
Aliphatic >C10-C12	5.8E-01	5.2E-01	6.1E-01	4.9E-01	1.1E-04	8.6E-03	2.0E+07	4.4E+05
Aliphatic >C12-C16	2.4E-01	1.2E-01	1.3E-01	1.1E-01	1.5E-06	1.1E-04	-	-
Aliphatic >C16-C21	1.9E-04	9.2E-05	1.0E-04	8.8E-05	8.0E-26	6.1E-24	-	-
Aliphatic >C21-C34	1.5E-05	7.4E-06	8.2E-06	7.1E-06	5.3E-31	4.1E-29	-	-
Aromatic >C8-C10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-	-
Aromatic > C10-C12	1.2E-01	1.7E-01	1.5E-01	1.1E-01	7.4E-05	5.6E-03	2.0E+07	4.4E+05
Aromatic >C12-C16	5.3E-03	4.6E-03	5.6E-03	4.5E-03	2.5E-07	1.9E-05	2.0E+07	4.4E+05
Aromatic >C16-C21	6.4E-03	4.3E-03	6.2E-03	5.3E-03	6.6E-09	5.0E-07	2.0E+07	4.4E+05
Aromatic>C21-C24	1.1E-03	5.5E-04	6.1E-04	5.3E-04	2.6E-30	2.0E-28	-	-
n-Hexane	6.3E-03	6.6E-03	6.6E-03	5.8E-03	8.8E-05	6.7E-03	1.4E+08	3.1E+06
Benzene	8.4E-03	1.1E-02	9.2E-03	8.0E-03	3.9E-04	3.0E-02	6.0E+06	1.3E+05
Toluene	2.6E-03	1.9E-03	2.5E-03	2.2E-03	4.3E-06	3.3E-04	1.0E+09	2.2E+07
Ethylbenzene	1.9E-03	2.2E-03	2.1E-03	1.8E-03	5.9E-06	4.5E-04	2.0E+08	4.4E+06
Total Xylenes	7.4E-03	7.2E-02	2.2E-02	1.7E-02	4.0E-04	3.0E-02	2.0E+07	4.4E+05
1,2,4-Trimethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E+06	3.1E+04
1,3,5-Trimethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-	-
Naphthalene	9.2E-03	5.8E-02	3.3E-02	1.2E-02	1.3E-05	1.0E-03	6.0E+05	1.3E+04
TPH RBC*	3.6E+04	21,000	4,700	>MAX	>MAX	>MAX	86,000,000	1,900,000
Generic Gasoline	2,500	20,000	9,700	>MAX	94	>MAX	79,000	1,700,000
Generic Diesel / Heating Oil	2,200	14,000	4,600	>MAX	>MAX	>MAX	21,000	440,000
Generic Mineral Insulating Oil	5,700	36,000	11,000	>MAX	>MAX	>MAX	30,000	620,000

* The TPH RBCs are based on a Hazard Index = 1 for the sum of all aliphatic fractions, aromatic fractions, and constituents present in the product.

Output from Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites (DEQ, 2003) with site-specific and MTCA B adjustments.

ATTACHMENT B

Risk-Based Concentrations for Gasoline in Boring 38

Former Plaid Pantry #324

White Center/King County, Washington

Fuel Fraction	RBCss				RBCsi		RBCsg	
	Retail Customer	Occupational	Construction Worker	Excavation Worker/ HWY Maintenance	Retail Customer	Occupational	Retail Customer	Occupational
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(ug/m3)	(ug/m3)
Aliphatic C5-C6	1.2E-05	3.5E-03	7.7E-04	5.2E-04	7.6E-04	5.8E-02	1.4E+08	3.1E+06
Aliphatic >C6-C8	2.5E-05	7.2E-03	1.6E-03	1.1E-03	2.9E-04	2.2E-02	1.4E+08	3.1E+06
Aliphatic >C8-C10	8.0E-02	1.2E-01	1.1E-01	7.3E-02	2.0E-04	1.5E-02	2.0E+07	4.4E+05
Aliphatic >C10-C12	8.0E-02	9.5E-02	1.1E-01	6.9E-02	1.9E-05	1.4E-03	2.0E+07	4.4E+05
Aliphatic >C12-C16	4.8E-01	3.1E-01	3.3E-01	2.2E-01	3.6E-06	2.7E-04	-	-
Aliphatic >C16-C21	1.6E-03	1.0E-03	1.1E-03	7.5E-04	8.2E-25	6.2E-23	-	-
Aliphatic >C21-C34	1.6E-03	1.0E-03	1.1E-03	7.5E-04	6.7E-29	5.1E-27	-	-
Aromatic >C8-C10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-	-
Aromatic > C10-C12	1.3E-02	2.5E-02	2.2E-02	1.2E-02	1.0E-05	7.6E-04	2.0E+07	4.4E+05
Aromatic >C12-C16	9.1E-02	1.0E-01	1.2E-01	7.8E-02	5.2E-06	4.0E-04	2.0E+07	4.4E+05
Aromatic >C16-C21	6.5E-02	5.8E-02	8.1E-02	5.4E-02	8.0E-08	6.1E-06	2.0E+07	4.4E+05
Aromatic>C21-C24	1.2E-01	7.8E-02	8.3E-02	5.6E-02	3.3E-28	2.6E-26	-	-
n-Hexane	6.8E-03	9.6E-03	9.2E-03	6.2E-03	1.1E-04	8.6E-03	1.4E+08	3.1E+06
Benzene	5.0E-02	8.6E-02	7.1E-02	4.8E-02	2.8E-03	2.1E-01	6.0E+06	1.3E+05
Toluene	2.5E-03	2.4E-03	3.1E-03	2.1E-03	5.1E-06	3.9E-04	1.0E+09	2.2E+07
Ethylbenzene	2.0E-03	3.0E-03	2.7E-03	1.9E-03	7.3E-06	5.5E-04	2.0E+08	4.4E+06
Total Xylenes	1.0E-03	1.4E-02	4.0E-03	2.6E-03	6.7E-05	5.1E-03	2.0E+07	4.4E+05
1,2,4-Trimethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E+06	3.1E+04
1,3,5-Trimethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-	-
Naphthalene	1.0E-02	8.2E-02	4.6E-02	1.4E-02	1.8E-05	1.4E-03	6.0E+05	1.3E+04
TPH RBC*	3.8E+04	30,000	6,500	>MAX	>MAX	>MAX	40,000,000	880,000
Generic Gasoline	2,500	20,000	9,700	>MAX	94	>MAX	79,000	1,700,000
Generic Diesel / Heating Oil	2,200	14,000	4,600	>MAX	>MAX	>MAX	21,000	440,000
Generic Mineral Insulating Oil	5,700	36,000	11,000	>MAX	>MAX	>MAX	30,000	620,000

* The TPH RBCs are based on a Hazard Index = 1 for the sum of all aliphatic fractions, aromatic fractions, and constituents present in the product.

Output from Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites (DEQ, 2003) with site-specific and MTCA B adjustments.

ATTACHMENT B

Risk-Based Concentrations for Gasoline in Boring 39

Former Plaid Pantry #324

White Center/King County, Washington

Fuel Fraction	RBCss				RBCsi		RBCsg	
	Retail Customer	Occupational	Construction Worker	Excavation Worker/ HWY Maintenance	Retail Customer	Occupational	Retail Customer	Occupational
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(ug/m3)	(ug/m3)
Aliphatic C5-C6	1.5E-05	2.8E-03	6.9E-04	5.6E-04	5.5E-04	4.2E-02	1.4E+08	3.1E+06
Aliphatic >C6-C8	7.5E-05	1.4E-02	3.5E-03	2.9E-03	5.2E-04	3.9E-02	1.4E+08	3.1E+06
Aliphatic >C8-C10	2.3E-01	2.3E-01	2.3E-01	1.8E-01	3.3E-04	2.5E-02	2.0E+07	4.4E+05
Aliphatic >C10-C12	2.8E-01	2.1E-01	2.8E-01	2.1E-01	3.9E-05	3.0E-03	2.0E+07	4.4E+05
Aliphatic >C12-C16	1.8E-01	7.8E-02	9.4E-02	7.7E-02	8.1E-07	6.2E-05	-	-
Aliphatic >C16-C21	1.8E-04	7.6E-05	9.1E-05	7.5E-05	5.4E-26	4.1E-24	-	-
Aliphatic >C21-C34	8.5E-05	3.7E-05	4.4E-05	3.6E-05	2.2E-30	1.6E-28	-	-
Aromatic >C8-C10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-	-
Aromatic > C10-C12	1.7E-01	2.0E-01	2.0E-01	1.3E-01	7.4E-05	5.6E-03	2.0E+07	4.4E+05
Aromatic >C12-C16	8.3E-02	6.2E-02	8.3E-02	6.3E-02	2.8E-06	2.1E-04	2.0E+07	4.4E+05
Aromatic >C16-C21	9.6E-03	5.7E-03	8.8E-03	7.2E-03	7.1E-09	5.4E-07	2.0E+07	4.4E+05
Aromatic>C21-C24	6.4E-03	2.8E-03	3.3E-03	2.7E-03	1.1E-29	8.2E-28	-	-
n-Hexane	8.5E-03	7.8E-03	8.4E-03	6.9E-03	8.4E-05	6.4E-03	1.4E+08	3.1E+06
Benzene	5.2E-03	5.9E-03	5.4E-03	4.5E-03	1.7E-04	1.3E-02	6.0E+06	1.3E+05
Toluene	4.5E-03	2.9E-03	4.2E-03	3.4E-03	5.5E-06	4.2E-04	1.0E+09	2.2E+07
Ethylbenzene	5.4E-03	5.3E-03	5.4E-03	4.4E-03	1.2E-05	8.9E-04	2.0E+08	4.4E+06
Total Xylenes	1.4E-02	1.2E-01	3.9E-02	2.7E-02	5.3E-04	4.1E-02	2.0E+07	4.4E+05
1,2,4-Trimethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E+06	3.1E+04
1,3,5-Trimethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-	-
Naphthalene	1.1E-02	5.8E-02	3.6E-02	1.3E-02	1.2E-05	9.2E-04	6.0E+05	1.3E+04
TPH RBC*	4.8E+04	25,000	6,000	>MAX	>MAX	>MAX	76,000,000	1,700,000
Generic Gasoline	2,500	20,000	9,700	>MAX	94	>MAX	79,000	1,700,000
Generic Diesel / Heating Oil	2,200	14,000	4,600	>MAX	>MAX	>MAX	21,000	440,000
Generic Mineral Insulating Oil	5,700	36,000	11,000	>MAX	>MAX	>MAX	30,000	620,000

* The TPH RBCs are based on a Hazard Index = 1 for the sum of all aliphatic fractions, aromatic fractions, and constituents present in the product.

Output from Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites (DEQ, 2003) with site-specific and MTCA B adjustments.

ATTACHMENT B

Risk-Based Concentrations for Gasoline in Boring 40

Former Plaid Pantry #324

White Center/King County, Washington

Fuel Fraction	RBCss				RBCsi		RBCsg	
	Retail Customer	Occupational	Construction Worker	Excavation Worker/ HWY Maintenance	Retail Customer	Occupational	Retail Customer	Occupational
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(ug/m3)	(ug/m3)
Aliphatic C5-C6	2.2E-04	4.1E-02	9.8E-03	3.4E-03	3.1E-03	2.3E-01	1.4E+08	3.1E+06
Aliphatic >C6-C8	3.0E-04	5.6E-02	1.3E-02	4.6E-03	7.8E-04	6.0E-02	1.4E+08	3.1E+06
Aliphatic >C8-C10	3.8E-02	3.6E-02	3.7E-02	1.2E-02	2.1E-05	1.6E-03	2.0E+07	4.4E+05
Aliphatic >C10-C12	2.9E-01	2.0E-01	2.7E-01	9.0E-02	1.6E-05	1.2E-03	2.0E+07	4.4E+05
Aliphatic >C12-C16	9.2E-02	3.9E-02	4.6E-02	1.6E-02	1.6E-07	1.2E-05	-	-
Aliphatic >C16-C21	5.6E-05	2.3E-05	2.8E-05	9.6E-06	6.5E-27	5.0E-25	-	-
Aliphatic >C21-C34	5.6E-05	2.3E-05	2.8E-05	9.6E-06	5.4E-31	4.1E-29	-	-
Aromatic >C8-C10	7.7E-19	3.4E-18	1.4E-18	3.9E-19	4.1E-21	3.1E-19	-	-
Aromatic > C10-C12	2.9E-01	2.7E-01	3.0E-01	9.3E-02	4.8E-05	3.7E-03	2.0E+07	4.4E+05
Aromatic >C12-C16	1.1E-01	7.5E-02	1.1E-01	3.5E-02	1.5E-06	1.1E-04	2.0E+07	4.4E+05
Aromatic >C16-C21	5.8E-03	3.3E-03	5.1E-03	1.7E-03	1.6E-09	1.2E-07	2.0E+07	4.4E+05
Aromatic>C21-C24	4.2E-03	1.8E-03	2.1E-03	7.2E-04	2.7E-30	2.0E-28	-	-
n-Hexane	2.0E-02	1.8E-02	1.9E-02	6.5E-03	7.3E-05	5.6E-03	1.4E+08	3.1E+06
Benzene	6.6E-02	7.2E-02	6.6E-02	2.3E-02	8.3E-04	6.3E-02	6.0E+06	1.3E+05
Toluene	4.1E-02	2.5E-02	3.7E-02	1.3E-02	1.9E-05	1.4E-03	1.0E+09	2.2E+07
Ethylbenzene	1.0E-02	9.5E-03	9.7E-03	3.3E-03	8.1E-06	6.2E-04	2.0E+08	4.4E+06
Total Xylenes	1.2E-02	9.8E-02	3.2E-02	9.2E-03	1.7E-04	1.3E-02	2.0E+07	4.4E+05
1,2,4-Trimethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E+06	3.1E+04
1,3,5-Trimethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-	-
Naphthalene	1.8E-02	6.1E-02	4.1E-02	8.3E-03	7.3E-06	5.6E-04	6.0E+05	1.3E+04
TPH RBC*	1.1E+05	55,000	13,000	>MAX	>MAX	>MAX	110,000,000	2,500,000
Generic Gasoline	2,500	20,000	9,700	>MAX	94	>MAX	79,000	1,700,000
Generic Diesel / Heating Oil	2,200	14,000	4,600	>MAX	>MAX	>MAX	21,000	440,000
Generic Mineral Insulating Oil	5,700	36,000	11,000	>MAX	>MAX	>MAX	30,000	620,000

* The TPH RBCs are based on a Hazard Index = 1 for the sum of all aliphatic fractions, aromatic fractions, and constituents present in the product.

Output from Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites (DEQ, 2003) with site-specific and MTCA B adjustments.

ATTACHMENT B

Risk-Based Concentrations for Gasoline in Boring 41

Former Plaid Pantry #324

White Center/King County, Washington

Fuel Fraction	RBCss				RBCsi	RBCair		RBCsg		
	Retail Customer	Occupational	Construction Worker	Excavation Worker/ HWY Maintenance	Retail Customer	Retail Customer	Occupational	Residential	Retail Customer	Occupational
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)
Aliphatic C5-C6	3.1E-05	5.1E-03	1.3E-03	8.2E-04	8.7E-04	7.0E+05	3.1E+03	1.5E+05	1.4E+08	3.1E+06
Aliphatic >C6-C8	5.3E-06	8.9E-04	2.3E-04	1.4E-04	2.8E-05	7.0E+05	3.1E+03	1.5E+05	1.4E+08	3.1E+06
Aliphatic >C8-C10	3.8E-02	3.3E-02	3.7E-02	2.2E-02	4.3E-05	1.0E+05	4.4E+02	2.1E+04	2.0E+07	4.4E+05
Aliphatic >C10-C12	2.6E-01	1.7E-01	2.5E-01	1.4E-01	2.8E-05	1.0E+05	4.4E+02	2.1E+04	2.0E+07	4.4E+05
Aliphatic >C12-C16	1.8E-01	6.7E-02	8.7E-02	5.3E-02	6.0E-07	1.0E+05	4.4E+02	-	-	-
Aliphatic >C16-C21	1.3E-04	5.1E-05	6.5E-05	4.0E-05	3.1E-26	1.0E+22	4.4E+19	-	-	-
Aliphatic >C21-C34	3.7E-05	1.4E-05	1.8E-05	1.1E-05	7.2E-31	1.0E+22	4.4E+19	-	-	-
Aromatic >C8-C10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.0E+22	4.4E+19	-	-	-
Aromatic > C10-C12	2.6E-01	2.6E-01	2.9E-01	1.5E-01	8.9E-05	1.0E+05	4.4E+02	2.1E+04	2.0E+07	4.4E+05
Aromatic >C12-C16	1.6E-01	1.0E-01	1.5E-01	8.8E-02	4.2E-06	1.0E+05	4.4E+02	2.1E+04	2.0E+07	4.4E+05
Aromatic >C16-C21	4.1E-03	2.2E-03	3.6E-03	2.2E-03	2.3E-09	1.0E+05	4.4E+02	2.1E+04	2.0E+07	4.4E+05
Aromatic>C21-C24	2.8E-03	1.1E-03	1.4E-03	8.3E-04	3.6E-30	1.0E+22	4.4E+19	-	-	-
n-Hexane	1.1E-02	8.8E-03	1.0E-02	6.3E-03	8.3E-05	7.0E+05	3.1E+03	1.5E+05	1.4E+08	3.1E+06
Benzene	1.2E-02	1.2E-02	1.2E-02	7.4E-03	3.1E-04	3.0E+04	1.3E+02	6.3E+03	6.0E+06	1.3E+05
Toluene	1.5E-02	8.2E-03	1.3E-02	7.9E-03	1.4E-05	5.0E+06	2.2E+04	1.0E+06	1.0E+09	2.2E+07
Ethylbenzene	1.0E-02	8.7E-03	9.7E-03	5.8E-03	1.7E-05	1.0E+06	4.4E+03	2.1E+05	2.0E+08	4.4E+06
Total Xylenes	3.1E-02	2.3E-01	8.3E-02	4.4E-02	9.1E-04	1.0E+05	4.4E+02	2.1E+04	2.0E+07	4.4E+05
1,2,4-Trimethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.0E+03	3.1E+01	1.5E+03	1.4E+06	3.1E+04
1,3,5-Trimethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.0E+22	4.4E+19	-	-	-
Naphthalene	1.8E-02	7.7E-02	5.0E-02	1.5E-02	1.5E-05	3.0E+03	1.3E+01	6.3E+02	6.0E+05	1.3E+04
TPH RBC*	6.1E+04	28,000	7,300	>MAX	>MAX	340,000	1,500	70,000	67,000,000	1,500,000
Generic Gasoline	2,500	20,000	9,700	>MAX	94	390	1,700	79,000	79,000	1,700,000
Generic Diesel / Heating Oil	2,200	14,000	4,600	>MAX	>MAX	100	440	21,000	21,000	440,000
Generic Mineral Insulating Oil	5,700	36,000	11,000	>MAX	>MAX	150	620	30,000	30,000	620,000

* The TPH RBCs are based on a Hazard Index = 1 for the sum of all aliphatic fractions, aromatic fractions, and constituents present in the product.

Output from Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites (DEQ, 2003) with site-specific and MTCA B adjustments.

ATTACHMENT B

Exposure Factors for TPH Calculations

Former Plaid Pantry #324

White Center/King County, Washington

Exposure Factors **Reasonable Maximum Exposure**

Parameter (unit)	Symbol	Residential	Urban Residential	Occupational	Construction Worker	Excavation Worker
ACCEPTABLE RISK LEVELS						
Acceptable Risk Level - Carcinogens	ARLc	1.00E-06	=	=	=	=
Acceptable Risk Level - Noncarcinogens	ARLn	1	=	=	=	=
EXPOSURE PARAMETERS						
Averaging Time - Carcinogen (yr)	ATc	70	=	=	=	=
Averaging Time - Noncarcinogen (yr)	ATn	30	1	25	1	1
Averaging Time - Noncarcinogen, Child (yr)	ATnc	11	11	NA	NA	NA
Body Weight - Adult (kg)	BWa	70	=	=	=	=
Body Weight - Child (kg)	BWc	15	=	NA	NA	NA
Exposure Duration - Adult (yr)	ED	30	1	25	1	1
Exposure Duration - Child (yr)	EDc	11	11	NA	NA	NA
Exposure Frequency (day/yr)	EF	350	175	250	250	9
Exposure Time (hr/day)	ET	24	0.025	8	8	8
Event Frequency - Groundwater (events/day)	EvFwe	NA	NA	NA	2	=
Event Time - Groundwater (hr/event)	t_{event}	NA	NA	NA	2	=
Inhalation Rate - Adult (m^3/day)	IRA	20	10	7	7	7
Inhalation Rate - Child (m^3/day)	IRAc	10.0	=	NA	NA	NA
Soil Ingestion Rate - Adult (mg/day)	IRS	100	100	100	330	330
Soil Ingestion Rate - Child (mg/day)	IRSc	200	200	NA	NA	NA
Water Ingestion Rate - Adult (L/day)	IRW	2.0	2.0	0.7	NA	NA
Water Ingestion Rate - Child (L/day)	IRWc	1.5	=	NA	NA	NA
Skin Surface Area - Adult to Soil (cm^2)	SA	5700	5700	3300	3300	3300
Skin Surface Area - Child to Soil (cm^2)	SAc	2800	=	NA	NA	NA
Skin Surface Area - Adult to Groundwater (cm^2)	SAw	NA	NA	NA	5700	5700
Soil to Skin Adherence Factor - Adult (mg/cm^2-day)	AF	0.07	0.07	0.10	0.30	0.30
Soil to Skin Adherence Factor - Child (mg/cm^2-day)	AFc	0.20	=	NA	NA	NA
AGE-ADJUSTED EXPOSURE FACTORS						
Ingestion Factor - Soil (mg-yr/kg-d)	IFSadj	174	132	NA	NA	NA
Ingestion Factor - Water (L-yr/kg-d)	IFWadj	1.64	0.81	NA	NA	NA
Surface Area Factor - Skin (mg-yr/kg-d)	SFSadj	519	354	NA	NA	NA

ATTACHMENT B

Exposure Factors for TPH Calculations

Former Plaid Pantry #324

White Center/King County, Washington

SITE PARAMETERS						
Soil Bu k Density (g/cm^3)	ρ_b	1.70	=	=	=	=
Soil Particle Density (g/cm^3)	ρ_s	2.74	=	=	=	=
Soil Porosity	n	0.38	=	=	=	=
Air Content - Vadose Zone Soils	n_a	0.26	=	=	=	=
Air Content - Cap. Fringe Soils	n_{acap}	0.038	=	=	=	=
Air Content - Foundation Cracks	n_{acrk}	0.26	=	=	=	=
Water Content - Vadose Zone Soils	n_w	0.12	=	=	=	=
Water Content - Cap. Fringe Soils	n_{wcap}	0.342	=	=	=	=
Water Content - Foundation Cracks	n_{wcrk}	0.12	=	=	=	=
NAPL Content - Vadose Zone Soils	n_p	0.000	=	=	=	=
Vadose Zone Thickness (cm)	L_v	295	=	=	=	=
Capillary Fringe Thickness (cm)	L_{cap}	5	=	=	=	=
Fraction Organic Carbon (shallow soil)	f_{oc}	0.005	=	=	=	=
Depth to Groundwater (cm)	L_w	300	=	=	=	=
Groundwater Dilution-Attenuation Factor	DAF	60	=	=	=	=
SOIL CONTAM NATION PARAMETERS						
Thickness of Contaminated Surface Soils (cm)	L_{ss}	100	=	=	=	=
Fraction of Site with Surface Soil Contamination	f_{ss}	0.50	=	=	=	=
Thickness of Clean Surface Soils (cm)	L_c	100	=	=	=	=
Thickness of Subsurface Contamination (cm)	L_s	200	=	=	=	=
Soil Gas Attenuation Factor for Petroleum Hydrocarbons	AF_{ph}	200	200	1000	NA	NA
Fraction of Site with Subsurface Vol. To Outdoor Air	f_{so}	1	=	=	=	=
Thickness of Clean Soils Under Building (cm)	L_{cb}	100	=	=	=	=
Thickness of Contaminated Soils Under Building (cm)	L_{sb}	200	=	=	=	=
Fraction of Contaminated Soils Under Building	f_{sb}	0.50	=	=	=	=
Particulate Emission Factor for Soils (kg/m^3)	PEF	7.58E-10	=	=	=	=
BUILDING PARAMETERS						
Building Air Exchange Rate (1/day)	ER	24	=	48	NA	NA
Building Height (indoor air mixing zone) (cm)	L_B	200	=	300	NA	NA
Foundation Wall Thickness (cm)	L_{crk}	15	=	=	NA	NA
Foundation Crack Fraction	f_{crk}	0.001	=	=	NA	NA
VOLATILIZATION FACTORS						
Averaging time for Volatilization - Adults (yr)	t_{vol}	25	=	=	=	=
Averaging time for Volatilization - Children (yr)	t_{volc}	6	=	NA	NA	NA
Max. Soil to Building Vol. Factor (kg/m^3)	$VF_{si}max$	3.88E-03	3.88E-03	1.29E-03	NA	NA
Max. Surface Soil Vol. Factor - Adult (kg/m^3)	$VF_{ss}max$	1.57E-05	1.57E-05	1.57E-05	1.57E-05	1.57E-05
Max. Surface Soil Vol. Factor - Child (kg/m^3)	$VF_{ss}max$	6.53E-05	=	NA	NA	NA
Max. Soil to Outdoor Air Vol. Factor - Adult (kg/m^3)	$VF_{so}max$	3.13E-05	3.13E-05	3.13E-05	NA	NA
Air Dispersion Term (g/m^2-s per kg/m^3)	Q/C	6.88E+01	=	=	=	=

ATTACHMENT B

Exposure Factors for TPH Calculations

Former Plaid Pantry #324

White Center/King County, Washington

MISCELLANEOUS PARAMETERS						
Ideal gas law constant (m^3-atm/K-mol)	R	0.0000821	=	=	=	=
Temperature (Kelvins)	T	293	=	=	=	=

For references, please refer to *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites* (DEQ, 2003).

ATTACHMENT B
Risk-Based Concentrations
Former Plaid Pantry #324
White Center/King County, Washington

Risk-Based Concentrations for TPH: **Gasoline**

	RBCSs					RBCSo			RBCSi			RBCSw			RBCTw			RBCWo			RBCWi			RBCWe	RBCAir			RBCSg		
Fuel Fraction	Residential	Urban Residential	Occupational	Construction Worker	Excavation Worker	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Construction & Excavation Worker	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/m^3)	(ug/m^3)	(ug/m^3)	(ug/m^3)	(ug/m^3)	(ug/m^3)
Aliphatic C5-C6	2.2E-02	6.6E-05	2.1E-02	1.0E-02	4.5E-03	5.2E-02	1.1E-03	1.5E-01	1.0E-01	4.0E-03	3.0E-01	8.0E-03	3.3E-05	7.9E-03	1.5E+03	1.4E+06	6.1E+03	6.5E+04	6.2E+07	2.7E+05	2.9E+03	2.8E+06	3.7E+04	1.7E+05	7.3E+02	7.0E+05	3.1E+03	1.5E+05	1.4E+08	3.1E+06
Aliphatic >C6-C8	2.4E-02	7.0E-05	2.3E-02	1.1E-02	4.8E-03	5.6E-02	9.6E-04	1.6E-01	1.1E-01	7.9E-04	6.0E-02	2.8E-03	1.2E-05	2.8E-03	1.5E+03	1.4E+06	6.1E+03	4.3E+04	4.1E+07	1.8E+05	1.9E+03	1.8E+06	2.4E+04	1.7E+05	7.3E+02	7.0E+05	3.1E+03	1.5E+05	1.4E+08	3.1E+06
Aliphatic >C8-C10	2.1E-01	4.0E-01	2.4E-01	3.1E-01	1.3E-01	1.6E-01	2.7E-04	6.2E-02	3.2E-01	2.2E-04	1.7E-02	2.0E-03	2.9E-03	2.1E-03	1.3E+02	3.6E+02	5.5E+02	3.8E+03	3.7E+06	1.6E+04	1.7E+02	1.6E+05	2.2E+03	2.0E+03	1.0E+02	1.0E+05	4.4E+02	2.1E+04	2.0E+07	4.4E+05
Aliphatic >C10-C12	6.9E-02	1.3E-01	7.0E-02	1.0E-01	4.2E-02	8.8E-03	8.6E-06	2.0E-03	2.4E-02	7.1E-06	5.4E-04	9.1E-05	1.3E-04	9.2E-05	1.3E+02	3.6E+02	5.5E+02	2.6E+03	2.5E+06	1.1E+04	1.1E+02	1.1E+05	1.4E+03	6.7E+02	1.0E+02	1.0E+05	4.4E+02	2.1E+04	2.0E+07	4.4E+05
Aliphatic >C12-C16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.7E+02	3.7E+02	1.5E+03	5.9E+02	5.7E+05	2.5E+03	2.6E+01	2.5E+04	3.3E+02	1.2E+02	1.0E+02	1.0E+05	4.4E+02	-	-	-
Aliphatic >C16-C21	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.1E+05	1.1E+05	4.4E+05	6.3E+18	6.0E+21	2.6E+19	2.8E+17	2.7E+20	3.5E+18	2.4E+03	1.0E+19	1.0E+22	4.4E+19	-	-	-
Aliphatic >C21-C34	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.1E+05	1.1E+05	4.4E+05	3.1E+17	3.0E+20	1.3E+18	1.4E+16	1.3E+19	1.7E+17	9.0E+02	1.0E+19	1.0E+22	4.4E+19	-	-	-
Aromatic >C8-C10	8.2E-19	4.0E-19	8.3E-19	5.9E-19	2.1E-19	1.6E-18	2.6E-21	6.0E-19	4.5E-19	2.2E-21	1.6E-19	2.9E-19	6.3E-20	2.9E-19	2.0E+19	3.6E+20	8.3E+19	5.0E+22	4.8E+25	2.1E+23	2.7E+21	2.6E+24	3.4E+22	2.1E+21	1.0E+19	1.0E+22	4.4E+19	-	-	-
Aromatic >C10-C12	2.9E-02	3.3E-02	2.3E-02	2.9E-02	1.1E-02	6.7E-03	6.8E-06	1.6E-03	2.1E-03	5.6E-06	4.3E-04	5.2E-03	3.3E-03	5.2E-03	1.8E+02	1.1E+03	7.3E+02	1.2E+06	1.1E+09	4.9E+06	8.9E+04	8.6E+07	1.1E+06	1.4E+04	1.0E+02	1.0E+05	4.4E+02	2.1E+04	2.0E+07	4.4E+05
Aromatic >C12-C16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.8E+02	1.1E+03	7.3E+02	1.9E+06	1.8E+09	7.9E+06	2.3E+05	2.2E+08	2.9E+06	1.2E+04	1.0E+02	1.0E+05	4.4E+02	2.1E+04	2.0E+07	4.4E+05
Aromatic >C16-C21	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.8E+02	1.1E+03	7.3E+02	3.8E+06	3.6E+09	1.6E+07	8.9E+05	8.6E+08	1.1E+07	9.5E+03	1.0E+02	1.0E+05	4.4E+02	2.1E+04	2.0E+07	4.4E+05
Aromatic >C21-C34	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.5E+03	1.5E+03	5.8E+03	4.2E+24	4.0E+27	1.8E+25	1.7E+24	1.6E+27	2.1E+25	7.3E+03	1.0E+19	1.0E+22	4.4E+19	-	-	-
n-Hexane	8.7E-03	1.8E-02	1.0E-02	1.4E-02	6.0E-03	6.1E-03	8.1E-05	1.7E-02	1.2E-02	6.6E-05	5.1E-03	2.7E-03	4.2E-03	2.7E-03	8.8E+02	2.2E+03	3.6E+03	2.1E+05	2.0E+08	9.0E+05	9.5E+03	9.2E+06	1.2E+05	6.5E+04	7.3E+02	7.0E+05	3.1E+03	1.5E+05	1.4E+08	3.1E+06
Benzene	1.6E-01	2.7E-01	1.8E-01	2.2E-01	9.8E-02	1.5E-01	3.1E-03	4.1E-01	2.9E-01	3.5E-03	2.7E-01	7.3E-01	8.7E-01	7.3E-01	4.4E+01	1.5E+02	1.8E+02	2.8E+05	2.7E+08	1.2E+06	1.9E+04	1.8E+07	2.4E+05	5.7E+03	3.1E+01	3.0E+04	1.3E+02	6.3E+03	6.0E+06	1.3E+05
Toluene	2.5E-02	6.6E-02	3.1E-02	4.8E-02	2.1E-02	4.2E-03	3.7E-05	8.5E-03	4.7E-03	3.0E-05	2.3E-03	2.6E-02	8.2E-02	2.7E-02	2.3E+03	2.9E+03	9.2E+03	4.4E+07	4.2E+10	1.8E+08	2.7E+06	2.6E+09	3.4E+07	2.1E+05	5.2E+03	5.0E+06	2.2E+04	1.0E+06	1.0E+09	2.2E+07
Ethylbenzene	4.6E-03	8.8E-03	5.4E-03	6.9E-03	3.0E-03	3.5E-03	8.8E-06	2.0E-03	2.1E-03	7.2E-06	5.5E-04	4.0E-03	5.8E-03	4.0E-03	1.3E+03	3.6E+03	5.5E+03	8.8E+06	8.5E+09	3.7E+07	5.3E+05	5.1E+08	6.6E+06	1.1E+05	1.0E+03	1.0E+06	4.4E+03	2.1E+05	2.0E+08	4.4E+06
Total Xylenes	9.1E-02	2.4E-02	9.0E-02	5.5E-02	2.0E-02	1.9E-01	4.5E-04	1.0E-01	9.8E-02	3.7E-04	2.8E-02	1.4E-01	1.6E-02	1.3E-01	2.0E+02	7.0E+03	8.5E+02	9.2E+05	8.9E+08	3.9E+06	5.9E+04	5.6E+07	7.4E+05	2.3E+04	1.0E+02	1.0E+05	4.4E+02	2.1E+04	2.0E+07	4.4E+05
1,2,4-trimethylbenzene	3.2E-01	6.8E-04	2.7E-01	1.5E-01	2.4E-02	3.6E-01	4.1E-04	9.2E-02	3.4E-02	3.3E-04	2.5E-02	5.7E-02	2.3E-04	5.6E-02	1.5E+01	1.4E+04	6.1E+01	8.0E+04	7.6E+07	3.3E+05	5.0E+03	4.8E+06	6.4E+04	1.7E+03	7.3E+00	7.0E+03	3.1E+01	1.5E+03	1.4E+06	3.1E+04
1,3,5-trimethylbenzene	1.5E-02	4.3E-02	1.9E-02	3.1E-02	1.3E-02	1.1E-19	1.1E-22	2.5E-20	4.7E-20	9.1E-23	6.9E-21	3.3E-03	1.3E-02	3.4E-03	3.7E+02	3.7E+02	1.5E+03	9.2E+22	8.8E+25	3.9E+23	5.4E+21	5.2E+24	6.8E+22	2.3E+04	1.0E+19	1.0E+22	4.4E+19	-	-	-
Naphthalene	2.3E-02	5.5E-03	1.2E-02	1.1E-02	2.6E-03	2.6E-03	2.7E-06	6.2E-04	8.2E-04	2.2E-06	1.7E-04	2.1E-02	7.8E-04	2.0E-02	6.2E+00	6.5E+02	2.6E+01	1.4E+05	1.3E+08	5.7E+05	2.9E+04	2.8E+07	3.7E+05	7.2E+02	3.1E+00	3.0E+03	1.3E+01	6.3E+02	6.0E+05	1.3E+04
TPH RBC* ⟶	1,200	6,900	20,000	9,700	>MAX	5,900	>MAX	69,000	94	>MAX	>MAX	31	120	130	110	400	450	>S	>S	>S	22,000	>S	>S	14,000	390	380,000	1,700	79,000	75,000,000	1,700,000
Generic Gasoline	1,200	2,500	20,000	9,700	>MAX	5,900	5,900	69,000	94	94	>MAX	31	31	130	110	110	450	>S	>S	>S	22,000	22,000	>S	14,000	390	390	1,700	79,000	79,000	1,700,000
Generic Diesel / Heating Oil	1,100	2,200	14,000	4,600	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	9,500	9,500	>MAX	100	100	430	>S	>S	>S	>S	>S	>S	>S	100	100	440	21,000	21,000	440,000
Generic Mineral Insulating Oil	2,800	5,700	36,000	11,000	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	300	300	1,300	>S	>S	>S	>S	>S	>S	>S	150	150	620	30,000	30,000	620,000

* The TPH RBCs are based on a Hazard Index = 1 for the sum of all aliphatic fractions, aromatic fractions, and constituents present in the product.

The data in the gray area of the main table above represent the following:

1. For **Air and Groundwater RBCs** the data are the RBCs for the specified fuel fraction or constituent.
2. For **Soil RBCs** the data are the hazard quotients for the specified fuel fraction or constituent.

For notes and references, please refer to *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites* (DEQ, 2003).

ATTACHMENT B
ProUCL Statistics
Soil Gas
Former Plaid Pantry #324
White Center/King County, Washington

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	4/28/2014 3:19:06 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzene

General Statistics

Total Number of Observations	11	Number of Distinct Observations	11
Number of Detects	10	Number of Non-Detects	1
Number of Distinct Detects	10	Number of Distinct Non-Detects	1
Minimum Detect	4.8	Minimum Non-Detect	24
Maximum Detect	100000	Maximum Non-Detect	24
Variance Detects	1.133E+9	Percent Non-Detects	9.091%
Mean Detects	21169	SD Detects	33667
Median Detects	1330	CV Detects	1.59
Skewness Detects	1.771	Kurtosis Detects	2.723
Mean of Logged Detects	6.423	SD of Logged Detects	4.142

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.714	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.311	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.28	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	19245	Standard Error of Mean	9870
SD	31055	95% KM (BCA) UCL	37403
95% KM (t) UCL	37134	95% KM (Percentile Bootstrap) UCL	35140
95% KM (z) UCL	35480	95% KM Bootstrap t UCL	63843
90% KM Chebyshev UCL	48855	95% KM Chebyshev UCL	62268
97.5% KM Chebyshev UCL	80883	99% KM Chebyshev UCL	117450

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.604	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.852	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.232	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.294	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.207	k star (bias corrected MLE)	0.212
Theta hat (MLE)	102285	Theta star (bias corrected MLE)	100072
nu hat (MLE)	4.139	nu star (bias corrected)	4.231
MLE Mean (bias corrected)	21169	MLE Sd (bias corrected)	46027

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.384	nu hat (KM)	8.449
Approximate Chi Square Value (8.45, α)	2.998	Adjusted Chi Square Value (8.45, β)	2.494
95% Gamma Approximate KM-UCL (use when n>=50)	54242	95% Gamma Adjusted KM-UCL (use when n<50)	65208

UCL Statistics for Data Sets with Non-Detects

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	19245
Maximum	100000	Median	260
SD	32571	CV	1.692
k hat (MLE)	0.17	k star (bias corrected MLE)	0.184
Theta hat (MLE)	113337	Theta star (bias corrected MLE)	104535
nu hat (MLE)	3.736	nu star (bias corrected)	4.05
MLE Mean (bias corrected)	19245	MLE Sd (bias corrected)	44853
		Adjusted Level of Significance (β)	0.0278
Approximate Chi Square Value (4.05, α)	0.742	Adjusted Chi Square Value (4.05, β)	0.546
95% Gamma Approximate UCL (use when n>=50)	105101	95% Gamma Adjusted UCL (use when n<50)	142859

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.847	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.229	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.28	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	19246	Mean in Log Scale	6.083
SD in Original Scale	32570	SD in Log Scale	4.088
95% t UCL (assumes normality of ROS data)	37045	95% Percentile Bootstrap UCL	35120
95% BCA Bootstrap UCL	40368	95% Bootstrap t UCL	64736
95% H-UCL (Log ROS)	8.592E+11		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	6.024	95% H-UCL (KM -Log)	2.074E+11
KM SD (logged)	3.955	95% Critical H Value (KM-Log)	9.763
KM Standard Error of Mean (logged)	1.258		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	19246	Mean in Log Scale	6.065
SD in Original Scale	32571	SD in Log Scale	4.105
95% t UCL (Assumes normality)	37045	95% H-Stat UCL	1.006E+12

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	62268	95% GROS Adjusted Gamma UCL	142859
95% Adjusted Gamma KM-UCL	65208		

Warning: Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

Toluene

General Statistics

Total Number of Observations	11	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	5.3	Mean	81476
Maximum	480000	Median	5000
SD	147464	Std. Error of Mean	44462
Coefficient of Variation	1.81	Skewness	2.348

Normal GOF Test

Shapiro Wilk Test Statistic	0.643	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.303	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.267	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	162062	95% Adjusted-CLT UCL (Chen-1995)	188248
		95% Modified-t UCL (Johnson-1978)	167309

Gamma GOF Test

A-D Test Statistic	0.51	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.873	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.203	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.283	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.187	k star (bias corrected MLE)	0.197
Theta hat (MLE)	435377	Theta star (bias corrected MLE)	414200
nu hat (MLE)	4.117	nu star (bias corrected)	4.328
MLE Mean (bias corrected)	81476	MLE Sd (bias corrected)	183705
		Approximate Chi Square Value (0.05)	0.855
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	0.637

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	412286	95% Adjusted Gamma UCL (use when n<50)	553202

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.86	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.205	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.267	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.668	Mean of logged Data	7.335
Maximum of Logged Data	13.08	SD of logged Data	4.555

Assuming Lognormal Distribution

95% H-UCL	4.986E+14	90% Chebyshev (MVUE) UCL	3555539
95% Chebyshev (MVUE) UCL	4754493	97.5% Chebyshev (MVUE) UCL	6418594
99% Chebyshev (MVUE) UCL	9687399		

ATTACHMENT B
ProUCL Statistics
Soil Gas
Former Plaid Pantry #324
White Center/King County, Washington

UCL Statistics for Data Sets with Non-Detects

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	154610	95% Jackknife UCL	162062
95% Standard Bootstrap UCL	150538	95% Bootstrap-t UCL	311063
95% Hall's Bootstrap UCL	420057	95% Percentile Bootstrap UCL	160005
95% BCA Bootstrap UCL	193658		
90% Chebyshev(Mean, Sd) UCL	214862	95% Chebyshev(Mean, Sd) UCL	275282
97.5% Chebyshev(Mean, Sd) UCL	359141	99% Chebyshev(Mean, Sd) UCL	523868

Suggested UCL to Use

95% Adjusted Gamma UCL 553202

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

Ethylbenzene

General Statistics

Total Number of Observations	11	Number of Distinct Observations	9
Number of Detects	8	Number of Non-Detects	3
Number of Distinct Detects	7	Number of Distinct Non-Detects	2
Minimum Detect	5.5	Minimum Non-Detect	5.1
Maximum Detect	97000	Maximum Non-Detect	5.2
Variance Detects	1.105E+9	Percent Non-Detects	27.27%
Mean Detects	28043	SD Detects	33243
Median Detects	22650	CV Detects	1.185
Skewness Detects	1.373	Kurtosis Detects	1.978
Mean of Logged Detects	8.311	SD of Logged Detects	3.412

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.828	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.214	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.313	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	20396	Standard Error of Mean	9448
SD	29312	95% KM (BCA) UCL	34760
95% KM (t) UCL	37521	95% KM (Percentile Bootstrap) UCL	34914
95% KM (z) UCL	35937	95% KM Bootstrap t UCL	47928
90% KM Chebyshev UCL	48741	95% KM Chebyshev UCL	61579
97.5% KM Chebyshev UCL	79399	99% KM Chebyshev UCL	114403

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.382	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.789	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.261	**Kolmogrov-Smirnoff GOF**	
5% K-S Critical Value	0.315	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.349	k star (bias corrected MLE)	0.301
Theta hat (MLE)	80443	Theta star (bias corrected MLE)	93100
nu hat (MLE)	5.578	nu star (bias corrected)	4.819
MLE Mean (bias corrected)	28043	MLE Sd (bias corrected)	51096

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.484	nu hat (KM)	10.65
Approximate Chi Square Value (10.65, α)	4.354	Adjusted Chi Square Value (10.65, β)	3.72
95% Gamma Approximate KM-UCL (use when n>=50)	49907	95% Gamma Adjusted KM-UCL (use when n<50)	58409

UCL Statistics for Data Sets with Non-Detects

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	20395
Maximum	97000	Median	1900
SD	30743	CV	1.507
k hat (MLE)	0.15	k star (bias corrected MLE)	0.17
Theta hat (MLE)	136211	Theta star (bias corrected MLE)	120323
nu hat (MLE)	3.294	nu star (bias corrected)	3.729
MLE Mean (bias corrected)	20395	MLE Sd (bias corrected)	49538
		Adjusted Level of Significance (β)	0.0278
Approximate Chi Square Value (3.73, α)	0.618	Adjusted Chi Square Value (3.73, β)	0.447
95% Gamma Approximate UCL (use when n>=50)	123132	95% Gamma Adjusted UCL (use when n<50)	170021

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.851	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.239	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.313	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	20396	Mean in Log Scale	6.24
SD in Original Scale	30743	SD in Log Scale	4.578
95% t UCL (assumes normality of ROS data)	37196	95% Percentile Bootstrap UCL	36459
95% BCA Bootstrap UCL	38705	95% Bootstrap t UCL	47518
95% H-UCL (Log ROS)	2.177E+14		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	6.489	95% H-UCL (KM -Log)	7 271E+11
KM SD (logged)	4.033	95% Critical H Value (KM-Log)	9.951
KM Standard Error of Mean (logged)	1.3		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	20396	Mean in Log Scale	6.303
SD in Original Scale	30743	SD in Log Scale	4.469
95% t UCL (Assumes normality)	37196	95% H-Stat UCL	6.686E+13

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	37521	95% KM (Percentile Bootstrap) UCL	34914

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
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UCL Statistics for Data Sets with Non-Detects

Xylenes

General Statistics

Total Number of Observations	11	Number of Distinct Observations	9
Number of Detects	8	Number of Non-Detects	3
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	29	Minimum Non-Detect	10
Maximum Detect	560000	Maximum Non-Detect	10
Variance Detects	3.548E+10	Percent Non-Detects	27.27%
Mean Detects	144737	SD Detects	188369
Median Detects	98500	CV Detects	1.301
Skewness Detects	1.785	Kurtosis Detects	3.556
Mean of Logged Detects	9.969	SD of Logged Detects	3.355

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.784	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.222	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.313	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	105266	Standard Error of Mean	52703
SD	163507	95% KM (BCA) UCL	203911
95% KM (t) UCL	200789	95% KM (Percentile Bootstrap) UCL	196638
95% KM (z) UCL	191955	95% KM Bootstrap t UCL	295468
90% KM Chebyshev UCL	263376	95% KM Chebyshev UCL	334994
97.5% KM Chebyshev UCL	434397	99% KM Chebyshev UCL	629656

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.284	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.788	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.227	**Kolmogrov-Smirnoff GOF**	
5% K-S Critical Value	0.315	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.351	k star (bias corrected MLE)	0.303
Theta hat (MLE)	412141	Theta star (bias corrected MLE)	477960
nu hat (MLE)	5.619	nu star (bias corrected)	4.845
MLE Mean (bias corrected)	144737	MLE Sd (bias corrected)	263018

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.414	nu hat (KM)	9.119
Approximate Chi Square Value (9.12, α)	3.399	Adjusted Chi Square Value (9.12, β)	2.854
95% Gamma Approximate KM-UCL (use when n>=50)	282422	95% Gamma Adjusted KM-UCL (use when n<50)	336347

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UCL Statistics for Data Sets with Non-Detects

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	105264
Maximum	560000	Median	13000
SD	171490	CV	1.629
k hat (MLE)	0.139	k star (bias corrected MLE)	0.162
Theta hat (MLE)	754899	Theta star (bias corrected MLE)	649705
nu hat (MLE)	3.068	nu star (bias corrected)	3.564
MLE Mean (bias corrected)	105264	MLE Sd (bias corrected)	261515
		Adjusted Level of Significance (β)	0.0278
Approximate Chi Square Value (3.56, α)	0.558	Adjusted Chi Square Value (3 56, β)	0.401
95% Gamma Approximate UCL (use when n>=50)	672906	95% Gamma Adjusted UCL (use when n<50)	936737

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.862	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.223	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.313	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	105269	Mean in Log Scale	7.891
SD in Original Scale	171486	SD in Log Scale	4.592
95% t UCL (assumes normality of ROS data)	198982	95% Percentile Bootstrap UCL	192270
95% BCA Bootstrap UCL	227550	95% Bootstrap t UCL	296017
95% H-UCL (Log ROS)	1.338E+15		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	7.878	95% H-UCL (KM -Log)	7.473E+13
KM SD (logged)	4.338	95% Critical H Value (KM-Log)	10.68
KM Standard Error of Mean (logged)	1.398		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	105265	Mean in Log Scale	7.689
SD in Original Scale	171489	SD in Log Scale	4.809
95% t UCL (Assumes normality)	198980	95% H-Stat UCL	1.452E+16

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	200789	95% KM (Percentile Bootstrap) UCL	196638

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
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UCL Statistics for Data Sets with Non-Detects

Hexane

General Statistics

Total Number of Observations	11	Number of Distinct Observations	10
		Number of Missing Observations	0
Minimum	15	Mean	94544
Maximum	320000	Median	1800
SD	136456	Std. Error of Mean	41143
Coefficient of Variation	1.443	Skewness	1.022

Normal GOF Test

Shapiro Wilk Test Statistic	0.702	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.349	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.267	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	169114	95% Adjusted-CLT UCL (Chen-1995)	175771
		95% Modified-t UCL (Johnson-1978)	171228

Gamma GOF Test

A-D Test Statistic	0.876	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.866	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.262	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.282	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.195	k star (bias corrected MLE)	0.202
Theta hat (MLE)	485171	Theta star (bias corrected MLE)	467282
nu hat (MLE)	4.287	nu star (bias corrected)	4.451
MLE Mean (bias corrected)	94544	MLE Sd (bias corrected)	210188
		Approximate Chi Square Value (0.05)	0.908
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	0.68

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	463662	95% Adjusted Gamma UCL (use when n<50)	618732

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.824	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.85	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.245	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.267	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.708	Mean of logged Data	7.665
Maximum of Logged Data	12.68	SD of logged Data	4.276

Assuming Lognormal Distribution

95% H-UCL	3.060E+13	90% Chebyshev (MVUE) UCL	2702603
95% Chebyshev (MVUE) UCL	3611251	97.5% Chebyshev (MVUE) UCL	4872418
99% Chebyshev (MVUE) UCL	7349738		

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UCL Statistics for Data Sets with Non-Detects

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	162219	95% Jackknife UCL	169114
95% Standard Bootstrap UCL	158649	95% Bootstrap-t UCL	191065
95% Hall's Bootstrap UCL	152885	95% Percentile Bootstrap UCL	162157
95% BCA Bootstrap UCL	173808		
90% Chebyshev(Mean, Sd) UCL	217973	95% Chebyshev(Mean, Sd) UCL	273883
97.5% Chebyshev(Mean, Sd) UCL	351482	99% Chebyshev(Mean, Sd) UCL	503912

Suggested UCL to Use

95% Adjusted Gamma UCL 618732

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

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UCL Statistics for Data Sets with Non-Detects

1,3,5-TMB

General Statistics

Total Number of Observations	11	Number of Distinct Observations	10
Number of Detects	7	Number of Non-Detects	4
Number of Distinct Detects	7	Number of Distinct Non-Detects	3
Minimum Detect	93	Minimum Non-Detect	5.7
Maximum Detect	29000	Maximum Non-Detect	5.9
Variance Detects	1.021E+8	Percent Non-Detects	36.36%
Mean Detects	11013	SD Detects	10104
Median Detects	8700	CV Detects	0.917
Skewness Detects	0.871	Kurtosis Detects	0.458
Mean of Logged Detects	8.444	SD of Logged Detects	1.998

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.935	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.162	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.335	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	7011	Standard Error of Mean	2980
SD	9150	95% KM (BCA) UCL	11900
95% KM (t) UCL	12411	95% KM (Percentile Bootstrap) UCL	11746
95% KM (z) UCL	11912	95% KM Bootstrap t UCL	15156
90% KM Chebyshev UCL	15950	95% KM Chebyshev UCL	19999
97.5% KM Chebyshev UCL	25620	99% KM Chebyshev UCL	36660

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.326	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.739	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.243	**Kolmogrov-Smirnoff GOF**	
5% K-S Critical Value	0.324	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.7	k star (bias corrected MLE)	0.495
Theta hat (MLE)	15727	Theta star (bias corrected MLE)	22231
nu hat (MLE)	9.804	nu star (bias corrected)	6.936
MLE Mean (bias corrected)	11013	MLE Sd (bias corrected)	15647

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.587	nu hat (KM)	12.91
Approximate Chi Square Value (12.91, α)	5.836	Adjusted Chi Square Value (12.91, β)	5.081
95% Gamma Approximate KM-UCL (use when n>=50)	15515	95% Gamma Adjusted KM-UCL (use when n<50)	17821

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UCL Statistics for Data Sets with Non-Detects

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	7008
Maximum	29000	Median	1200
SD	9598	CV	1.37
k hat (MLE)	0.149	k star (bias corrected MLE)	0.169
Theta hat (MLE)	46979	Theta star (bias corrected MLE)	41445
nu hat (MLE)	3.282	nu star (bias corrected)	3.72
MLE Mean (bias corrected)	7008	MLE Sd (bias corrected)	17043
		Adjusted Level of Significance (β)	0.0278
Approximate Chi Square Value (3.72, α)	0.614	Adjusted Chi Square Value (3.72, β)	0.445
95% Gamma Approximate UCL (use when n>=50)	42437	95% Gamma Adjusted UCL (use when n<50)	58623

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.84	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.298	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.335	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	7029	Mean in Log Scale	6.786
SD in Original Scale	9582	SD in Log Scale	2.792
95% t UCL (assumes normality of ROS data)	12265	95% Percentile Bootstrap UCL	11739
95% BCA Bootstrap UCL	12900	95% Bootstrap t UCL	15391
95% H-UCL (Log ROS)	20994559		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	6.006	95% H-UCL (KM -Log)	4.112E+9
KM SD (logged)	3.546	95% Critical H Value (KM-Log)	8.777
KM Standard Error of Mean (logged)	1.155		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	7010	Mean in Log Scale	5.762
SD in Original Scale	9597	SD in Log Scale	4.03
95% t UCL (Assumes normality)	12254	95% H-Stat UCL	3.406E+11

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	12411	95% KM (Percentile Bootstrap) UCL	11746

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
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UCL Statistics for Data Sets with Non-Detects

1,2,4-TMB

General Statistics

Total Number of Observations	11	Number of Distinct Observations	9
Number of Detects	7	Number of Non-Detects	4
Number of Distinct Detects	6	Number of Distinct Non-Detects	3
Minimum Detect	280	Minimum Non-Detect	5.7
Maximum Detect	86000	Maximum Non-Detect	5.9
Variance Detects	8.523E+8	Percent Non-Detects	36.36%
Mean Detects	27183	SD Detects	29194
Median Detects	20000	CV Detects	1.074
Skewness Detects	1.569	Kurtosis Detects	2.875
Mean of Logged Detects	9.321	SD of Logged Detects	1.929

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.846	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.265	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.335	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	17300	Standard Error of Mean	8212
SD	25215	95% KM (BCA) UCL	29912
95% KM (t) UCL	32184	95% KM (Percentile Bootstrap) UCL	30846
95% KM (z) UCL	30807	95% KM Bootstrap t UCL	42061
90% KM Chebyshev UCL	41936	95% KM Chebyshev UCL	53095
97.5% KM Chebyshev UCL	68583	99% KM Chebyshev UCL	99006

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.243	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.74	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.167	**Kolmogrov-Smirnoff GOF**	
5% K-S Critical Value	0.324	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.682	k star (bias corrected MLE)	0.485
Theta hat (MLE)	39852	Theta star (bias corrected MLE)	56047
nu hat (MLE)	9.549	nu star (bias corrected)	6.79
MLE Mean (bias corrected)	27183	MLE Sd (bias corrected)	39032

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.471	nu hat (KM)	10.36
Approximate Chi Square Value (10.36, α)	4.166	Adjusted Chi Square Value (10.36, β)	3.549
95% Gamma Approximate KM-UCL (use when n>=50)	43010	95% Gamma Adjusted KM-UCL (use when n<50)	50489

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UCL Statistics for Data Sets with Non-Detects

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	17298
Maximum	86000	Median	3000
SD	26447	CV	1.529
k hat (MLE)	0.141	k star (bias corrected MLE)	0.163
Theta hat (MLE)	122714	Theta star (bias corrected MLE)	106043
nu hat (MLE)	3.101	nu star (bias corrected)	3.589
MLE Mean (bias corrected)	17298	MLE Sd (bias corrected)	42829
		Adjusted Level of Significance (β)	0.0278
Approximate Chi Square Value (3.59, α)	0.566	Adjusted Chi Square Value (3 59, β)	0.407
95% Gamma Approximate UCL (use when n>=50)	109619	95% Gamma Adjusted UCL (use when n<50)	152416

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.883	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.246	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.335	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	17347	Mean in Log Scale	7.665
SD in Original Scale	26412	SD in Log Scale	2.76
95% t UCL (assumes normality of ROS data)	31781	95% Percentile Bootstrap UCL	30395
95% BCA Bootstrap UCL	34113	95% Bootstrap t UCL	45969
95% H-UCL (Log ROS)	40438382		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	6.565	95% H-UCL (KM -Log)	2 376E+11
KM SD (logged)	3.915	95% Critical H Value (KM-Log)	9.665
KM Standard Error of Mean (logged)	1.275		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	17299	Mean in Log Scale	6.32
SD in Original Scale	26447	SD in Log Scale	4.423
95% t UCL (Assumes normality)	31752	95% H-Stat UCL	4.050E+13

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	32184	95% KM (Percentile Bootstrap) UCL	30846

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
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UCL Statistics for Data Sets with Non-Detects

TPHG

General Statistics

Total Number of Observations	11	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	940	Mean	3081222
Maximum	10000000	Median	82000
SD	4326125	Std. Error of Mean	1304376
Coefficient of Variation	1.404	Skewness	0.918

Normal GOF Test

Shapiro Wilk Test Statistic	0.706	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.345	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.267	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5445352	95% Adjusted-CLT UCL (Chen-1995)	5612359
		95% Modified-t UCL (Johnson-1978)	5505503

Gamma GOF Test

A-D Test Statistic	0.872	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.858	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.24	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.281	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.208	k star (bias corrected MLE)	0.212
Theta hat (MLE)	14803914	Theta star (bias corrected MLE)	14535613
nu hat (MLE)	4.579	nu star (bias corrected)	4.664
MLE Mean (bias corrected)	3081222	MLE Sd (bias corrected)	6692343
		Approximate Chi Square Value (0.05)	1
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	0.756

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	14369036	95% Adjusted Gamma UCL (use when n<50)	19002771

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.823	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.85	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.204	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.267	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	6.846	Mean of logged Data	11.43
Maximum of Logged Data	16.12	SD of logged Data	4.057

Assuming Lognormal Distribution

95% H-UCL	1.292E+14	90% Chebyshev (MVUE) UCL	72801478
95% Chebyshev (MVUE) UCL	97203169	97.5% Chebyshev (MVUE) UCL	1 311E+8
99% Chebyshev (MVUE) UCL	1.976E+8		

ATTACHMENT B
ProUCL Statistics
Soil Gas
Former Plaid Pantry #324
White Center/King County, Washington

UCL Statistics for Data Sets with Non-Detects

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	5226729	95% Jackknife UCL	5445352
95% Standard Bootstrap UCL	5033543	95% Bootstrap-t UCL	6175094
95% Hall's Bootstrap UCL	4799234	95% Percentile Bootstrap UCL	5226585
95% BCA Bootstrap UCL	5519358		
90% Chebyshev(Mean, Sd) UCL	6994349	95% Chebyshev(Mean, Sd) UCL	8766864
97.5% Chebyshev(Mean, Sd) UCL	11227046	99% Chebyshev(Mean, Sd) UCL	16059596

Suggested UCL to Use

95% Adjusted Gamma UCL 19002771

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.