Final Draft Remedial Investigation Report

BNSF Parkwater Rail Yard Site
Spokane, Washington

for

BNSF Parkwater Company

August 11, 2010

GeoEngineers
Earth Science + Technology

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EXECUTIVE SUMMARY

Introduction

This remedial investigation (RI) report describes investigations conducted between December 3, 2009 and February 25, 2010 at the BNSF Railway Company (BNSF) Parkwater Rail Yard Site (Site), formerly known as Yardley, located at 5302 East Trent Avenue, Spokane Valley, Washington. The general location of the Site is shown with respect to surrounding physical features in the Vicinity Map, Figure 1.

The purpose of this RI was to collect, develop and evaluate sufficient soil and groundwater data to determine what, if any, cleanup actions at the Site are necessary pursuant to the Model Toxics Control Act, RCW 70.105D (MTCA). In addition to the 2009/2010 investigations, the scope and results of previous investigations are also described in this report to provide a comprehensive summary of Site conditions. This RI was prepared in accordance with Agreed Order No. 6453, and in accordance with the RI/FS Work Plan approved by Ecology pursuant to that Agreed Order.

Site Description

The Site is an active rail yard bounded on the east by North Fancher Road, on the north by East Trent Avenue, on the west by North Havana Street and on the south by the BNSF mainline tracks as shown in Subject Property and Areas of Potential Environmental Concern, Figure 2. The Site covers approximately 130 acres. The ground surface is generally level and most has been improved with crushed rock surfacing, although some high use areas are covered with concrete or asphalt.

RI Scope

The scope of work for the RI at the Site is described in detail in the RI/FS Work Plan and includes the following:

- Installed two, 2-inch-diameter groundwater monitoring wells, MW-22 and MW-23, to depths of approximately 75 feet (depths discussed in this report are with respect to existing ground surface at the time of exploration) and develop the newly installed wells.
- Drilled, probed, or excavated 67 soil excavations from areas potentially impacted with contaminant of potential concern (COPCs) based on field screening results in the Koch Asphalt Lease Area, Diesel Shop and Materials Storage Building Area, Western Fruit Express (Generator Storage Area), Dismantling Spur and East and West Debris and Soil Deposit Areas, Yardley Office (Main Line Track No. 1), Ralston Lead Track and the TTX Facility.
- Submitted up to three soil samples from each monitoring well boring, test pit, direct push or sonic boring to Pace Analytical Laboratory for analysis of the relevant COPCs.
- Obtained groundwater samples from the screened interval of the newly installed wells using low-flow sampling techniques and submitted groundwater samples to a qualified laboratory for analysis of COPCs.

RI Results

Koch Area Asphalt Lease Area

Eight explorations were conducted in this area. Analytical results indicate samples obtained in the upper 2 feet of soil in test pits GTP-46 contain diesel-range petroleum hydrocarbons (DRPH) at a concentration of 4,120 milligrams per kilogram (mg/kg) and oil-range petroleum hydrocarbons (ORPH) at 6,940 mg/kg. Samples obtained from test pit GTP-47, also at a depth of 2 feet or less, contained concentrations of ORPH at 2,130 mg/kg. Test pit GTP-49 contained arsenic and cadmium at concentrations of 26.4 and 3.3 mg/kg, respectively, in a sample obtained at a depth of 2 feet or less. ORPH, DRPH, polycyclic aromatic hydrocarbons (PAHs) and metals were not detected in samples obtained below depths of approximately 2 feet.

Diesel Shop and Materials Storage Building

Twenty explorations were conducted in this area. Analytical results indicate samples obtained in the upper 4 feet of soil in borings DP-2, DP-3, DP-7 and DP-8 contain DRPH concentrations from 3,950 to 12,800 mg/kg and ORPH concentrations from 2,330 to 10,600 mg/kg. In borings DP-3 and DP-7 naphthalene was detected in soil samples obtained in the upper 4 feet of the borings at concentrations of 5.4 and 34.5 mg/kg, respectively. Methylene chloride was detected at a concentration of 0.023 mg/kg in a soil sample obtained at a depth of approximately 60 feet in monitoring well MW-23. With the exception of MW-23, ORPH, DRPH, PAHs, metals and benzene, ethylbenzene, toluene and xylenes (BETX) were not detected at concentrations exceeding cleanup levels in soil samples obtained below depths of approximately 4 feet.

Western Fruit Express (Generator Storage Area)

Nine explorations were conducted in this area. Analytical results indicate soil samples obtained in test pits GTP-32, GTP-33, GTP-34, GTP-35 and GTP-35B contain lead concentrations ranging from 1,690 to 48,200 mg/kg. Arsenic was detected in test pits GTP-32, GTP-34 and GTP-35 at concentrations ranging from 95.2 to 204 mg/kg. Cadmium was detected in six test pits at concentrations ranging from 2.4 to 653 mg/kg. Mercury was detected in test pit GTP-35 at a concentration of 6.1 mg/kg. All samples noted above were obtained in the upper 2 feet of soil. DRPH, ORPH, metals and polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), PAHs and metals were not detected at concentrations exceeding preliminary cleanup levels in soil samples obtained below depths of approximately 2 feet.

Dismantling Spur and East and West Debris and Soil Deposit Area

Eight explorations were conducted in this area. Analytical results indicate soil samples obtained in test pits GTP-36, GTP-37, GTP-38 and GTP-38A contain concentrations of arsenic ranging from 22.9 to 91.9 mg/kg at an approximate depth of 8 feet or less. Soil samples obtained in test pits GTP-36 through GTP-38 contained concentrations of lead ranging from 1,120 to 3,130 mg/kg. Cadmium was detected at concentrations ranging from 4.9 to 39.2 mg/kg in samples collected from four test pits. DRPH, ORPH, PCBs and metals were not detected at concentrations exceeding preliminary cleanup levels in soil samples obtained below a depth of approximately 8 feet.

Yardley Office (Main Line No. 1)

Eleven explorations were conducted in this area. Analytical results indicate soil samples obtained in borings DP-15, DP-21 and DP-23 contained concentrations of arsenic ranging from 21.2 to 53.9 mg/kg at an approximate depth of 4 feet or less. Cadmium was detected at concentrations of 3.8 and 5.2 mg/kg in samples collected from DP-21 and DP-23, respectively. DRPH, ORPH and metals were not detected at concentrations exceeding preliminary cleanup levels in soil samples obtained below depths of approximately 4 feet.

Ralston Lead Track

Six explorations were conducted in this area. Analytical results indicate soil samples obtained in borings DP-43 and DP-44 contained concentrations of methylene chloride from 0.074 to 0.18 mg/kg at an approximately depth of 4 feet or less. Cadmium was detected at 2.3 mg/kg in a sample collected from ground surface to 2 feet below grade in boring DP-44A. DRPH, ORPH, metals, PAHs and VOCs were not detected at concentrations exceeding preliminary cleanup levels in soil samples obtained below depths of approximately 4 feet.

TTX Facility

One exploration was conducted in this area. Analytical results indicate soil samples obtained in boring DP-45 at a depth of 16 feet or less did not contain concentrations of DRPH, ORPH or metals exceeding preliminary cleanup levels.

Fueling Area

Analytical results of groundwater samples obtained from monitoring wells MW-22 and MW-23 indicate DRPH and ORPH were not detected above laboratory reporting limits.

Locations and Media Requiring Cleanup Action Evaluation in Feasibility Study

Based on the results of this RI, the following eight areas and media require evaluation for cleanup action in the Feasibility Study (FS). Based on the results of the RI, no further action is recommended at the TTX Facility or near monitoring wells MW-22 and MW-23 such that these areas will not be further evaluated in the FS.

- Koch Asphalt Lease Area: soil to a depth of at least 2 feet near test pits GTP-46, GTP-47 and GTP-49 for DRPH, ORPH, arsenic, cadmium and PAH's.
- Diesel Shop: soil near the former remedial excavation between the Diesel Shop and Material Storage Building for DRPH, ORPH, naphthalene and PAH's.
- Material Storage Building: soil to a depth of at least 4 feet near DP-2, DP-3 and DP-7 through DP-9 for DRPH, ORPH, naphthalene and PAH's.
- Western Fruit Express (Generator Storage Area): soil to a depth of at least 2 feet near test pits GTP-32 through GTP-35 and GTP-35B, and soil boring DP-12 for arsenic, lead, cadmium and mercury..
- Dismantling Spur and East and West Debris and Soil Deposit Areas: soil to a depth of at least 8 feet near test pits GTP-36B, GTP-36 through GTP-38, and GTP-38A for arsenic, lead, cadmium and mercury.

- Yardley Office (Main Line Track No. 1): soil to a depth of at least 4 feet near borings DP-15, DP-21 and DP-23 for arsenic and cadmium.
- Ralston Lead: soil to a depth of at least 4 feet near borings DP-43, DP-44 and DP-44A for methylene chloride and cadmium.
- Fueling Area: soil and groundwater near former petroleum tanks. This area currently is being addressed with the soil and groundwater remediation system that has been in operation since March 2009.

1.0 INTRODUCTION

This report presents the objectives and results of remedial investigation (RI) activities conducted between December 3, 2009 and February 25, 2010 at the BNSF Railway Company (BNSF) Parkwater Rail Yard Site (Site), formerly known as Yardley, located at 5302 East Trent Avenue, Spokane, Washington (Figure 1). In addition to the studies completed in December 2009/ February 2010, this RI report also incorporates the results of earlier investigations and interim remedial actions to present a comprehensive summary of Site conditions. The subject property and areas of interest are shown in Figure 2.

The Site is located in a historical industrial area approximately ½-mile south of the Spokane River. The Site overlies the Spokane Valley – Rathdrum Prairie (SVRP) Aquifer, the sole source of drinking water for area residents.

BNSF is performing this RI in accordance with Agreed Order No. 6453 with the Washington State Department of Ecology (Ecology) and the RI/FS Work Plan approved by Ecology pursuant to that Agreed Order. The Site is listed on the Ecology Site Database as Ecology Identifier 676. The Site also includes the Western Fruit Express Co., Ecology Identifier 69324774, and the Western Fruit Express Spokane [Turbo Waste], Ecology Identifier 2450396.

BNSF and its predecessors have owned and operated the Site since the early 1900s. Typical railroad operations during this time have included locomotive and rail car maintenance and repair, rail commodities storage and transfer, and locomotive refueling. BNSF leased a 3-acre portion of the Site to various other industrial businesses including Koch Materials, Tri-State Oil and Continental Coal Company. These lessees operated at least 13 above ground storage tanks (ASTs) at the Site which stored asphalt, fuel oil and bunker oil. The ASTs were dismantled in 1988.

Previous environmental investigations conducted at the Site have documented petroleum hydrocarbons in soil and groundwater, and PCBs in soil at concentrations exceeding Model Toxics Control Act (MTCA) Method A cleanup levels.

BNSF is required to prepare and submit a RI/FS for the Site as part of the Scope of Work defined in the Agreed Order as described in the mutually agreed RI/FS Work Plan dated September 30, 2009 (RI/FS Work Plan). This document fulfills the RI report component outlined in the RI/FS Work Plan.

This RI report was prepared in general accordance with the requirements defined by the MTCA Regulation (Washington Administrative Code [WAC] 173-340-350) for submittal to Ecology. Appendices to this RI include Appendix A – Remedial Investigation Field Methods; Appendix B – Soil Chemical Analytical Results Tables; Appendix C – Data Quality Assessment Summary; and Appendix D - Laboratory Analytical Reports (CD).

1.1. RI Objective

The objective of this RI was to collect, develop and evaluate sufficient information to determine what, if any, areas at the Site require cleanup and should be analyzed in the FS. This RI report also references summaries of previous investigations conducted at the Site.

1.2. Report Organization

Section 2.0 of this report describes Site history, environmental setting, current land uses, basis of concern and regulatory framework. Section 3.0 describes cleanup standards development. Soil investigations associated with the RI and results of these investigations are presented in Section 4.0. Section 5.0 explains groundwater investigations and presents the results of these investigations. Section 6.0 presents a conceptual site model based on existing data. Section 7.0 describes the locations and media that should be evaluated in the FS, based on the results of the RI and Section 8.0 presents report references and acronyms.

2.0 SITE DESCRIPTION, HISTORY, AND REGULATORY FRAMEWORK

This section describes the Site, including location, history and current uses, and describes the existing regulatory framework.

2.1. Property Description

The Site is bounded on the east by North Fancher Road, on the north by East Trent Avenue, on the west by North Havana Street and on the south by the BNSF mainline tracks as shown in Figure 2. The Site generally is level and covers approximately 130 acres. Most of the ground surface has been improved with crushed rock surfacing, although some high use areas are covered with concrete or asphalt. Current Site facilities include modern buildings and several historic buildings. Adjacent properties include additional rail yard facilities and operations west of Havana Street and east of Fancher Road (BNSF Intermodal Facility); Trent Avenue to the north and commercial development along Trent Avenue; and additional industrial areas south of the BNSF mainline tracks.

2.2. Historical Operations and Site Uses

Parkwater is located along an active BNSF east-west mainline and is the principal BNSF rail yard in the Spokane area. Parkwater initially was constructed in the early 1900s as the main roundhouse and terminal facility for the Northern Pacific Railroad (Northern Pacific Railroad and Great Northern Railway and other railroads merged in 1972). Parkwater was the central operations maintenance and switching facility for the Northern Pacific Railroad from the early 1900s to 1959, when the roundhouse was demolished. During this time period, Parkwater supported several rail operations including fueling, maintenance, intermodal operations and switching. Parkwater continued to support many of these operations in a lesser capacity from 1959 to 2004 when BNSF opened the new fueling facility in Hauser, Idaho. Presently, Parkwater provides refueling, maintenance and switching operations.

1. Documentation of specific historic activities that have occurred over the 100-year operational period of the Parkwater Rail Yard is limited. However, the general Site layout has remained relatively unchanged over the years. Former facilities such as the Koch Materials asphalt lease area, which included ASTs, have been removed. Based on historic information obtained under development of the RI/FS Work Plan and this study, the primary areas at the Site that use(d) hazardous materials in routine operations and areas of documented and/or suspected releases include: (1) Former Koch Materials asphalt lease area; (2) Diesel Shop and Materials Storage Building; (3) Western Fruit Express Maintenance Facility; (4) Dismantling Spur and

East and West Debris and Soil Deposit Areas; (5) Yardley Office (Main Line No. 1) Area; (6) Ralston Lead; (7) TTX Facility; (8) a former building shown on a historic site plan labeled "paint"; and (9) a former gasoline storage tank shown on a historic site plan. Descriptions of these areas are detailed in the RI/FS Work Plan and the Environmental Site Assessment Report (June 30, 2008).

2.3. Fueling Area and Interim Groundwater Treatment System

The east-central portion of Parkwater, about 500 feet west-southwest of the turntable and between the Materials Storage Building and Western Fruit Express Maintenance Facility, has historically been used for locomotive fueling. Several former underground storage tanks (USTs), including a 10,000-gallon, a 17,000-gallon, and a 25,000-gallon diesel USTs, and an 18,000-gallon waste oil UST were located west and northwest of the current Fueling Area. The general location of the Fueling Area is shown in Figure 2.

The Fueling Area is an area of past diesel release(s) resulting from a former leaking underground storage tank(s). The Fueling Area has undergone extensive studies prior to development of the RI/FS Work Plan. Currently, soil vapor extraction (SVE) and air sparging (AS) systems are in operation as interim remedial actions. These systems were put into operation on March 25, 2009 pursuant to Agreed Order No. 6453 and approved work plans. Preliminary details of this remedial alternative were provided to Ecology in the report titled "Interim Cleanup Action Plan, Diesel Fuel Release Parkwater Railyard, Spokane, Washington" dated December 17, 2008. Details of the current operational systems are discussed in greater detail in the following sections. Groundwater analytical results are provided in Table 1 and compare diesel-range petroleum hydrocarbons before and after the startup of the interim remedial system.

Soil vapor extraction is used to extract diesel vapors entrained within the interstitial spaces in vadose-zone soils. The SVE system can be modified to introduce oxygen into contaminated vadose-zone soils (bioventing) to stimulate natural biodegradation of petroleum hydrocarbons. Air sparging is used to introduce oxygen, enhanced with ozone, into the aquifer to both promote natural biodegradation of diesel in groundwater, to breakdown petroleum hydrocarbons via oxidation, and to strip volatile components of diesel from groundwater.

In the short-term the physical effects of vapor extraction and stripping appear to have removed the lighter-end compounds in the beginning of the remedial period. The long-term remedial approach will be to provide sufficient oxygen into both soil and groundwater to promote biodegradation of the heavier-end compounds typically found in diesel.

Data obtained during routine monitoring, since system start up in March 2009, indicates the system is performing as designed, removing petroleum hydrocarbons from subsurface soil and groundwater. Semi-annual remedial system progress reports (GeoEngineers, January 28, 2010 and May 11, 2010) document the operation of these systems.

2.4. Environmental Setting

This section describes the geology and hydrogeology of the Parkwater Rail Yard Area. The description is based on information obtained during previous investigations; however, the

groundwater occurrence summary and flow directions also incorporate information from the 2009/2010 RI.

2.4.1. Geologic and Soil Conditions

Geologic maps indicate the region is underlain by glacial flood-channel deposits, predominantly gravel (Qfcg). This geologic unit was deposited during prehistoric catastrophic ice-age flooding at the end of the last ice age, on the order of 10,000 years ago. The Qfcg geologic unit is described as a thickly bedded to massive mixture of boulders, cobbles, gravel and sand with localized beds and lenses of sand and silt. Boulders can be more than 5 feet diameter. The color is typically gray to yellowish gray, or light brown.

As indicated above, in general, regional surface soil conditions consist of gravel and/or crushed rock surfacing. According to the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), the Site is underlain by the Garrison Gravelly Loam, 0 to 5 percent slopes (Unit GgA). The NRCS Web Soil Survey described the GgA soil unit as, "very deep, somewhat excessively drained soil situated on nearly level to gently sloping terraces. It formed in glacial outwash mixed with volcanic ash in the upper part. Typically the surface layer is gravelly loam 15 inches thick. The subsoil is very gravelly loam, 29 inches thick. The substratum is very gravelly loamy coarse sand to a depth of 60 inches."

Subsurface explorations conducted on portions of the Site as part of past environmental investigations indicate soil conditions similar to those described in soil and geologic maps and literature. In general, these explorations indicate that portions of the Site are underlain by fill soil to maximum depths of 20 feet, overlying predominantly gravel deposits with variable silt and sand content.

The gravel includes interbeds and lenses of sand, silty sand and occasional lenses of silt. In general, deeper investigations at the Site terminated in gravel unit at depths on the order of 80 feet below the current ground surface. Interpreted subsurface conditions near the fueling area are shown on cross sections included in the *Interim Action Work Plan* (GeoEngineers, 2009).

2.4.2. Hydrogeologic Conditions

Parkwater is underlain by at least two aquifers. These aquifers occur within: (1) basement rocks; and (2) unconsolidated glaciofluvial sediments. Groundwater occurs in basement rocks in fractured and/or weathered zones. Porosity, hydraulic conductivity, and transmissivity generally are low. Water wells penetrating the basement rock aquifer typically can be expected to yield several gallons per minute (gpm) or less.

Groundwater within unconsolidated sediments near Parkwater generally occurs within glaciofluvial sediments associated with the SVRP Aquifer, which covers a land area of about 408 square miles in Idaho and Washington. The SVRP aquifer is highly transmissive, unconfined throughout much of its length, and reaches saturated thicknesses exceeding 800 feet within the Rathdrum Prairie and 600 feet within the Hillyard Trough (Kahle and Bartolino, 2007). The hydraulic properties of the SVRP Aquifer have been estimated by Vaccaro and Bolke (1983), Jensen and Eckart (1989), CH2M Hill (1998), Buchanan (1999), and Hsieh et. al. (2007), and are summarized by the following:

- Hydraulic conductivity estimates range from about 100 to 6,200 feet per second (ft/s);
- Transmissivity estimates range from 0.05 to 70 square feet per second (ft^2/s);
- Specific yield estimates range from 0.1 to 0.3; and
- Groundwater velocity estimates range from 0.01 to 80 feet per day (ft/d).
- Groundwater flux through the SVRP aquifer was estimated at about 250 to 650 million gallons per day near the Washington-Idaho border (Kahle et. al., 2005).

Based on measurements in several existing monitoring wells at the Site, depths to groundwater range from about 62 to 68 feet, but can vary as much as 10 to 15 feet seasonally within the SVRP Aquifer underlying the site. Groundwater flow direction generally is to the west and northwest and hydraulic gradient is on the order of $2.2x10^{-3}$ (feet/feet).

2.5. Current and Likely Future Land Use

The Site currently is an active rail yard, and routine operations include fueling, locomotive and rail car maintenance and switching of rail cars. There currently are no plans to change the use or operations at the Site in the future. According to the City of Spokane, the site is currently zoned Heavy Industrial (HI).

2.6. Exposure Pathways and Receptors

Prior to the 2009/2010 investigations, available information indicated releases to the environment of materials used at the Site. Ecology listed portions of the Site on its Confirmed and Suspected Contaminated Sites List because of the presence of DRPH, ORPH and gasoline range petroleum hydrocarbons (GRPH), VOCs, metals and PCBs in soil and/or groundwater. Potential groundwater impacts include hazardous substances that migrate from soil to groundwater.

The City of Spokane supplies water for on-site use. Currently, there are no known active groundwater supply wells at the Site; therefore, there is no current use of groundwater beneath the Site. Numerous resource protection wells are maintained at the site for the purpose of monitoring groundwater conditions underlying the Site.

Potential exposure pathways related to soil and/or groundwater are discussed below; further, exposure pathways deemed to be incomplete were not considered further in this RI. Additional details of contamination sources and mechanisms are discussed in Section 6.0, Conceptual Site Model.

The following potential exposure pathways and receptors include:

- Ecological
  - Direct contact with contaminated soil and surface water runoff – small mammals, birds, soil biota, plants
  - Ingestion of contaminated soil and surface water runoff – small mammals and birds
  - Ingestion of plants or fauna that have ingested or absorbed contaminants from the site – predatory small mammals and birds
- Human

- Dermal contact with contaminated soil during excavation work – on-site workers
- Dermal contact with contaminated groundwater removed from on-site monitoring wells – on-site workers
- Dermal contact with and inhalation of contaminated windblown dust – on-site workers, adjacent off-site workers, and adjacent residents
- Dermal contact with contaminated surface water runoff – on-site workers, adjacent off-site workers, and adjacent residents

2.7. Regulatory Framework

In 2009, BNSF Railway entered into Agreed Order 6453 with the Washington State Department of Ecology under the MTCA. Work to be performed under the Agreed Order includes: (1) project planning including a RI Work Plan, Interim Action Work Plan, Sampling and Analysis Plan, and a Health and Safety Plan; (2) complete RI field activities based on the Ecology approved Work Plan; (3) complete a Feasibility Study (FS) based on the RI results; and (4) prepare RI and FS reports for submittal to Ecology. Interim actions are being implemented pursuant to the Agreed Order and the approved Interim Action Work Plan.

3.0 DEVELOPMENT OF CLEANUP STANDARDS

Cleanup standards consist of: (1) cleanup levels that are protective of human health and the environment; and (2) the point of compliance at which the cleanup levels must be met. Preliminary cleanup standards are developed in this RI. Proposed cleanup standards for remedial alternative evaluation are presented in the FS, and serve as the basis for developing media-specific objectives for the cleanup action. Final cleanup standards for the Site will be established in the Cleanup Action Plan to be prepared following completion of the FS.

3.1. Cleanup Levels

In accordance with MTCA, development of preliminary cleanup levels includes identifying potential exposure pathways for human and environmental impacts based on planned land use. The Site is currently zoned industrial and future zoning is not anticipated to change. As discussed previously, the site is part of an active rail yard that will remain in service.

3.1.1. Soil

Access to the property is currently restricted to BNSF employees and their authorized contractors. Based on current and likely future zoning and Site use, preliminary soil cleanup levels will be based on industrial land use. Therefore, preliminary cleanup levels were developed using MTCA Method A Industrial and Method C cleanup levels. During the FS, cleanup levels based on protection of groundwater and/or risk-based remediation levels for specific land uses and associated institutional controls might be considered a component of cleanup alternative development and evaluation. Preliminary soil cleanup levels based on protection of groundwater are presented in Table 2.

Preliminary cleanup levels were selected from the following regulatory criteria:

- MTCA Method A Soil Cleanup Levels – Industrial Land Use

- MTCA Method C Soil Cleanup Levels – Soil Direct Contact/Ingestion

In addition to the criteria listed above, Washington State soil background concentrations for metals (Ecology, 1994) and method reporting limits were considered in accordance with WAC 173-340-709, WAC 173-340-705(6), and WAC 173-340-707.

In general, the lowest applicable soil criteria were identified as the preliminary soil cleanup levels. The following exceptions were considered:

- **Background:** If the lowest regulatory criterion is less than the background concentration, the preliminary soil cleanup level was set at the background concentration.
- **Method Reporting Limit:** If the lowest regulatory criterion is less than the method reporting limit, the preliminary soil cleanup level was set at the method reporting limit unless the method reporting limit is less than the background concentration. In that case, the preliminary soil cleanup level was set at the background concentration. Method reporting limits are included in Table 2 for site COPCs.

BNSF plans to continue using the Site as an active rail yard indefinitely. It is unlikely that the COPCs detected in soil will pose an unacceptable risk to terrestrial ecological receptors because of the industrial nature of the Site and lack of habitat. A *Terrestrial Ecological Evaluation Process-Simplified Evaluation Documentation Form* (TEE), (Ecology, 2008) was completed during preparation of the RI/FS Work Plan and is summarized in Section 3.1.3 of this report. Based on the results of the simplified TEE, there are no expected impacts to wildlife at the site.

3.1.2. Groundwater

Preliminary groundwater cleanup levels were selected from MTCA Method A Cleanup Levels Groundwater WAC 173-340-720(3) and Chapter 173-340 WAC Table 720-1.

In addition to the criteria listed above, Washington State groundwater background concentrations and method reporting limits were considered in accordance with WAC 173-340-709 and WAC 173-340-705(6), and WAC 173-340-707.

The following exceptions were considered:

- **Background:** If the lowest published regulatory criterion is less than the background concentration, the preliminary groundwater cleanup level was set at the background concentration.
- **Method Reporting Limit:** If the lowest published regulatory criterion is less than the method reporting limit, the preliminary groundwater cleanup level was set at the method reporting limit, unless the method reporting limit is less than the background concentration. In that case, the preliminary groundwater cleanup level was set at the background concentration.

Preliminary cleanup levels for groundwater are shown in Table 3.

3.1.3. Terrestrial Ecological Evaluation

BNSF plans to continue using the Site as an active rail yard indefinitely. Based on the industrial nature of the Site and the lack of habitat, it is unlikely that the COPCs detected in soil will pose an

unacceptable risk to terrestrial ecological receptors. Based on WAC 173-340-7491, the site does not meet the criteria for a terrestrial ecological evaluation (TEE) exclusion. A review was performed of the TEE forms [Terrestrial Ecological Evaluation Process – Primary Exclusions Documentation Form and Terrestrial Ecological Evaluation Process-Simplified Evaluation Documentation Form, (Ecology, 2008)]. Based on that review, a simplified TEE was completed for the Site consistent with the criteria in WAC 173-340-7492(2)(a)(ii): land use at the Site and surrounding area makes substantial wildlife exposure unlikely based on completion of Table 749-1. The following values were used in Table 749-1 to complete the simplified TEE:

1. Box 1 (Area Size): 4 points for 0.25 acres or less of undeveloped land – The Site is an active railyard surrounded by other developed properties. The entire Site is developed and used for railroad-related activities.
2. Box 2 (Site Use): 3 points for industrial site – The Site is an active railyard.
3. Box 3 (Habitat Quality): 3 points for low habitat quality – There is minimal plant life and heavy industrial human activity disturbs the entire Site. There are no habitat areas surrounding the Site.
4. Box 4 (Wildlife Attraction): 2 points for low potential for the property to attract wildlife – There is no undeveloped land on the Site to attract wildlife.
5. Box 5 (Contaminants Present): 1 point, releases have been documented at the Site.
6. Box 6 Summary of above scores in Boxes 2 through 5: 9 points – If the Box 6 total is greater than the Box 1 value, the simplified TEE is complete.

3.2. Based on the results of the simplified TEE, there are no expected impacts to wildlife at the Site. Points of Compliance

Under MTCA, the point of compliance is the point or location on a site where the cleanup levels must be attained. The points of compliance for affected media will be approved by Ecology and presented in the site-wide CAP. However, it is necessary to identify proposed points of compliance to develop and evaluate the effectiveness of cleanup action alternatives in the FS. This section describes the proposed points of compliance for soil and groundwater.

3.2.1. Soil

The standard point of compliance for preliminary soil cleanup levels based on protection of humans from direct contact shown in Table 2 will be throughout the soil column from the ground surface to 15 feet, in accordance with WAC 173-340-740(6)(d) and WAC 173-340-7490(4)(b). The standard point of compliance for preliminary soil cleanup levels based on protection of groundwater shown in Table 2 will be throughout the soil column [WAC 173-340-740(6)(b)]. For potential terrestrial ecological exposures, MTCA regulations allow a conditional point of compliance to be established from the ground surface to 6 feet (the biologically active zone according to MTCA default assumptions), provided institutional controls are used to prevent excavation of deeper soil [WAC 173-340-7490(4)(a)]. Accordingly, in areas of the Site where potential ecological exposures are a concern, and where appropriate institutional controls can be implemented, a conditional point of compliance for soil concentrations protective of terrestrial ecological receptors may be proposed throughout the soil column from the ground surface to 6 feet. For cleanup actions that

involve containment of hazardous substances, soil cleanup levels will typically not be met inside containment area(s) [WAC 173-340-740(6)(f)].

3.2.2. Groundwater

The standard point of compliance for preliminary groundwater cleanup levels shown in Table 3 will be all groundwater at the Site from the top of the saturated zone to the lowest depth which could be affected by the site {WAD173-340-720(8)(b)}.

4.0 SOIL INVESTIGATIONS AND RESULTS

This section presents a description of the RI activities associated with the soil conducted at the Site and the physical and chemical characterizations of the soil. A summary of previous investigations for Site soil also are presented in this section. Refer to the RI/FS Work Plan for more detailed descriptions of previous investigations. Logs of the explorations and descriptions of the remedial investigation field methods are presented in Appendix A. A summary of explorations completed as part of the RI is presented in Tables 4 and A-1. Note borings DP-6 and DP-31 were not completed because of surface infrastructure conflicts and/or underground utility conflicts. Summary tables of the soil chemical analytical results are presented in Appendix B. Laboratory analytical reports are provided on CD in Appendix D.

4.1. Soil Investigation Activities

4.1.1. General

Soil investigation activities were completed at the Site from December 3, 2009 through February 25, 2010 as part of Phase I of the RI to address data gaps described in the RI/FS Work Plan. The soil investigation consisted of a series of drilled and direct push borings and test pits and the installation of two groundwater monitoring wells. Phase II of the RI included completing three hand auger borings to a depth of approximately 1½ feet in the WFE Generator Storage Area. The locations of the explorations are shown in Figures 3 through 9. The following sections describe soil sampling RI activities as well as previous soil investigation activities. Refer to the RI/FS Work Plan for a comprehensive summary of previous investigations completed at the Site. Note the depths that samples were obtained from the borings and the depths at which the soils encountered change, were normalized to 100 percent recovery. Refer to Appendix A for discussion of methods used to normalize the depths during exploration.

4.1.2. Former Koch Materials Lease Area

4.1.2.1. SUMMARY OF PREVIOUS INVESTIGATIONS

According to reports prepared by SCS Engineers (1989) and (1990) an area of total petroleum hydrocarbon (TPH) and PAH contamination was discovered in soil samples from 10 shallow test pits excavated at the former Koch facility. However, the vertical extent of the TPH and PAH contamination was not determined.

4.1.2.2. 2009/2010 INVESTIGATIONS

The RI data objective at the Former Koch Materials Lease Area was to characterize the vertical and lateral extent of TPH and PAH soil contamination that had not been delineated by previous investigations In addition to TPH and PAH, COPCs included DRPH and metals. The data objective

was accomplished by excavating eight test pits (GTP-46 through GTP-53) at the approximate test pit locations shown in Figure 3. Test pits were excavated to depths from 11 to 15 feet below the ground surface. Sample screening and collection were completed in accordance with the Sampling and Analyses Plan (SAP), Appendix B, of the RI/FS Work Plan. Up to three samples were obtained from each test pit based on field observations and screening. Select samples obtained from the explorations with moderate sheen or headspace vapor detection of 10 ppm or greater were submitted for chemical analyses. Refer to Appendix A for description of field screening methods.

4.1.3. Diesel Shop and Materials Storage Building

4.1.3.1. SUMMARY OF PREVIOUS INVESTIGATIONS

A remedial excavation was conducted to remove diesel-contaminated soil between the Diesel Shop and the Materials Storage Building. Confirmation samples obtained from the base (6 feet bgs) and west sidewall of the excavation indicated the presence of diesel-contaminated soil at concentrations exceeding MTCA Method A cleanup levels (Olympus Environmental Services, 1999).

Four borings were completed between the Diesel Shop and the Materials Storage Building along the north side of the Diesel Shop. DRPH and ORPH were detected in only one boring at concentrations less than cleanup levels. DRPH, ORPH and BETX were not detected in soil samples from the remaining three borings (Remediation Technologies, Inc., 2003).

Previous remediation activities, including subsequent overexcavation and confirmation sampling at the Material Storage Building, included excavation, transport and disposal of petroleum-contaminated soil removed from a rail bed south of the Materials Storage Building (Olympus Environmental Services, 1999). Confirmation sampling indicated contamination levels less than MTCA Method A Cleanup levels.

4.1.3.2. 2009/2010 INVESTIGATIONS

The RI data objective at the Diesel Shop and Materials Storage Building areas was to: (1) characterize the nature and extent of staining observed along the tracks south of the Materials Storage Building; (2) contamination remaining from previous remedial investigation between the Diesel Shop and the Materials Storage Building; and (3) staining observed west of the Diesel Shop. COPCs included DRPH, ORPH, BETX, metals and PAHs.

Eleven borings (DP-1, DP-1A, DP-2 through DP-5 and DP-7 through DP-11) were drilled along the tracks south of the Materials Building; six borings west of the Diesel Shop (DP-24 through DP-29); and one boring (DP-30) in the former remedial excavation area between the Diesel Shop and Materials Storage Building. Borings were completed to depths of 15 to 16 feet, and approximate locations of the explorations are shown in Figure 4. Additional borings were not completed in the former remedial excavation area because of space limitations and the presence of railroad tracks.

4.1.4. Western Fruit Express (Generator Storage Area)

4.1.4.1. SUMMARY OF PREVIOUS INVESTIGATIONS

A previous evaluation conducted by Retec in 2001 in the generator storage and portable fuel tank storage area presents evidence that potential releases occurred in the WFE oil/water separator and generator storage areas (Retec, 2001). Details of previous evaluations completed at the WFE facility are provided in the RI/FS Work Plan.

4.1.4.2. 2009/2010 INVESTIGATIONS

The RI data objective at the Western Fruit Express Facility included characterizing the nature and extent of staining observed near the generator storage area, the former portable storage tanks area and to confirm the presence of a release from an oil/water separator located near the wash bay. COPCs included DRPH, ORPH, metals, PCBs, VOCs and PAHs.

Five test pits, (GTP-32 through GTP-35 and GTP-35B), were excavated near the generator and former portable 250-gallon waste oil tank storage area, and Boring DP-12 was completed inside a wash bay near the former oil/water separator. Three hand auger borings, GTP-56 through GTP-58, were excavated at the west end of the generator storage area, after receipt of analytical results from the initial test pits to better define the lateral limits of metals contamination in soil. The locations of the five initial test pits, which were excavated to depths from 4 to 8 feet, are shown in Figure 5. The three additional explorations, GTP-56 through GTP-58, were completed using hand equipment to maximum depths of only about 1½ feet, because analytical data from samples obtained below a depth of 2 feet in the initial test pits were non-detect for the COPCs. The hand auger borings were completed through the shallow fill soil into the native gravel. The direct push boring, completed within the wash bay, was advanced to a depth of 12 feet.

4.1.5. Dismantling Spur and East and West Debris and Soil Deposit Areas

4.1.5.1. SUMMARY OF PREVIOUS INVESTIGATIONS

PCB-contaminated soil was excavated from an area southeast of the WFE Maintenance Facility and stockpiled north of the dismantling spur prior to removal from the site. Reportedly, no previous investigations were completed specific to the dismantling spur area.

Previous investigations were conducted by ThermoRetec in 1999; Foss Environmental Services Company on April 22, 2003; and GeoEngineers, Inc. on October 17, 2006 in the debris and soil deposit areas. These investigations yielded detections of ORPH, DRPH and metals. The sources and vertical and lateral and extent of the contamination in the debris and soil deposit areas were delineated.

4.1.5.2. 2009/2010 INVESTIGATIONS

The RI data objective near the dismantling spur primarily was to characterize possible impacts of PCB in soil stockpiled in the area prior to removal from the site. Explorations also were conducted to augment existing data for the east and west debris and soil deposit areas. COPCs included DRPH, ORPH, PCBs and metals.

Eight test pits, (GTP-36, GTP-36A, GTP-36B and GTP-37 through GPT-40), were completed to depths from 7½ to 11 feet and are approximately shown in Figure 6.

4.1.6. Yardley Office (Main Line Track No. 1) Area

4.1.6.1. SUMMARY OF PREVIOUS INVESTIGATIONS

According to a previous investigation conducted by Retec in 2001, diesel was released from a locomotive on Main Line Track No.1 near the Havana Street crossing on November 27, 2000. The release reportedly was caused by a broken fuel injection line. The volume of the release was not stated in the report and only minor cleanup was performed on the spill. No further assessments were completed (Retec, 2001).

4.1.6.2. 2009/2010 INVESTIGATIONS

The RI data objective near the Yardley Office (Main Line Track No. 1) was to characterize the nature and extent of soil impacted by a fuel release along the Main Line Track No. 1. COPCs included DRPH, ORPH and metals.

Eleven borings, DP-13 through DP-23, were drilled along alternating sides of Main Line Track No. 1 between Havana Street and the first signal post crossing east of Havana Street, near the BNSF Yardley Office (Main Line Track No. 1). Borings were located within 5 feet of the track and completed to a depth of 15 feet with the exception of DP-22, which encountered refusal at 8 feet. Further, an additional boring near DP-22 could not be completed because of train traffic. Borings were continuously sampled, and select samples were submitted for chemical analyses based on field observations and screening. Boring locations approximately are shown in Figure 7.

4.1.7. Ralston Lead Track

4.1.7.1. SUMMARY OF PREVIOUS INVESTIGATIONS

In 2009, during excavation of soil contaminated by a small motor spill, petroleum-contaminated soil was discovered beneath the Ralston Lead Track. The contamination appeared to be old because only native soil beneath the track was affected; overlying ballast was not contaminated. An assessment was not completed and remedial activities associated with the contamination were not pursued.

4.1.7.2. 2009/2010 INVESTIGATIONS

The RI data objective at the Ralston Lead Track area was to characterize the location, nature, and extent of historic contamination along an approximately 300-foot-long section of the track. COPCs included DRPH, ORPH, metals, VOCs and PAHs.

Six borings (DP-41 through DP-44, and DP44A and DP-44B) were completed along the north side of the Ralston Lead track, approximately as shown in Figure 8. The borings were completed to depths of 15 feet using sonic drilling and continuous sampling methods. Select samples obtained from the explorations with moderate sheen or head space vapor detection of 10 ppm or greater were submitted for chemical analyses. Refer to Appendix A for description of screening methods.

4.1.8. TTX Facility

4.1.8.1. SUMMARY OF PREVIOUS INVESTIGATIONS

Personal Communication with Ray Wilson, NRC Environmental, on February 27, 2009 indicates several hundred gallons of oil reportedly were spilled between two trailers. Contaminated soil was excavated and replaced with clean gravel; no previous assessments have been completed in this area.

4.1.8.2. 2009/2010 INVESTIGATIONS

The RI data objective at the TTX facility was to collect confirmation samples to verify the effectiveness of a previous remediation that involved the removal of contaminated soil associated with an oil release between the two trailers. COPCs included ORPH and metals.

Boring DP-45 was drilled to a depth of 16 feet using direct-push and continuous sampling methods between two supply trailers, approximately as shown in Figure 9. Select samples were submitted for chemical analyses.

4.1.9. Former Building Labeled "Paint"

4.1.9.1. SUMMARY OF PREVIOUS INVESTIGATIONS

The labeling on the historic site plan suggests the potential use of paints and solvents at a former building at this location. During development of the RI/FS Work Plan, no documentation was found regarding potential assessments in this area.

4.1.9.2. 2009/2010 INVESTIGATIONS

The RI data objective at the location of the former "paint" building was to evaluate the area for potential soil contamination possibly associated with paint storage or operations. COPCs included VOCs and lead.

Boring DP-54 was completed near the former building location, approximately as shown in Figure 3. The boring was drilled to a depth of 15 feet using sonic drilling and continuous sampling methods. Select samples were submitted for chemical analyses based on field observations and screening.

4.1.10. Former Gasoline Storage Tank

4.1.10.1. SUMMARY OF PREVIOUS INVESTIGATIONS

A historic site plan indicates a former gasoline storage tank located near the 90-day storage area. No other historic documentation was found during development of the RI/FS Work Plan regarding details of this storage tank or information regarding potential assessments in this area.

4.1.10.2. 2009/2010 INVESTIGATIONS

The RI data objective at the location of the former gasoline storage tank was to evaluate potential soil contamination near the former storage tank site. COPCs included GRPH, TPH and lead.

Test pit GTP-55 was excavated near the former gasoline storage tank location, approximately as shown in Figure 4. The test pit was completed to a depth of 9 feet. Samples were obtained from the test pit based on field observations and screening, and select samples were submitted for chemical analyses.

4.2. Soil Investigation Results

4.2.1. Former Koch Materials Lease Area

4.2.1.1. PHYSICAL CHARACTERIZATION

Subsurface conditions were evaluated by excavating eight test pits to a maximum depth of 15 feet below the ground surface. Subsurface conditions encountered at the locations of test pits GTP-46 through GTP-53 can be characterized into two general units including: (1) fill; and (2) gravel. Fill was encountered at depths from 1½ to 5 feet and consisted of black to dark brown gravel with sand and variable debris including fragments of tar/asphalt and brick. The fill is underlain by a native gravel unit generally consisting of brown gravel with variable sand and silt content, and occasional cobbles and boulders. Each of the test pits was completed within the gravel unit. In general, soil staining observed within the test pits was contained within the fill unit.

4.2.1.2. CHEMICAL CHARACTERIZATION

Select samples obtained from test pits GTP-46 though GTP-53 were submitted for chemical analysis of ORPH, DRPH, PAHs, and RCRA metals. In addition, after field screening, three samples

obtained from GTP-46 were submitted for chemical analysis of BETX. At least two soil samples from each test pit were submitted for chemical analysis, one from stained near-surface soil obtained at a depth of 1 to 2 feet, and samples within native soil at a depth of approximately 3 to 7 feet. Samples obtained at a depth of approximately 11 feet from test pits GTP-46 and GTP-47 also were submitted for chemical analysis.

Chemical data for soil samples obtained within the Koch Materials Lease Area were compared to preliminary soil cleanup levels to assess the nature and extent of soil contamination. Analytical results indicate that BETX were not detected in the Koch Asphalt Lease Area soil at concentrations exceeding preliminary cleanup levels. ORPH, DRPH, arsenic cadmium and PAHs were detected at concentrations exceeding preliminary cleanup levels from depths of 2 feet or less; concentrations are shown in Table 5 and in Figure 3.

TABLE 5. SOIL ANALYTICAL EXCEEDANCE SUMMARY - KOCH ASPHALT LEASE AREA

Location ID	Sample ID	Sample Date	Sample Depth	TPH (mg/kg)		Metals (mg/kg)		PAHs (mg/kg)
				Diesel-range Petroleum Hydrocarbons	Oil-range Petroleum Hydrocarbons	Arsenic	Cadmium	CPAH TEQ
MTCA Method A Industrial Cleanup Level				**2,000**	**2,000**	**20**	**2**	**2**
GTP-46	GTP46-1	12/21/09	1	**4,120**	**6,940**	**6.6**	**1.2**	**4.88**
GTP-47	GTP47-1	12/22/09	1	**467**	**2,130**	**4.9**	**0.2**	**0.658**
GTP-49	GTP49-1	12/21/09	1	**55.4**	**347**	**26.4**	**3.3**	**1.030**

Notes
TPH = total petroleum hydrocarbons;
mg/kg = milligram per kilogram
Bolding indicates detected greater than the method reporting limit (MDL)
Shading indicates detected exceeding Method A Industrial cleanup level

4.2.2. Diesel Shop and Materials Storage Building

4.2.2.1. PHYSICAL CHARACTERIZATION

Subsurface conditions were evaluated by drilling 11 borings using sonic and direct push drilling methods to a maximum depth of 16 feet below the ground surface. Subsurface conditions at the locations of borings DP-1, DP-1A, DP-2 through DP-5 and DP-7 through DP-11 and DP-24 through DP-29 and DP-30 consisted of two general units including: (1) fill; and (2) sand and gravel. Fill was encountered at depths ranging from ½ to 3 feet and consisted of black to dark brown gravel with variable sand content (railroad ballast). With the exception of DP-4, DP-7 and DP-8, the fill overlies alternating layers of sand and gravel with variable silt and clay content. In DP-4 a layer of sand was encountered between 9½ feet and the completion of the boring at 15 feet depth. In DP-7 and DP-8, a zone of well-graded gravel was encountered between 6 feet and the completion of the borings at 15 feet depth. Each boring was completed in the sand and gravel unit. In general, the darker, black to dark brown, soil terminated at about 3½ feet.

4.2.2.2. CHEMICAL CHARACTERIZATION

Select samples obtained from borings DP-1, DP-1A, DP-2 through DP-5, DP-7 through DP-11 and DP-24 through DP-29 were submitted for chemical analysis of ORPH, DRPH, PAHs, metals and

BETX. After field observations and screening, one to three samples from each boring were submitted for chemical analysis. In general, a near-surface sample was obtained from each boring, within approximately 4 feet of the ground surface, and subsequent samples obtained below depths of 4 feet. In boring MW-23, a deep sample obtained at approximately 60 feet was the only sample that met the field screening criteria; that sample was submitted for chemical analysis of DRPH, ORPH, metals, PCBs, VOCs and PAHs.

Chemical data for soil samples obtained within the Diesel Shop and Material Storage Building Area were compared to the preliminary soil cleanup levels to assess the nature and extent of contamination. Analytical results indicate that metals were not detected in the Diesel Shop and Materials Storage Building Areas at levels exceeding preliminary cleanup levels. ORPH, DRPH and naphthalene and CPAHs were detected at depths of 4 feet or less at concentrations exceeding preliminary cleanup levels as shown in Table 6 and in Figure 4.

TABLE 6. SOIL ANALYTICAL EXCEEDANCE SUMMARY - DIESEL SHOP AND MATERIALS STORAGE BUILDING AREA

Location ID	Sample ID	Sample Date	Sample Depth	TPH (mg/kg)		PAHs (mg/kg)	PAH (mg/kg)
				Diesel-range Petroleum Hydrocarbons	Oil-range Petroleum Hydrocarbons	Naphthalene	CPAH TEQ
MTCA Method A Industrial Cleanup Level				**2,000**	**2,000**	**5**	**2**
DP-2	DP02-1-2	12/14/09	1.5 - 3	**3,950**	**2,330**	**2.61**	**0.228**
DP-3	DP03-1.5-2	12/14/09	1.5 - 2	**12,800**	**10,600**	**34.5**	**0.542**
DP-7	DP07-2-2.7	12/14/09	3 - 4	**4,630**	**10,200**	**5.4**	**0.423**
DP-8	DP08-1.6-2.4	12/14/09	2.1 - 3.2	**968**	**4,570**	**0.714**	**0.459**
DP-9	DP-9-1-2	12/14/09	1 - 2	**519**	**1,700**	**0.568**	**2.524**

Notes
TPH = total petroleum hydrocarbons
PAHs = polycyclic aromatic hydrocarbons
mg/kg = milligram per kilogram
Bolding indicates detected greater than the method reporting limit (MDL)
Shading indicates detected exceeding Method A Industrial cleanup level

4.2.3. Western Fruit Express (Generator Storage Area)

4.2.3.1. PHYSICAL CHARACTERIZATION

Subsurface conditions were evaluated by excavating five test pits, drilling one direct push boring and completing three hand augers to maximum depths of 8, 12 and 1½ feet, respectively. Similar subsurface conditions were observed at the locations of test pits GTP-32 through GTP-35 and GTP-35B, boring DP-12 and hand auger borings GTP-56 through GTP-58. Soil units consisted of three general units including: (1) fill; (2) silty gravel; and (3) gravel. The fill unit was consistently encountered to approximately 2 feet in the test pits and thinned to about 1½ feet toward the west as evidenced by hand auger borings GTP-56 through GTP-58 and consisted of black silty sand and silty gravel intermixed with wood, brick, clay tiles and metal debris. The silty gravel unit was

encountered from about 2 to 4 feet, and the gravel unit was encountered from about 4 feet to the completion of the test pits and hand auger borings.

4.2.3.2. CHEMICAL CHARACTERIZATION

Select samples obtained from test pits GTP-32 through GTP-35 and GTP-35B, direct push boring DP-12 and hand auger borings GTP-56 through GTP-58 were submitted for chemical analysis of DRPH, ORPH, PAHs, PCBs, metals and VOCs. At least two samples from each test pit and boring were submitted for chemical analysis, with the exception of GTP-56 through GTP-58. Only one sample was submitted from each of these shallow hand auger borings. In general, a sample was submitted from the stained near-surface soil obtained at a depth of 1 to 2 feet, and a second sample was obtained in the native soil below a depth of approximately 2 feet.

Chemical data for soil samples obtained within the Western Fruit Express (generator storage area) were compared to preliminary soil cleanup levels to assess the nature and extent of soil contamination. Analytical results indicate that DRPH, ORPH, PAHs, PCBs and VOCs were not detected in the generator storage area at concentrations exceeding preliminary cleanup levels. Metals consisting of Arsenic, Cadmium, Lead and mercury were detected at depths of 4 feet or less at concentrations exceeding preliminary cleanup levels and are shown in Table 7 and in Figure 5.

TABLE 7. SOIL ANALYTICAL EXCEEDANCE SUMMARY - WESTERN FRUIT EXPRESS (GENERATOR STORAGE AREA)

Location ID	Sample ID	Sample Date	Sample Depth	Metals (mg/kg)			
				Arsenic	Lead	Mercury	Cadmium
MTCA Method A Industrial Cleanup Level				**20**	**1,000**	**2**	**2**
GTP-32	GTP32-1-2	1/4/10	1 - 2	**98.9**	**34,700**	**0.3**	**9.0**
GTP-33	GTP33-1-2	1/4/10	1 - 2	**8.5**	**1,690**	**0.11**	**2.4**
GTP-34	GTP34-1-2	1/4/10	1 - 2	**95.2**	**44,200**	**0.71**	**6.7**
GTP-35	GTP35-1-2	1/4/10	1 - 2	**204**	**48,200**	**6.1**	**653**
GTP-35B	GTP35B-1.5	1/4/10	1.5	**13.2**	**3,100**	**0.16**	**3.3**
DP-12	DP-12-Q5-1.25	1/19/10	0.5-1.25	**9.9**	**225**	**0.1**	**7.3**

Notes
mg/kg = milligram per kilogram
Bolding indicates detected greater than the method reporting limit (MDL)
Shading indicates detected exceeding Method A Industrial cleanup level

4.2.4. Dismantling Spur and East and West Debris and Soil Deposit Areas

4.2.4.1. PHYSICAL CHARACTERIZATION

Subsurface conditions were evaluated by excavating eight test pits to a maximum depth of 11 feet below the ground surface. Subsurface conditions at the locations of test pits GTP-36, GTP-36A, GTP-36B and GTP-37 through GPT-40 can be characterized into two general units including: (1) fill/debris; and (2) gravel. The fill/debris unit occurred in all of the test pits completed in the dismantling spur/debris and soil deposit area. It was encountered from 1½ to 9 feet and generally consisted of black to dark brown silt, silty sand, sand and silty gravel intermixed with debris including glass, brick, tile, metal, asphalt, drywall and hose. In test pit GTP-39, approximately 2 feet of white sand, interpreted as sandblasting sand, was encountered overlying the fill/debris

unit. Test pit GTP-38 contained approximately 1½ feet of dark brown to black silty gravel; however, the fill did not include debris. The gravel unit generally consisted of brown gravel with variable silt and sand content, and occasional cobbles and boulders. All of the test pits were completed to a maximum depth of 11 feet below the ground surface into the gravel unit with the exception of GTP-40, which was completed at a depth of approximately 11 feet into a sand layer.

4.2.4.2. CHEMICAL CHARACTERIZATION

Select samples obtained from test pits GTP-36, GTP-36A, GTP-36B, GTP-37, GTP-38, GTP-38A, GTP-39 and GTP-40 were submitted for chemical analysis of DRPH, ORPH, PCBs and metals. At least two soil samples—one from the fill/debris zone from a depth to approximately 9 feet and one from the underlying native soil—were submitted for chemical analysis.

Chemical data for soil samples obtained within Dismantling Spur and East and West Debris and Soil Deposit Areas were compared to preliminary soil cleanup levels to assess the nature and extent of soil contamination. Analytical results indicate that DRPH, ORPH and PCBs were not detected in the Dismantling Spur and East and West Debris and Soil Deposit Areas soil at concentrations exceeding preliminary cleanup levels. Metals including arsenic, cadmium and lead were detected in the fill/debris, at depths of 9 feet or less, at concentrations exceeding preliminary cleanup levels as shown in Table 8 and in Figure 6.

TABLE 8. SOIL ANALYTICAL EXCEEDANCE SUMMARY - DISMANTLING SPUR AND EAST AND WEST DEBRIS AND SOIL DEPOSIT AREAS

Location ID	Sample ID	Sample Date	Sample Depth	Metals (mg/kg)		
				Arsenic	Lead	Cadmium
MTCA Method A Industrial Cleanup Level				**20**	**1,000**	**2**
GTP-36	GTP36-1-2	1/4/10	1 - 2	**22.9**	**1,120**	**36.8**
GTP-36B	GTP36B-1	2/9/10	1	**15.6**	**494**	**4.9**
GTP-37	GTP37-5	12/22/09	5	**91.9**	**3,130**	**39.2**
GTP-38	GTP38-4	12/22/09	4	**30.9**	**1,560**	**12**
GTP-38A	GTP38A-1	2/9/10	1	**25.8**	**666**	**1.9**

Notes
mg/kg = milligram per kilogram
Bolding indicates detected greater than the method reporting limit (MDL)
Shading indicates detected exceeding Method A Industrial cleanup level

4.2.5. Yardley Office (Main Line Track No. 1) Area

4.2.5.1. PHYSICAL CHARACTERIZATION

Subsurface conditions were evaluated by drilling 11 borings using sonic drilling methods to a maximum depth of 15 feet below the ground surface. Variable subsurface conditions were encountered at the locations of borings DP-13 through DP-23. However, for the purposes of this report, subsurface conditions were characterized into four general units including: (1) gravel fill; (2) clayey gravel fill; (3) gravel; and (4) silty gravel.

All of the borings contained fill consisting of black coarse gravel with variable sand content (railroad ballast) from the ground surface to depths from approximately 2½ to 5 feet. Clayey

gravel, encountered from 2½ to 4½ feet, consisted of black clayey gravel with variable sand content and occasional cobbles. This fill unit was encountered in all the borings except DP-14 and DP-21, which contained poorly-graded and well-graded gravel approximately from 3 to 4 feet.

A dark brown to brown gravel unit occurred approximately from 2½ to 13 feet. In borings DP-13, DP-18, DP-19 and DP-21 the gravel was encountered to a depth of approximately 15 feet. The gravel unit consisted of alternating layers of dark brown to brown well-graded and silty gravel with occasional zones of poorly-graded gravel and was encountered within all borings except DP-22, which met refusal in a silty sand layer at a depth of approximately 8 feet.

In borings DP-14, DP-15, DP-16, DP-17, DP-20 and DP-23 the gravel unit overlaid a silty gravel unit consisting of gray to grayish brown silty gravel. The lower gravel unit consisted of silty fine to coarse gravel with variable sand content and occasional cobbles, and was encountered from 7 to 15 feet.

4.2.5.2. CHEMICAL CHARACTERIZATION

Select samples obtained from borings DP-13 through DP-23 were submitted for chemical analysis of DRPH, ORPH and metals. At least two samples were obtained from each boring with the exception of DP-22, in which only one sample was obtained, were submitted for chemical analysis. In general, a sample was submitted from soil obtained at a depth of 4 feet or less, and a second sample obtained below 4 feet.

Chemical data for soil samples obtained within the Yardley Office (Main Line Track No. 1) Area were compared to the preliminary soil cleanup levels to assess the nature and extent of contamination in soil. Analytical results indicate that DRPH and ORPH were not detected in the Yardley Office (Main Line Track No. 1) Area at concentrations exceeding preliminary cleanup levels. Metals consisting of arsenic and cadmium were detected at depths of 4 feet or less exceeded preliminary cleanup levels, as shown in Table 9 and in Figure 7.

TABLE 9. SOIL ANALYTICAL EXCEEDANCE SUMMARY - YARDLEY OFFICE (MAIN LINE TRACK NO. 1) AREA

Location ID	Sample ID	Sample Date	Sample Depth	Metals (mg/kg)	
				Arsenic	Cadmium
MTCA Method A Industrial Cleanup Level				**20**	**2**
DP-15	DP15-1-2	12/28/09	1.4 - 2.7	**21.2**	**0.44**
DP-21	DP21-1.5-2.5	12/28/09	2 - 3.4	**38.3**	**3.8**
DP-23	DP23-1-2	12/28/09	1.3 - 2.6	**53.9**	**5.2**

Notes
mg/kg = milligram per kilogram
Bolding indicates detected greater than the method reporting limit (MDL)
Shading indicates detected exceeding Method A Industrial cleanup level

4.2.6. Ralston Lead Track

4.2.6.1. PHYSICAL CHARACTERIZATION

Subsurface conditions were evaluated by drilling six borings using sonic drilling methods to a maximum depth of 15 feet below the ground surface. Variable subsurface conditions were

encountered at the locations of DP-41 through DP-44 and DP-44A and DP-44B. However, for the purposes of this report, subsurface conditions were characterized into three general units including: (1) fill; (2) alternating sand and gravel; and (3) sand.

All of the borings encountered a fill unit consisting of black sand with variable silt and clay content from the ground surface to approximately 2 feet. In borings DP-41, DP-43, DP-44, DP-44A and DP-44B, a unit of alternating sand and gravel layers occurs approximately from 2 to 7½ feet. In boring DP-41, the fill and alternating sand and gravel units are separated by a clayey gravel layer approximately from 1½ to 3 feet. In borings, DP-41, DP-44, and DP-44A the alternating sand and gravel unit overlies a sand unit consisting of fine sand with gravel and variable silt content. The sand unit was encountered from a depth of approximately 6 to 8 feet, to the completion of the borings at approximately 15 feet.

4.2.6.2. CHEMICAL CHARACTERIZATION

Select samples obtained from borings DP-41 through DP-44 and DP-44A and DP44B were submitted for chemical analysis of DRPH and ORPH, PAHs, metals and VOCs. At least two soil samples from each boring were submitted for chemical analysis, with the exception of boring DP-44B, in which one sample was submitted. In general, one shallow sample was obtained at a depth of 1 to 4 feet, and a second sample was obtained below a depth of 4 feet.

Chemical data for soil samples obtained within the Ralston Lead Track were compared to the preliminary soil cleanup levels to assess the nature and extent of soil contamination. The analytical results indicate that DRPH, ORPH and PAHs were not detected in the Ralston Lead Track area at concentrations exceeding preliminary cleanup levels. Cadmium and Methylene Chloride was detected in samples obtained between the ground surface to a depth of approximately 4 feet in borings DP-43, DP-44, and DP-44A, as shown in Table 10 and Figure 8.

TABLE 10. SOIL ANALYTICAL EXCEEDANCE SUMMARY - RALSTON LEAD TRACK

Location ID	Sample ID	Sample Date	Sample Depth	Methylene Chloride	Cadmium
MTCA Method A Industrial Cleanup Level				**0.02**	**2**
DP-43	DP43-0-1	12/16/09	0 - 1	**0.18**	**1.8**
DP-44	DP44-0.5-1.5	12/16/09	0.5 - 1.5	**0.0738**	**1.4**
DP-44A	DP44A-0-1	12/16/09	0-1.7	**NA**	**2.3**

Notes
mg/kg = milligram per kilogram
NA = not analyzed
Bolding indicates detected greater than the method reporting limit (MDL)
Shading indicates detected exceeding Method A Industrial cleanup level

4.2.7. TTX Facility

4.2.7.1. PHYSICAL CHARACTERIZATION

Subsurface conditions were evaluated by one boring advanced using direct-push drilling methods to a maximum depth of 16 feet below the ground surface. Subsurface conditions at the location of boring DP-45 generally consisted of fill overlying sand. The upper portion of the fill consisted of light gray gravel with sand and trace silt from ground surface to approximately 2 feet. The lower

993 portion of the fill consisted of black to reddish brown sand with gravel and trace silt from
994 approximately 2 to 8½ feet. Light gray to brown sand with gravel occurred to the completion of the
995 boring at 16 feet.

996 #### 4.2.7.2. CHEMICAL CHARACTERIZATION
997 A select sample obtained from boring DP-45 at a depth of 1.7 to 2.7 feet, was submitted for
998 chemical analysis of DRPH, ORPH and metals. Chemical data for the soil sample was compared to
999 preliminary soil cleanup levels to assess the nature and extent of soil contamination. Analytical
1000 results indicate that DRPH, ORPH and metals were not detected in the TTX Facility area at
1001 concentrations exceeding preliminary cleanup levels.

1002 ### *4.2.8. Former Building Labeled "Paint"*

1003 #### 4.2.8.1. PHYSICAL CHARACTERIZATION
1004 Subsurface conditions were evaluated by drilling one boring using sonic drilling methods to a
1005 maximum depth of 15 feet below the ground surface. Subsurface conditions at the location of
1006 boring DP-54 included approximately 3 inches of asphalt concrete overlying fill and clayey gravel.
1007 The fill underlying the asphalt consisted of black to dark brownish gray silty and clayey gravel with
1008 charcoal and brick fragments, extending to a depth of approximately 3 feet. Brown clayey gravel
1009 occurred to the completion of the boring at approximately 15 feet.

1010 #### 4.2.8.2. CHEMICAL CHARACTERIZATION
1011 Select samples obtained from boring DP-54, within the former "paint" building area, were
1012 submitted for chemical analysis of lead and VOCs. Chemical data were compared to the
1013 preliminary soil cleanup levels to assess the nature and extent of soil contamination. Analytical
1014 results indicate that lead and VOCs were not detected at concentrations exceeding preliminary
1015 cleanup levels.

1016 ### *4.2.9. Former Gasoline Storage Tank*

1017 #### 4.2.9.1. PHYSICAL CHARACTERIZATION
1018 Subsurface conditions were evaluated by excavating one test pit to a maximum depth of 9 feet
1019 below the ground surface. Subsurface conditions at test pit GTP-55 included approximately 4 feet
1020 of fill overlying gravel. The upper portion of the fill, from the ground surface to approximately ½
1021 foot, consisted of black gravel including a light yellow powdery material. The lower portion of the
1022 fill, from approximately ½ to 4 feet, consisted of fine to coarse gravel with sand, silt and wood
1023 debris. Fine to coarse gravel with coarse sand and clay was encountered to the completion of the
1024 test pit at 9 feet.

1025 #### 4.2.9.2. CHEMICAL CHARACTERIZATION
1026 Select samples obtained from test pit GTP-55 were submitted for chemical analysis of DRPH,
1027 ORPH, GRPH, BETX and lead. Chemical data for soil samples obtained within the former gasoline
1028 storage tank area were compared to preliminary soil cleanup levels to assess the nature and
1029 extent of contamination in soil. Analytical results indicate that DRPH, ORPH, GRPH, BETX and lead
1030 were not detected at concentrations exceeding preliminary cleanup levels.

5.0 GROUNDWATER INVESTIGATION AND RESULTS

This section presents a description of associated groundwater RI activities conducted at the Site. RI data objectives for characterizing groundwater at the Site included:

- Further characterized the extent of the Fueling Area diesel plume.
- Provided hydrogeologic information including groundwater depths, elevations and flow direction.
- Evaluated data gaps, including groundwater characterization in areas not previously explored during preceding studies.
- Evaluated groundwater samples for selected COPCs not previously analyzed.
- Obtained hydraulic conductivity data to calculate site-specific groundwater velocities.

5.1. 2009/2010 Investigations

Data objectives were accomplished by installing two, 2-inch-diameter monitoring wells, MW-22 and MW-23 to depths of approximately 75 feet near the Fueling Area. Groundwater samples were obtained and submitted to an Ecology-certified laboratory for analysis of DRPH and ORPH,.

Slug tests were completed within four representative site monitoring wells, including the most upgradient and downgradient wells. Details of hydraulic conductivity testing are provided in Section 5.4.

5.2. Groundwater Field Parameters MW-22 and MW-23

Groundwater samples were obtained and field parameters measured for MW-22 and MW-23 on January 21 and 22, 2010, respectively. Depths to groundwater and vapor headspace tests using a photo-ionization detector (PID) were completed during sample collection. In addition, water quality parameters including pH, specific conductivity, turbidity, dissolved oxygen, temperature and oxidation reduction potential were measured. Calculated groundwater elevations are shown in Summary of Groundwater Elevations, Table 11. Results of vapor headspace tests are shown in Summary of Well/Sample PID Measurements, Table 12, and water quality parameters are provided in Summary of Groundwater Field Parameters, Table 13.

Dissolved oxygen in MW-23 measured 0.0 mg/l on January 22, 2010. The reason for the low dissolved oxygen measurements in MW-23 is uncertain. This low reading could be the result of silting of the well resulting in a stagnant condition.

5.3. Chemical Characterization

As shown in Table 14, DRPH and ORPH were not detected above laboratory reporting limits in groundwater samples obtained from MW-22 and MW-23. However, as indicated in Table 12, PID measurements in the well space and samples indicated 0.3 ppm and 21.2 ppm, and 0.8 ppm and 0.2 ppm for MW-22 and MW-23, respectively. It is important to note that the PID is used to field screen samples for potential analytical testing. The PID instrument is subject to error from calibration, air temperature, air moisture and background vapors. Monitoring wells MW-22 and MW-23 are located near the fueling area where fuel transfer operations are conducted. It is possible that the anomalous PID readings discussed in the preceding paragraph are related to

VOC's present in the ambient air during fueling operations. The analytical laboratory testing results, which are the primary basis for interpretation, indicate non-detect for the COC's.

5.4. Hydraulic Conductivity Testing

5.4.1. Method Selection

Assessment of the saturated hydraulic conductivity of the shallow aquifer beneath the Parkwater facility was conducted as a basis for estimating groundwater velocity. A number of techniques for estimating hydraulic conductivity were considered, including (in order of decreasing complexity) aquifer testing, slug testing, laboratory permeability testing, and empirical analysis of grain-size distribution data. In our opinion, in-place hydraulic testing (aquifer or slug testing) provide more accurate hydraulic conductivity estimates in sand and gravel aquifers than laboratory or empirical grain-sized based analyses. Aquifer testing (via one or more conventional pumping tests) was not selected because of the following considerations:

- Limited feasibility of creating sufficient aquifer drawdown within the SVRP Aquifer to allow for meaningful data analysis;
- Large volume of potentially contaminated groundwater that would have to be treated and discharged;
- Large cost in testing infrastructure; and
- Permitting and associated schedule constraints.

Based on these considerations, slug testing was selected for use. However, the following limitations are inherent to the selected methodology:

- Slug tests provide a point estimate of hydraulic conductivity near the tested well screen (as opposed to pumping tests which stress a larger volume of aquifer material);
- Inadequate well development can cause slug testing to underestimate the hydraulic conductivity of the subject aquifer;
- Falling head test data are not valid when water level decrease occurs within the screened portion of the well, which was the case for each test location described in this report section; and
- In highly permeable formations (such as the SVRP Aquifer), water level response can be too rapid to achieve precise hydraulic conductivity estimates.

5.4.2. Test Methodology

The saturated hydraulic conductivity of the aquifer beneath the Parkwater facility was estimated by performing rising-head slug tests in monitoring wells MW-11, MW-17 and MW-22. Although slug testing was performed in monitoring well MW-20, water level response was too rapid to constrain with the testing equipment and the associated data are not presented in this report. Testing locations are presented in Figure 10.

A rising-head slug test is performed by rapidly lowering the water level in a well and measuring the subsequent rate of water level change as head conditions recover. Lowering the water level is

achieved by quickly removing a slug (in this case a sealed PVC pipe filled with impermeable material) from the water column.

Water level data were recorded by a pressure transducer and data logger. After slug testing, the data were downloaded, reduced and analyzed for hydraulic conductivity using a solution derived by Bouwer and Rice (1976) and updated by Bouwer (1989).

Slug test data are presented for monitoring wells MW-11, MW-17 and MW-22 in Rising Head Test Plots, Figures 11 through 13. Two to three rising head tests were performed at each test location. A summary of the inputs and results of the hydraulic conductivity analyses are presented in Rising Head Test Analyses, Table 15.

5.4.3. Results

Water level recovery in tested monitoring wells during slug testing was rapid, which is indicative of permeable soil conditions. This observation was substantiated by the hydraulic conductivity analyses, which are summarized in Table 16 below.

TABLE 16. HYDRAULIC CONDUCTIVITY SUMMARY

Monitoring Well	Average Hydraulic Conductivity[1] (feet per day)
MW-11	2.7×10^2
MW-17	3.8×10^2
MW-22	3.5×10^2

Notes:
1: Hydraulic conductivity estimates represent average result of rising-head slug tests conducted at each location.

Based on the results of the analyses, the saturated hydraulic conductivity of the aquifer near the selected monitoring wells ranges from about 270 feet per day near monitoring well MW-11 to about 380 feet per day near MW-17. These saturated hydraulic conductivity estimates are within a relatively narrow range and on the low end of the range typically reported for the SVRP Aquifer. This could suggest that, because of highly permeable aquifer conditions, slug testing results were impacted by the permeability of the sand pack surrounding the installed well screens.

Nevertheless, these hydraulic conductivity estimates are, on balance, relatively high and generally indicative of a permeable aquifer that has potential for transport of significant quantities of groundwater and, consequently, associated soluble groundwater contaminants.

5.4.4. Groundwater Velocity

Based on the results and limitations presented above, a literature search was conducted to assess pumping test information associated with previous SVRP Aquifer studies near the facility. Pumping test results were reviewed within the Draft Groundwater Remedial Investigation/Feasibility Study (July 2003) for the Kaiser Trentwood Facility, which is situated above the SVRP Aquifer about 5½ miles east of Parkwater. For the shallow aquifer, this study provided a median horizontal hydraulic conductivity estimate of 2,500 feet per day. This estimate is used in the groundwater flow velocity calculations presented below.

Groundwater flow velocity for the shallow unconsolidated aquifer underlying the site was estimated using a standard Darcy's Law-based analysis:

$$V = - (K/n_e) * dh/dl \qquad \text{Equation 1}$$

where V = groundwater flow velocity, K = saturated hydraulic conductivity, n_e = effective porosity of the aquifer material, and dh/dl = hydraulic gradient.

The following inputs were assumed:

- A hydraulic conductivity of 2,500 feet per day, based on pumping test information from the Kaiser Trentwood Facility;
- An effective porosity of 25 percent, based on typical values for sand and gravel aquifers presented in Domenico and Schwartz (1990); and
- A hydraulic gradient of 2.2×10^{-3} feet per foot, based on site groundwater elevation information collected on January 19, 2010 and submitted under separate cover.

Based on these inputs, we estimate the groundwater flow velocity within the shallow unconsolidated aquifer underlying the Parkwater facility is about 22 feet per day.

6.0 CONCEPTUAL SITE MODEL

This section provides the conceptual model for the Site based on the data presented in this RI report and additional detail from the Exposure Pathways and Receptors discussed in Section 2.6. The conceptual site model includes a discussion of the sources of COPCs at the site, the subsequent potential migration of those hazardous substances in environmental media, and complete exposure pathways. The model was developed to help direct remediation at the site, where necessary.

A complete exposure pathway consists of: (1) an identified contaminant source; (2) a transport pathway to locations (exposure points) where potential receptors might come in contact with COPCs; and (3) an exposure route (e.g., soil ingestion) through which potential receptors might be exposed to COPCs. Exposure pathways deemed to be incomplete need not be considered further.

Contamination sources and mechanisms are shown in Conceptual Site Model Figure 14, and include the following:

- Spills from fueling locomotives and from above ground storage tanks, stockpiling of contaminated soil from remedial excavations, releases of materials transported in open boxcars and leakage from industrial equipment can cause surficial soil contamination. Contaminants of concern include petroleum hydrocarbons, metals, VOCs, PCBs, and PAHs. Contaminants might be leached and/or transported downwards by infiltrating water towards the water table. Stormwater runoff might transport contaminated soil within and off the site. Wind might mobilize dry, contaminated soils and deposit the dust on and off the site.
- Soil in the Debris and Soil Deposit Area and Western Fruit Express Area is contaminated with metals. Contaminants might be leached and/or transported downwards towards the water

table by infiltrating water. Stormwater runoff might transport contaminated soil within and off the site. Wind might mobilize dry, contaminated soils and deposit the dust on and off the site.

- UST leakage has contaminated subsurface soil with diesel and heavy oil. In some areas, contaminants have migrated downward to the water table.
- A plume of diesel-contaminated groundwater is located beneath and downgradient of the fueling area. Groundwater movement has caused the plume to migrate to the west-northwest. Based on groundwater analytical data it appears that the diesel plume is shrinking in size. However, this interpretation could be related to one or more of the following:
    - Affects of the groundwater treatment system in the fueling area
    - Natural attenuation and/or biodegradation of the plume
    - A consequence of changing sampling procedures from disposable bailer to standard low-flow sampling protocol, which provides samples that better reflect aquifer conditions. As such, the initial estimate of the size of the plume might have been exaggerated as it was based on data from bailer sampling
- Contaminated subsurface soil from unknown sources is present on the site. Contaminants might be leached and/or transported downwards towards the water table by infiltrating water.

As discussed previously in Section 2.5, potential exposure pathways and receptors include:

- Ecological
    - Direct contact with contaminated soil and surface water runoff – small mammals, birds, soil biota, plants
    - Ingestion of contaminated soil and surface water runoff – small mammals and birds
    - Ingestion of plants or fauna that have ingested or absorbed contaminants from the site – predatory small mammals and birds
- Human
    - Dermal contact with contaminated soil during excavation work – on-site workers and trespassers
    - Dermal contact with contaminated groundwater removed from on-site monitoring wells – on-site workers
    - Dermal contact with and inhalation of contaminated windblown dust – on-site workers, adjacent off-site workers, trespassers and adjacent residents
    - Dermal contact with contaminated surface water runoff – on-site workers, adjacent off-site workers, trespassers and adjacent residents

6.1. Soil

Site soil consists of multiple layers of fill overlying native sand and gravel (Pleistocene-age flood deposits). Surface soil is predominantly recent gravel and sand fill material (railroad ballast) with occasional mixed wood debris. In the Debris and Soil Deposit Areas the soil is intermixed with other debris including scrap metal, glass and ash. Analytical results indicate virtually all of the COPCs at concentrations detected greater than preliminary cleanup levels occurred within the upper 4 feet of the soil column, with the exception of the Debris and Soil Deposit Area where COPCs were detected up to a depth of approximately 8 feet.

The following potential exposure pathways and receptors were previously identified in Section 2.5.1 for contaminants in Site soil:

- Contact (dermal, incidental ingestion or inhalation) by visitors, workers (including excavation workers) and potential future residents or other Site users with hazardous substances in soil;
- Contact (dermal, incidental ingestion or inhalation) by terrestrial wildlife with hazardous substances in soil; and
- Contact by terrestrial plants and soil biota and/or food-web exposure to hazardous substances in soil.

Constituents detected in the upper 15 feet of soil were evaluated to assess the potential risk to humans, plants and animals posed by contaminated soil.

6.2. Groundwater

Groundwater contamination associated with the fueling area is contained within the Site. Groundwater elevations at the site vary as much as 10 feet seasonally, which has created a contaminated smear zone within the zone of groundwater fluctuation. Based on drilling observations, contamination within this zone appeared thickest near the source area. During much of the year, contaminants in the unsaturated portion of the smear zone are above the groundwater table and not readily mobilized. During periods of seasonally high groundwater conditions, contaminants adsorbed within previously unsaturated soil can transition to a dissolved state, and migrate downgradient. Observed subsurface conditions below and downgradient of the service area suggest these processes have occurred at the Site. However, the thickness (vertical distribution) of the contaminated smear zone appears to decrease with increasing distance from the source area, indicating biodegradation of petroleum hydrocarbons is occurring downgradient of the source area.

Drinking water is supplied by the City of Spokane. No drinking water wells are located on the Site; therefore, no complete exposure pathway exists for ingestion of contaminated groundwater. The nearest downgradient water supply well is located at 4423 Hutton Street, approximately 0.5 miles northwest of the northwest site boundary, according to the Ecology on-line water well log database.

7.0 LOCATIONS AND MEDIA REQUIRING CLEANUP ACTION EVALUATION IN FEASIBILITY STUDY

This section identifies the locations and environmental media (soil and groundwater) at the Site that require evaluation in the FS. Based on the results of this RI the following areas should be evaluated in the FS: (1) Koch Asphalt Lease Area for DRPH, ORPH, arsenic, cadmium and PAHs, (2) Diesel Shop and Materials Storage Area for DRPH, ORPH, naphthalene and PAHs; (3) Western Fruit Express (Generator Storage Area) for arsenic, lead, cadmium and mercury; (4) Dismantling Spur and East and West Debris and Soil Deposit Areas for arsenic, lead and cadmium; (5) the Yardley Office (Main Line Track No. 1 Area) for arsenic and cadmium; and 6) the Ralston Lead Track for methylene chloride and cadmium.

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Acronyms

ASTs = above ground storage tanks
BETX = benzene, ethylbenzene, toluene and xylenes
BNSF = BNSF Railway Company
COPCS = contaminant of potential concern
DRPH = diesel-range petroleum hydrocarbon
Ecology = Washington State Department of Ecology
FS = Feasibility Study
GPS = global positioning system
GRPH = gasoline-range petroleum hydrocarbons
HI = Heavy Industrial
mg/kg = milligrams per kilogram
MTCA = Model Toxics Control Act
NRCS = Natural Resources Conservation Service
ORPH = oil-range petroleum hydrocarbon
PAHs = polycyclic aromatic hydrocarbons
Qfcg = predominately gravel
RI = remedial investigation
SAP = Sampling and Analysis Plan
SVRP = Spokane Valley – Rathdrum Prairie
TPH = total petroleum hydrocarbon
Unit GgA = Garrison Gravelly Loam
USDA = United State Department of Agriculture
WAC = Washington Administrative Code
VOCs = volatile organic compounds

TABLES

FINAL DRAFT

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Table 1

Summary of Chemical Analytical Results - Diesel Range

Petroleum Hydrocarbons in Groundwater - Pre and Post Groundwater Treatment System Operation

BNSF Parkwater Rail Yard
Spokane, Washington

Well Number	Pre Remedial System 11/14/01 - 1/22/09				Post Remedial System 4/29/09 - 1/19/10			
	Low (µg/L)	High (µg/L)	Average (µg/L)	Number of Samples	Low (µg/L)	High (µg/L)	Average (µg/L)	Number of Samples
MW-1	65[1]	4,680	618	19	65	65	65	1
MW-2	854	306,000	41,922	15	N/A	N/A	N/A	N/A
MW-3	614	321000	54,190	9	N/A	N/A	N/A	N/A
MW-4	65	409	91	13	65	65	65	5
MW-5	65	1,280	334	12	65	65	65	1
MW-6	65	9,430	2,843	13	65	260	119	5
MW-7	65	6,820	1,134	14	65	65	65	5
MW-8	65	48,100	9,551	13	65	65	65	5
MW-9	65	11,000	2,922	12	65	65	65	5
MW-10	65	524	146	13	65	65	65	5
MW-11	65	65	65	13	65	65	65	5
MW-12	65	65	65	12	65	65	65	5
MW-13	65	65	65	3	65	65	65	1
MW-14	65	16,600	6,674	4	65	267	157	3
MW-15	65	65	65	3	65	65	65	3
MW-16	65	362	139	4	65	65	65	1
MW-17	65	65	65	3	65	65	65	1
MW-18	65	3,820	1,918	3	65	65	65	1
MW-19	65	65	65	3	65	65	65	1
MW-20	65	65	65	3	65	510	213	3
MW-21	65	13,400	4,268	4	65	65	65	3
MW-22	N/A	N/A	N/A	N/A	65	65	65	2
MW-23	N/A	N/A	N/A	N/A	65	65	65	2

Notes:

[1]A detection of 65 µg/L listed in this table represents non-detectable concentration. The method detection limit (MDL) is 130 µg/L for diesel. For averaging purposes, one-half of the MDL was used to calculate average concentrations.

https://projects.geoengineers.com/sites/0050611712/Final/BNSF RI Report Final Draft/[Table 1 Compilation Pre and Post IA GW Data.xlsx]Compilation Table

Table 2

Preliminary Soil Cleanup Levels

BNSF Parkwater Facility Remedial Investigation
Spokane Valley, Washington

Analytes	Units	Soil Criteria				Analytical Laboratory Criteria [6]		Preliminary Soil Cleanup Level [7]
		Washington State Background[1]	MTCA Method A Industrial Land Use[2]	Soil, Method C, Carcinogen, Standard Formula Value, Direct Contact (ingestion only), industrial land use[5]	Soil, Method C, Non-carcinogen, Standard Formula Value, Direct Contact (ingestion only), industrial land use[5]	Reporting Limits	Analytical Method	
Total Petroleum Hydrocarbons								
Diesel-Range[4]	mg/kg	--	2,000	--	--	10	NW-TPH-Dx	2,000
Oil-Range[4]	mg/kg	--	2,000	--	--	25	NW-TPH-Dx	2,000
Metals								
Cadmium[3]	mg/kg	1	2	--	3500	0.20	6010	2
Arsenic[3]	mg/kg	9	20	88	1100	2.50	6010	20
Lead[4]	mg/kg	15	1000	--	--	1.50	6010	1,000
Mercury[3]	mg/kg	0	2	--	--	0.02	EPA 7471	2
Volatile Organic Compounds								
Benzene[3]	mg/kg	--	0.03	2,400	14,000	0.015/0.020	EPA 8260B	0.03
Ethylbenzene[3]	mg/kg	--	6	--	350,000	0.20/0.10	EPA 8260B	6
Toluene[3]	mg/kg	--	7		280,000	0.20/0.10	EPA 8260B	7
Xylenes[3]	mg/kg	--	9	--	700,000	0.60/0.40	EPA 8260B	9
Methylene Chloride[3]	mg/kg	--	0.02	--	-	0.057	EPA 8260B	0.02
Methyl tert-butyl ether (MTBE)[3]	mg/kg	--	0.1	73,000	3,000,000	0.100	EPA 8260B	0.1
Ethylene Dibromide (EDB)[3]	mg/kg	--	0.005	1.5	--	0.100	EPA 8260B	0.005
1,2-Dichloroethane (EDC)	mg/kg	--	--	1,400	70,000	0.100	EPA 8260B	1,400
Tetrachloroethylene (PCE)[3]	mg/kg	--	0.05	240	35,000	0.100	EPA 8260B	0.05
Trichloroethylene (TCE)[3]	mg/kg	--	0.03	1,500	1,100	0.100	EPA 8260B	0.03
1,1,1-Trichloroethane[3]	mg/kg		2	--	3,200,000	0.100	EPA 8260B	2
Vinyl Chloride	mg/kg	--	--	88	11,000	0.100	EPA 8260B	88
Polycyclic Aromatic Hydrocarbons								
Naphthalene[3]	mg/kg	--	5	--	70,000	0.10	EPA 8270C SIM	5
Benzo(a)anthracene[8]	mg/kg	--	--	--	--	0.10	EPA 8270C SIM	2[8]

Analytes	Units	Soil Criteria				Analytical Laboratory Criteria [6]		Preliminary Soil Cleanup Level [7]
		Washington State Background[1]	MTCA Method A Industrial Land Use[2]	Soil, Method C, Carcinogen, Standard Formula Value, Direct Contact (ingestion only), industrial land use[5]	Soil, Method C, Non-carcinogen, Standard Formula Value, Direct Contact (ingestion only), industrial land use[5]	Reporting Limits	Analytical Method	
Benzo(a)pyrene[8]	mg/kg	--	**2**	18	--	0.10	EPA 8270C SIM	2[8]
Benzo(b)fluoranthene[8]	mg/kg	--	--	--	--	0.10	EPA 8270C SIM	2[8]
Benzo(k)fluoranthene[8]	mg/kg	--	--	--	--	0.10	EPA 8270C SIM	2[8]
Chrysene[8]	mg/kg	--	--	--	--	0.10	EPA 8270C SIM	2[8]
Dibenz(a,h)anthracene[8]	mg/kg	--	--	--	--	0.10	EPA 8270C SIM	2[8]
Indeno(1,2,3-cd)pyrene[8]	mg/kg	--	--	--	--	0.10	EPA 8270C SIM	2[8]
Total cPAHs (TEF)[3]	mg/kg	--	**2**	18		0.10	EPA 8270C SIM	2[3]
Polychlorinated Biphenyls								
Total PCBs	mg/kg	--	**10**	66	--	0.1	8082 Low Level	10

Notes:

[1] Natural Background Soil Metals Concentrations in Washington State for Spokane Basin. October 1994.

[2] MTCA Method A Industrial Soil Cleanup Levels [WAC 173-340-745(3) and Chapter 173-340 WAC Table 745-1].

[3] MTCA Method A Industrial Soil Cleanup Levels (WAC 173-340-900 Table 745-1) based on protection of groundwater.

[4] MTCA Method A Industrial Soil Cleanup Levels (WAC 173-340-900 Table 745-1) based on direct contact.

[5] MTCA Method C Soil Cleanup Levels; Direct Contact/Ingestion (WAC 173-340-745).

[6] Reporting limits obtained from Pace.

[7] Preliminary Soil Cleanup Level is the lowest soil criteria as indicated by shading; adjusted based on Washington State background. Additional adjustments were made based on reporting limits or minimum levels per WAC 173-340-720(7)(c).

[8] Carcinogenic PAH cleanup level will be based on Toxicity Equivalency Factor (TEF) as described in WAC 173-340-708. The cleanup level for cPAHs is 2 mg/kg.

BOLD indicates value was selected as the Applicable Soil Cleanup Level.

https://projects.geoengineers.com/sites/0050611712/Final/BNSF RI Report Final Draft/[050611712_Table 2.xlsx]T3 Soil PrelimCULs

Table 3

Preliminary Groundwater Cleanup Levels

BNSF Parkwater Facility Remedial Investigation

Spokane Valley, Washington

Analytes	Units	Groundwater Criteria		Analytical Laboratory Criteria[1]		
		Washington State Groundwater Background Concentrations	Method A Cleanup Levels for Groundwater[2]	Reporting Limit	Analytical Method	Preliminary Groundwater Cleanup Level
Petroleum Hydrocarbons						
Diesel Range	µg/L	--	500	250	NW-TPH-Dx	500
Oil Range	µg/L	--	500	500	NW-TPH-Dx	500
Metals *(Total or Dissolved)*						
Cadmium	µg/L	2	5	200	EPA 6020/200.8 ICP-MS	5
Arsenic	µg/L		5	200	EPA 6020/200.8 ICP-MS	5
Lead	µg/L	10	15	66.3	EPA 6020/200.8 ICP-MS	15
Volatile Organic Compounds						
Benzene	µg/L	--	5	0.500/0.200	EPA 8260B	5
Toluene	µg/L	--	1000	1.00/1.00	EPA 8260B	1,000
Ethylbenzene	µg/L	--	700	2.00/1.00	EPA 8260B	700
Xylenes	µg/L	--	1000	1.50/2.00	EPA 8260B	1,000
Methyl tert-butyl ether (MTBE)	µg/L	--	20	1.0	EPA 8260B (5 mL purge)	20
Ethylene Dibromide (EDB)	µg/L	--	0.01	1.0	EPA 8260B (5 mL purge)	2.0
1,2-Dichloroethane (EDC)	µg/L	--	5	1.0	EPA 8260B (5 mL purge)	5
Tetrachloroethylene (PCE)	µg/L	--	5	1.0	EPA 8260B (20 mL purge)	5
Trichloroethylene (TCE)	µg/L	--	5	1.0	EPA 8260B (5 mL purge)	5
1,1,1-Trichloroethane	µg/L	--	200	1.0	EPA 8260B (5 mL purge)	200
Vinyl Chloride	µg/L	--	0.2	0.2	EPA 8260B (5 mL purge)	0.2
Polycyclic Aromatic Hydrocarbons						
Naphthalene	µg/L	--	160	0.01	8270C-SIM	160
Benzo(a)anthracene[3]	µg/L	--	--	0.01	8270C-SIM	0
Benzo(a)pyrene[3]	µg/L	--	0.1	0.01	8270C-SIM	0.1
Benzo(b)fluoranthene[3]	µg/L	--	--	0.01	8270C-SIM	0
Benzo(k)fluoranthene[3]	µg/L	--	--	0.01	8270C-SIM	0
Chrysene[3]	µg/L	--	--	0.01	8270C-SIM	0
Dibenz(a,h)anthracene[3]	µg/L	--	--	0.01	8270C-SIM	0
Indeno(1,2,3-cd)pyrene[3]	µg/L	--	--	0.01	8270C-SIM	0

Analytes	Units	Groundwater Criteria		Analytical Laboratory Criteria[1]		
		Washington State Groundwater Background Concentrations	Method A Cleanup Levels for Groundwater[2]	Reporting Limit	Analytical Method	Preliminary Groundwater Cleanup Level
Total cPAHs (TEQ)	µg/L	--	**0.1**	0.01	8270C-SIM	0.1
Polychlorinated Biphenyls						
Total PCBs	µg/L	--	**0.1**		EPA 8081	0.10

Notes:

[1] Reporting limits obtained from Pace.

[2] MTCA Method A Groundwater Cleanup Levels [WAC 173-340-720(3) and Chapter 173-340 WAC Table 720-1].

[3] Carcinogenic PAH cleanup level will be based on Toxicity Equivalency Factor (TEF) as described in WAC 173-340-708. The cleanup level for cPAHs is 0.1 µg/L.

BOLD indicates value was selected as the Applicable Soil Cleanup Level.

https://projects.geoengineers.com/sites/0050611712/Final/BNSF RI Report Final Draft/[050611712_Table 3.xlsx]T4 GW Prelim CULs

Table 4

Exploration and Sample Analyses Summary

BNSF Parkwater Facility Remedial Investigation
Spokane Valley, Washington

Area	Explorations (Total Completed)	Exploration Method	Depth or Depth Range (feet bgs)	Contaminants of Concern	Analytical Methods	RI Objectives
Former Koch Asphalt Lease Area	GTP-46 through GTP-53 (8)	Test Pit	11-15	Soil: Diesel, Heavy Oil, Metals, PAHs, BETX	NWTPH-Dx Metals (including Mercury) by 6010/7471 PAHs by 8270C-SIM	Define extent and concentrations of remaining impacted soil exceeding MTCA cleanup levels.
Fueling Area	Monitoring Wells MW-22 and MW-23 (2)	Sonic Boring	75	Soil: Diesel, Heavy Oil, Total Metals, PCBs, VOCs, PAHs Groundwater: Diesel, Heavy Oil, Total Metals, Dissolved Metals, PCBs, VOCs, PAHs	NWTPH-Dx Metals (including Mercury) by 6010/7471 PAHs by 8270C-SIM VOCs by 8260B PCBs by 8082	Augment data to define extent of existing groundwater plume.
Materials Storage Building	DP-1, DP-1A, DP-2 through DP-5 and DP-7 through DP-11 (11)	Sonic Boring	15-16	Soil: Diesel, Heavy Oil, BETX, Metals, PAHs	NWTPH-Dx Metals (including Mercury) by 6010/7471 PAHs by 8270C-SIM VOCs by 8260B	Confirm the presence of diesel release extent and concentrations.
Diesel Shop	DP-30 (1)	Sonic Boring	15	Soil: Diesel, Heavy Oil, BETX, Metals, PAHs	NWTPH-Dx Metals (including Mercury) by 6010/7471 PAHs by 8270C-SIM VOCs by 8260B	Define extent and concentrations of remaining impacted soil exceeding MTCA cleanup levels.
	DP-24 through DP-29 (6)	Sonic Boring	15	Soil: Diesel, Heavy Oil, BETX, Metals, PAHs	NWTPH-Dx Metals (including Mercury) by 6010/7471 PAHs by 8270C-SIM VOCs by 8260B	Define contaminants, concentrations and extents, in area of visible staining.
Western Fruit Express (Generator Storage Area)	GTP32 through GTP-35, GTP-35B and hand augers GTP-56 through GTP-58 (8)	Test Pit and Hand Augers	4 -8 for test pits and 1.5 for hand augers	Soil: Diesel, Heavy Oil, Metals, PCBs, VOC, PAHs	NWTPH-Dx Metals (including Mercury) by 6010/7471 PAHs by 8270C-SIM VOCs by 8260B PCBs by 8082	Define contaminants, concentrations and extent, in area of visible staining and the area historically occupied by portable tanks.
Western Fruit Express (oil/water separator /washbay Area)	DP-12 (1)	Direct Push	12	Soil: Diesel, Heavy Oil, Metals, PCBs, VOC, PAHs	NWTPH-Dx Metals (including Mercury) by 6010/7471 PAHs by 8270C-SIM VOCs by 8260B PCBs by 8082	Evaluate potential release from oil/water separator.
Dismantling Spur and East and West Debris and Soil Deposit Areas	GTP 36, GTP-36A, GTP-36B, GTP-37, GTP-38, GTP-38A, GTP-39 and GTP-40 (8)	Test Pit	10-11	Soil: Diesel, Heavy Oil, Metals, PCBs	NWTPH-Dx Metals (including Mercury) by 6010/7471 PCBs by 8082	Evaluate potential soil impacts from stockpiled contaminated soil and augment data on vertical extent of debris.
Yardley Office	DP-13 through DP-23 (11)	Sonic Boring	15, except DP-22 refused at 8 feet	Soil: Diesel, Heavy Oil, Metals	NWTPH-Dx Metals (including Mercury) by 6010/7471	Confirm the presence of diesel release extents and concentrations.

Area	Explorations (Total Completed)	Exploration Method	Depth or Depth Range (feet bgs)	Contaminants of Concern	Analytical Methods	RI Objectives
Ralston Lead Track	DP-41 through DP-44 and DP-44A and DP-44B (6)	Sonic Boring	15	Soil: Diesel, Heavy Oil, Metals, VOC, PAHs	NWTPH-Dx Metals (including Mercury) by 6010/7471 PAHs by 8270C-SIM VOCs by 8260B	Delineate extents and contaminants of concern for potential impacted soil.
TTX Facility	DP-45 (1)	Direct Push	16	Soil: Diesel, Heavy Oil, Metals	NWTPH-Dx Metals (including Mercury) by 6010/7471	Evaluate former oil spill area for remaining impacted soil.
Former Building Labeled "Paint"	DP-54 (1)	Sonic Boring	15	Soil: VOC, Lead	Metals (including Mercury) by 6010/7471 VOCs by 8260B	Evaluate potential contamination below former building location.
Former Gasoline Storage Tank Near Current 90-day Hazardous Waste Storage	GTP-55 (1)	Test Pit	9	Soil: Gasoline, Diesel, Heavy Oil, BETX, Lead	NWTPH-Gx VOCs by 8260B Metals (including Mercury) by 6010/7471	Evaluate potential contamination at location of former gasoline storage tank.

Notes:

MTCA = Washington State Department of Ecology Model Toxics Control Act
BETX = benzene, ethylbenzene. toluene and xylenes
EPA = United States Environmental Protection Agency
TPH = total petroleum hydrocarbons
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyls
VOC = volatile organic compounds

Table 11

Summary of Groundwater Elevations[1]

BNSF Parkwater Facility Remedial Investigation
Spokane, Washington

Well Number	Top of Casing Elevation (feet)1	Date Sampled	Depth to Water (feet)	Groundwater Elevation (feet)[2]
MW-22	1951.72	01/19/10	66.88	1884.84
MW-23	1951.35	01/19/10	67.06	1884.29

Notes:

[1]Elevations are referenced to the North American Vertical Datum of 1988 (NAVD 88 datum). Well casing elevations were surveyed in January 2010.

https://projects.geoengineers.com/sites/0050611712/Final/BNSF RI Report Final Draft/[050611712 Tables 11_14.xlsx]T11 GW Elevations

Table 12

Summary of Well/Sample Headspace PID Measurements

BNSF Parkwater Facility Remedial Investigation

Spokane, Washington

Well Number	Date Measured	LPH Thickness[1] (inches)	PID Reading Well[2] (ppm)	PID Reading Sample[3] (ppm)
MW-22	01/19/10	0.0	0.3	21.2
MW-23	01/19/10	0.0	0.8	0.2

Notes:

[1]Liquid Phase Hydrocarbons (LPH) were measured by partially filling a disposable bailer with groundwater sample and then measuring observed product thickness, if any.

[2]PID measurements were collected within well headspace immediately upon removing the well cap and represent the maximum reading observed during a 20-second measurement period.

[3]PID measurements were collected within the headspace of a groundwater sample collected from the monitoring well with a disposable bailer.

PID = Photoionization detector; ppm = parts per million

https://projects.geoengineers.com/sites/0050611712/Final/BNSF RI Report Final Draft/[050611712 Tables 11_14.xlsx]T12 Headspace

Table 13

Summary of Groundwater Quality Parameters[1]

BNSF Parkwater Facility Remedial Investigation
Spokane, Washington

Well Number	Date Measured	pH	Specific Conductivity (mS/m)	Turbidity[2] (ntu)	Dissolved Oxygen (mg/l)	Temperature (°C)	ORP (mV)
MW-22	01/21/10	7.50	26.4	2.9	8.10	10.9	355
MW-23	01/22/10	6.90	30.8	3.1	0.00	10.5	358

Notes:

[1]Water quality parameter reading recorded at stabilization prior to sampling.

[2]Turbidity was measured with a Hanna Instruments tubidity meter.

mS/m = milliSiemens per meter; ntu = nephelometric turbidity units; mg/l = milligrams per liter; °C = degrees Celsius; and mV = millivolts

ORP = oxidation reduction potential

https://projects.geoengineers.com/sites/0050611712/Final/BNSF RI Report Final Draft/[050611712 Tables 11_14.xlsx]T13 WQ Parameters

Table 14

Summary of Groundwater Chemical Analytical Results[1]

BNSF Parkwater Facility Remedial Investigation
Spokane, Washington

Well Number	Date Sampled	DRPH[2] (µg/l)	ORPH[2] (µg/l)
MW-22	01/21/10	ND	ND
MW-23	01/22/10	ND	ND
MTCA[3] Method A cleanup levels		500	500

Notes:

[1]Chemical analyses conducted by TestAmerica's laboratory in Tacoma, Washington.

[2]Diesel- (DRPH) and heavy oil-(ORPH) range petroleum hydrocarbons analyzed using Northwest Method NWTPH-Dx.

[3]MTCA = Washington State, Model Toxics Control Act

µg/l = micrograms per liter; ND = not detected

https://projects.geoengineers.com/sites/0050611712/Final/BNSF RI Report Final Draft/[050611712 Tables 11_14.xlsx]T14 Chemical Analytical

Table 15

Rising Head Test Analyses

BNSF Parkwater Facility Remedial Investigation
Spokane, Washington

Monitoring Well	Test Type and Number[1]	Well Casing Radius r_c feet	Borehole Radius r_w feet	Saturated Screen Interval L_e feet	Sand Pack Porosity (if applicable)[2] n	Corrected Well Casing Radius (if applicable)[2] r_{ec} feet	Static Potentiometric Level to Screen Bottom L_w feet	Static Potentiometric Level to Aquifer Bottom[3] H feet	Dimensionless Parameters (if applicable)[4] (Ref.2, Fig.2, p. 305) A	B	C	$\ln(R_e/r_w)$ (Ref. 2, Eqn. 4, p. 305)[5]	Log Change in Y $\ln(Y_1/Y_2)$	Time Change t_2-t_1 minutes	Slope[6] $(\ln(Y_1/Y_2)/t_2-t_1)$ feet/minute	Hydraulic Conductivity (Ref. 2, Eqn. 3, p. 305) K feet/day	Hydraulic Conductivity (Ref. 2, Eqn. 3, p. 305) K cm/sec
MW-11	RH1	0.083	0.25	10.1	0.30	0.154	10.14	130.14	2.9	0.45	NA	2.29	1.23	0.02	73.36	**282**	**1.0E-01**
MW-11	RH2	0.083	0.25	10.1	0.30	0.154	10.14	130.14	2.9	0.45	NA	2.29	1.10	0.02	65.79	**253**	**8.9E-02**
MW-17	RH1	0.083	0.25	13.2	0.30	0.154	13.18	133.18	3.2	0.50	NA	2.52	1.86	0.02	111.67	**363**	**1.3E-01**
MW-17	RH2	0.083	0.25	13.2	0.30	0.154	13.18	133.18	3.2	0.50	NA	2.52	2.05	0.02	122.99	**400**	**1.4E-01**
MW-22	RH2	0.083	0.25	8.5	0.30	0.154	8.48	132.98	2.65	0.43	NA	2.13	1.23	0.02	73.80	**315**	**1.1E-01**
MW-22	RH3	0.083	0.25	8.5	0.30	0.154	8.48	132.98	2.65	0.43	NA	2.13	1.47	0.02	87.91	**376**	**1.3E-01**

Notes:

[1]RH = Risinng-head test; FH = Falling-head test.

[2]Sand pack porosity and corrected well radius values are applicable to slug tests where water level rise occurs within the screened or open portion of the well.

[3]Effective aquifer thickness assumed to be 200 feet, based on Kahle and Bartolino (2007) and inferred distribution of interbedded aquitard units.

[4]Dimensionless parameters A and B are applicable to the case where $L_w < H$. Dimensionless parameter C is applicable to the case where $L_w = H$.

[5]Re = the effective radial distance over which Y is dissipated.

[6]Slope of the best fit line to data, see Figures 11 through 13.

feet/ day = feet per day; cm/sec = centimeters per second

References:

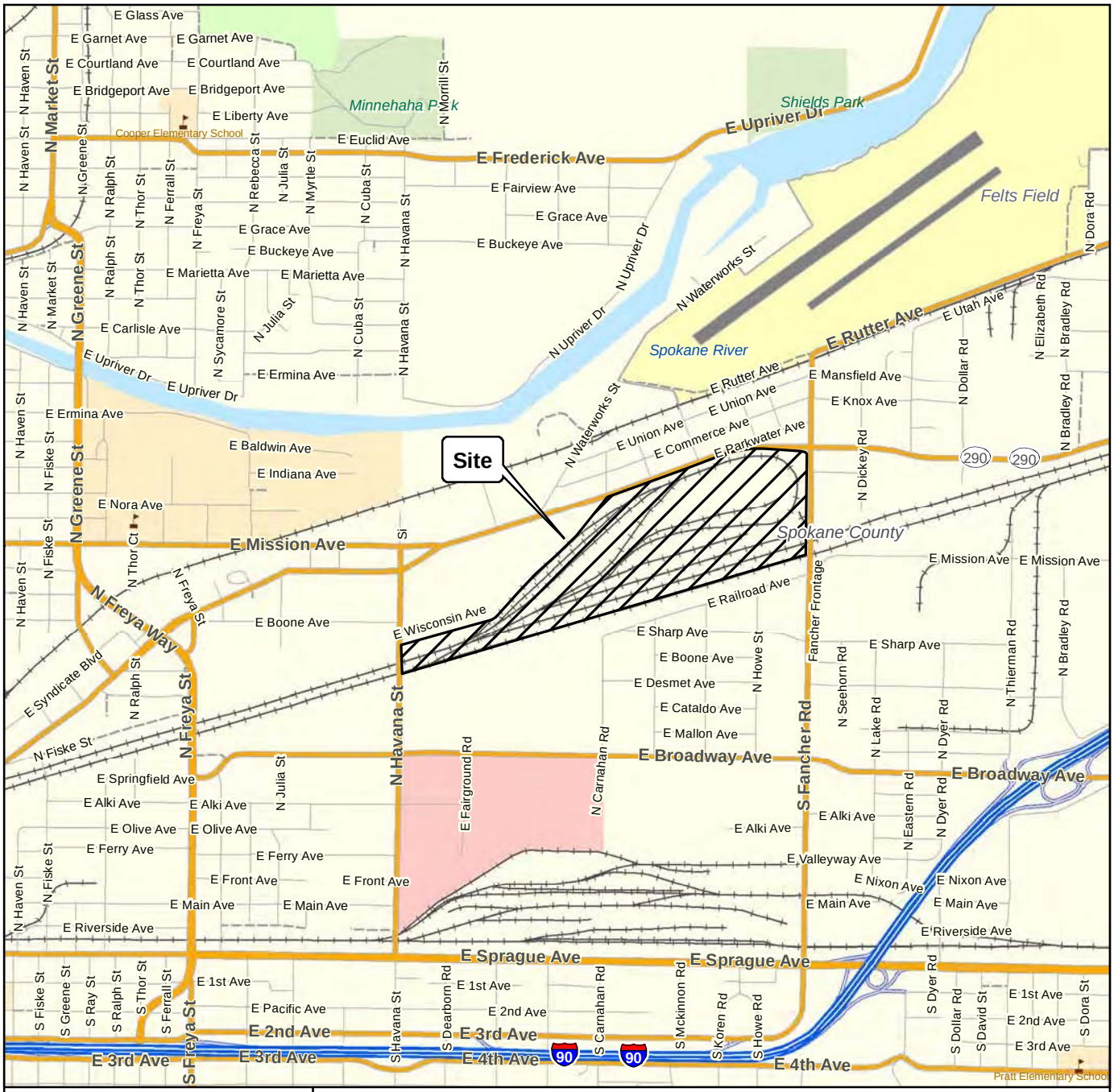
1) Bouwer, H. and R.C. Rice, 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells. Water Resources Research, v. 12, pp. 423-428.

2) Bouwer, H., 1989. The Bouwer and Rice Slug Test - An Update. Ground Water, v. 12, No. 3, pp. 304 - 309.

https://projects.geoengineers.com/sites/0050611712/Final/BNSF RI Report Final Draft/[050611712 Table 15.xlsx]Calculations

FIGURES

GeoEngineers



Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
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Data Sources: ESRI Data & Maps, Street Maps 2005

Transverse Mercator, Zone 11 N North, North American Datum 1983
North arrow oriented to grid north

N
W E
S

2,000 0 2,000
Feet

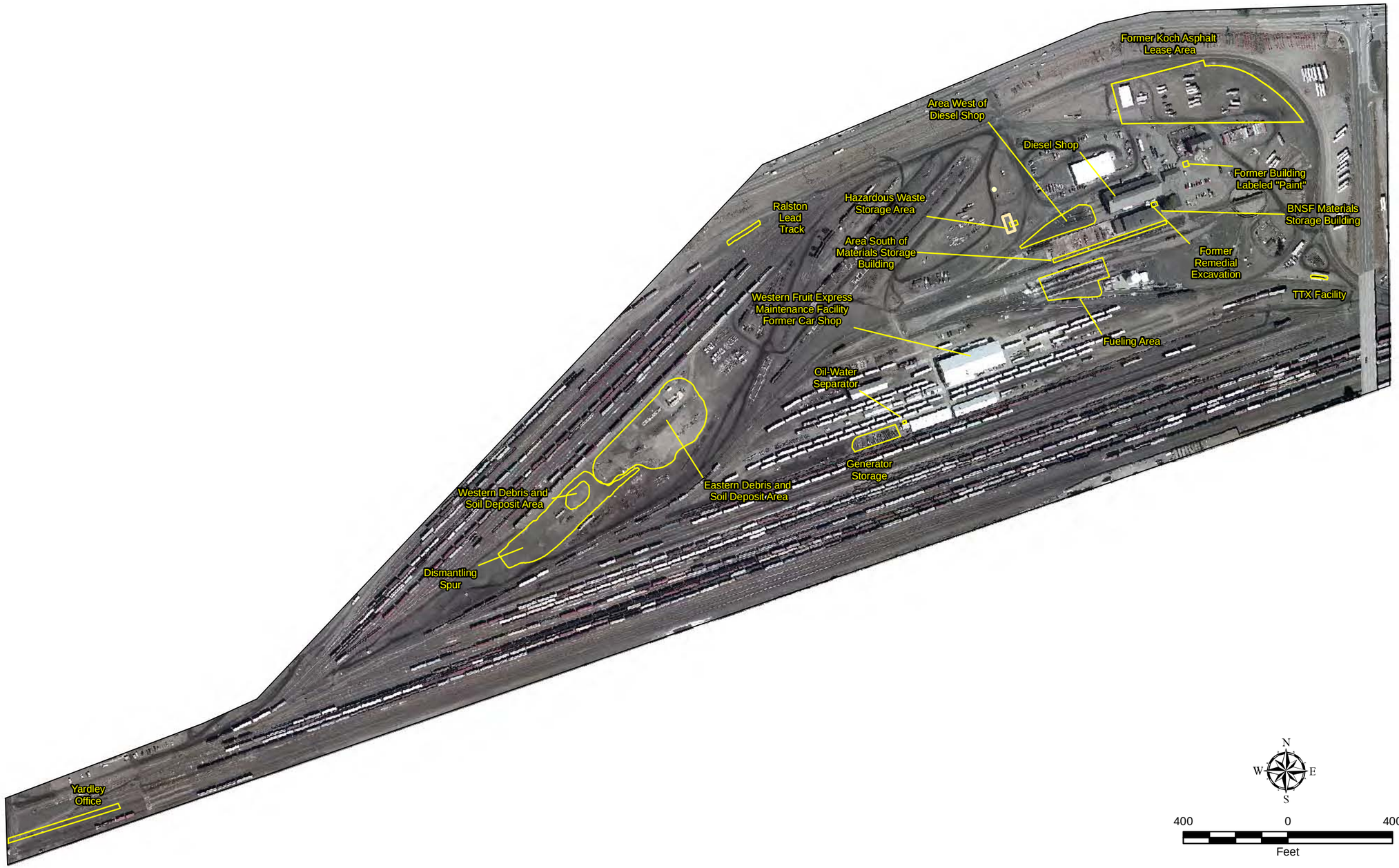
Vicinity Map

BNSF Parkwater Railyard Remedial Investigation
Spokane Valley, Washington

GeoEngineers

Figure 1

Office: SPOK Path: P:\0\0506117\GIS\12\RIMain_rev\050611712_Figure01_RI-FS_Vicinity.mxd Map Revised: March 8, 2010



N
W E
S

400 0 400
Feet

Reference:
2006 aerial photograph from Spokane County. Approximate extent of former Koch Materials/Time Oil operations from SCS Engineers, 1989.
Approximate extent of fueling area, landfills, petroleum contaminated soil, and diesel fuel release from RETECH Group Inc., 2001.

Notes:
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2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Subject Property and Areas of Interest

BNSF Parkwater Railyard Remedial Investigation
Spokane, Washington

GeoEngineers

Figure 2

Map Revised: March 26, 2010
Path: P:\000\05061\17\GIS\12\R\Main_rev\050611712_Figure2_SitePlan.mxd
Office:Spo

DRAFT

Metals Exceedance in Soil
Depth (feet below ground surface [ft bgs])
- 0 to 2 ft bgs
- 2 to 4 ft bgs
- 4 to 15 ft bgs

Polycyclic Aromatic Hydrocarbon Exceedance in Soil
Depth (ft bgs)
- 0 to 2 ft bgs
- 2 to 4 ft bgs
- 4 to 15 ft bgs

Petroleum Hydrocarbon Exceedance in Soil
Depth (ft bgs)
- 0 to 2 ft bgs
- 2 to 4 ft bgs
- 4 to 15 ft bgs

No Exceedance in Soil (Metals, PAHs, DRPH, ORPH, VOCs)
Depth (ft bgs)
- 0 to 2 ft bgs
- 2 to 4 ft bgs
- 4 to 15 ft bgs

Former Soil Stockpile (Remediated)

GTP-46
DRPH = 4,120 mg/kg
ORPH = 6,940 mg/kg
Total cPAH TEQ = 4.88 mg/kg

GTP-48

GTP-50

GTP-47
ORPH = 2,130 mg/kg

GTP-49
Arsenic = 26.4 mg/kg
Cadmium = 3.3 mg/kg

GTP-51

GTP-52

GTP-53

Former Koch Lease Area

Former Building Labeled "Paint"

DP-54

Diesel Shop

Notes: 1. DRPH = Diesel-range petroleum hydrocarbons, ORPH = Oil-range petroleum hydrocarbons, cPAHs = Carcinogenic Polycyclic Aromatic Hydrocarbons, TEQ = Toxicity Equivalency Quotient
2. mg/kg = milligram per kilogram.
3. The locations of all features shown are approximate.
4. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
Reference: Aerial photo (June 2007) from City of Spokane.

DP-54 = Labels for 2009/2010 Explorations

N W E S

80 0 80
Feet

Soil Exploration Locations and Chemical Exceedances in Soil - Koch Asphalt Lease Area and Former Building Labeled "Paint"

BNSF Parkwater Railyard Remedial Investigation
Spokane Valley, Washington

GeoEngineers

Figure 3

Office:SPO Path:Spokane\Projects\0050611?\GIS\12\RI_Report\RIMain_rev\050611712_RI_Exceedances_Koch.mxd Map Revised: May 18, 2010 TCK:CRC:KKS:CRC

DRAFT

Not Analyzed

Polycyclic Aromatic Hydrocarbon Exceedance in Soil
Depth (feet below ground surface [ft bgs])

- 0 to 4 ft bgs
- 4 to 8 ft bgs
- 8 to 16 ft bgs

Petroleum Hydrocarbon Exceedance in Soil
Depth (ft bgs)

- 0 to 4 ft bgs
- 4 to 8 ft bgs
- 8 to 16 ft bgs

No Exceedance in Soil (Metals, PAHs, PCBs, DRPH, ORPH, BTEX, GRPH)
Depth (ft bgs)

- 0 to 4 ft bgs
- 4 to 8 ft bgs
- 8 to 16 ft bgs

Former Remedial Excavation Area

Diesel Shop

Former Gas Storage Tank Area

Materials Storage Building

GTP-55

DP-28

DP-27

DP-25

DP-29

DP-26

MW-23

DP-24

DP-30

DP-11

DP-10

DP-9

DP-8

DP-7

DP-5

DP-4

DP-3

DP-2

DP-1

DP-1a

MW-22

Total cPAH TEQ = 2.524 mg/kg

ORPH = 4,570 mg/kg

DRPH = 4,630 mg/kg
ORPH = 10,200 mg/kg
Naphthalene = 5.4 mg/kg

DRPH = 12,800 mg/kg
ORPH = 10,600 mg/kg
Naphthalene = 34.5 mg/kg

DRPH = 3,950 mg/kg
ORPH = 2,330 mg/kg

Reference: Aerial photo (June 2007) from City of Spokane.

DP-1 = Labels for 2009/2010 Explorations

Notes: 1. DRPH = diesel range petroleum hydrocarbons, ORPH = Oil-range petroleum hydrocarbons, PAHs = Polycyclic Aromatic Hydrocarbons, cPAHs = Carcinogenic Polycyclic Aromatic Hydrocarbons, TEQ = Toxicity Equivalency Quotient
2. mg/kg = milligram per kilogram.
3. The locations of all features shown are approximate.
4. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

N W E S

50 0 50
Feet

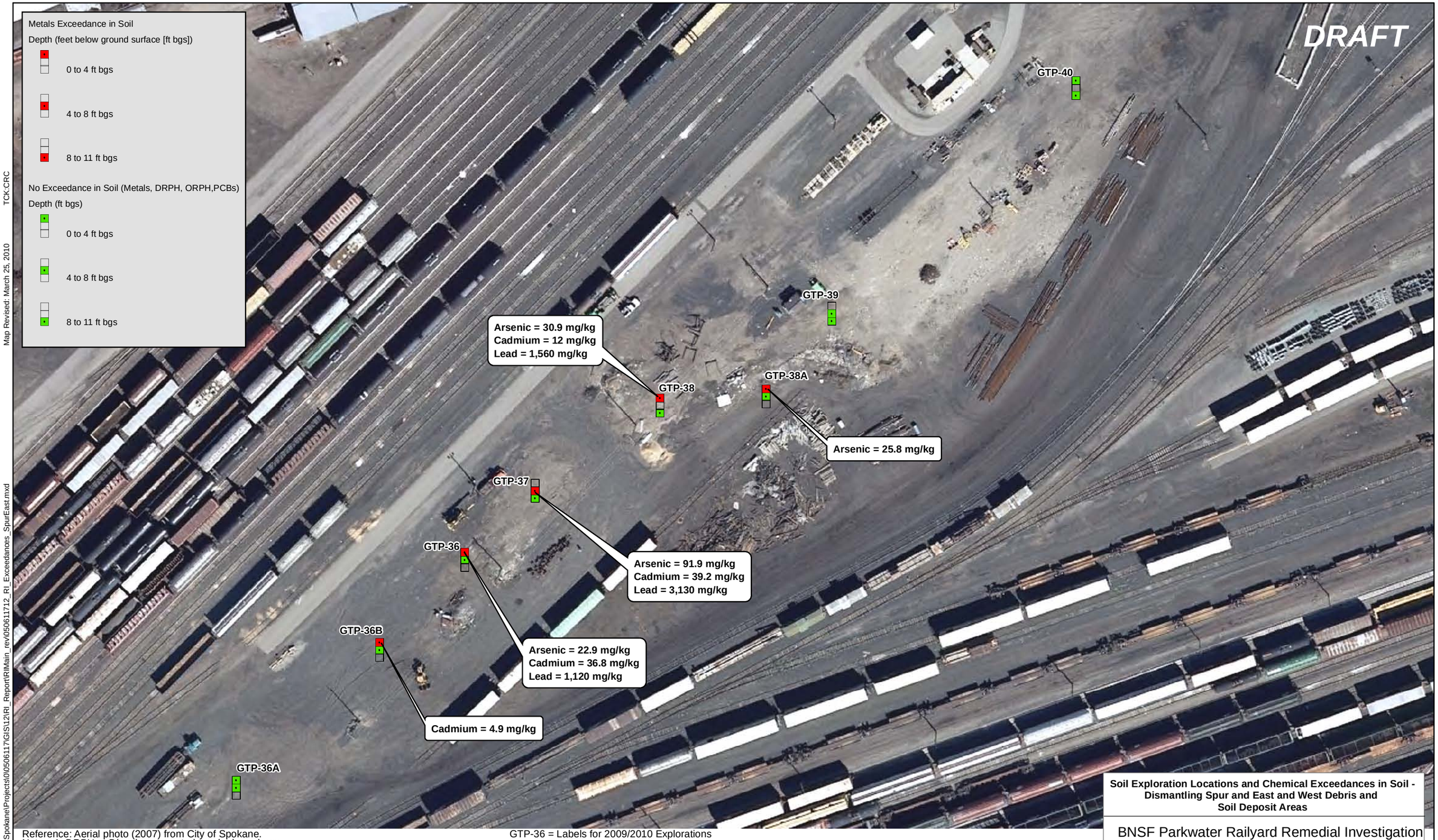
Soil Exploration Locations and Chemical Exceedances in Soil - Diesel Shop, Materials Storage Building and Former Gas Storage Tank

BNSF Parkwater Railyard Remedial Investigation
Spokane Valley, Washington

GeoEngineers

Figure 4

Map Revised: May 17, 2010
TCK/CRC:KKS
Path:S:\Spokane\Projects\0050511712\GIS\2010\RI_Report\RiMain_rev050611712_RI_Exceedances_DieselShop.mxd
Office:SPO



Reference: Aerial photo (2007) from City of Spokane.

GTP-36 = Labels for 2009/2010 Explorations

Notes: 1. DRPH = Diesel-range petroleum hydrocarbons,
ORPH = Oil-range petroleum hydrocarbons, PCBs = Polychlorinated biphenyls
2. mg/kg = milligram per kilogram.
3. The locations of all features shown are approximate.
4. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

N W E S

80 0 80
Feet

Soil Exploration Locations and Chemical Exceedances in Soil - Dismantling Spur and East and West Debris and Soil Deposit Areas

BNSF Parkwater Railyard Remedial Investigation
Spokane Valley, Washington

GeoEngineers

Figure 6

Map Revised: March 25, 2010 TCK:CRC

Path:Spokane\Projects\0050611?GIS\12\RI_Report\RIMain_rev\0506117l2_RI_Exceedances_SpurEast.mxd

Office:SPO

Metals Exceedance in Soil

Depth (feet below ground surface [ft bgs])

- 0 to 2 ft bgs
- 2 to 4 ft bgs
- 4 to 8 ft bgs

No Exceedance in Soil (Metals, PAHs, DRPH, ORPH, PCBs, VOCs)

Depth (ft bgs)

- 0 to 2 ft bgs
- 2 to 4 ft bgs
- 4 to 8 ft bgs

Arsenic = 204 mg/kg
Cadmium = 653 mg/kg
Lead = 48,200 mg/kg
Mercury = 6.1 mg/kg

Cadmium = 3.3 mg/kg
Lead = 3,100 mg/kg

Cadmium = 7.3 mg/kg

Cadmium = 2.4 mg/kg
Lead = 1,690 mg/kg

Arsenic = 95.2 mg/kg
Cadmium = 6.7 mg/kg
Lead = 44,200 mg/kg

Arsenic = 98.9 mg/kg
Cadmium - 9.0 mg/kg
Lead = 34,700 mg/kg

DP-12
GTP-35B
GTP-34
GTP-35
GTP-32
GTP-33
GTP-56
GTP-58
GTP-57

Reference: Aerial photo (June 2007) from City of Spokane.

Notes: 1. DRPH = Diesel-range petroleum hydrocarbons, PAHs = Polycyclic Aromatic Hydrocarbons, ORPH = Oil-range petroleum hydrocarbons, PCBs = Polychlorinated biphenyls, VOCs = Volatile Organic Compounds
2. mg/kg = milligram per kilogram.
3. The locations of all features shown are approximate.
4. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

GTP-32 = Labels for 2009/2010 Explorations

N W E S

50 0 50
Feet

Soil Exploration Locations and Chemical Exceedances in Soil - Western Fruit Express Facility (Generator Storage Area)

BNSF Parkwater Railyard Remedial Investigation
Spokane Valley, Washington

GeoEngineers

Figure 5

Map Revised: March 25, 2010 TCK:CRC

Path:SpokaneProjects\0\0506117GIS\12\RI_Report\RIMain_rev\0506117l2_RI_Exceedances_WesternFruit.mxd

Office:SPO

DRAFT

Metals Exceedance in Soil

Depth (feet below ground surface [ft bgs])

0 to 4 ft bgs

4 to 8 ft bgs

8 to 15 ft bgs

No Exceedance in Soil (Metals, DRPH, ORPH)

Depth (ft bgs)

0 to 4 ft bgs

4 to 8 ft bgs

8 to 15 ft bgs

Arsenic = 38.3 mg/kg
Cadmium = 3.8 mg/kg

Arsenic = 53.9 mg/kg
Cadmium = 5.2 mg/kg

Arsenic = 21.2 mg/kg

DP-13
DP-14
DP-15
DP-16
DP-17
DP-18
DP-19
DP-20
DP-21
DP-22
DP-23

Reference: Aerial photo (2007) from City of Spokane.

DP-13 = Labels for 2009 Explorations

Notes: 1. DRPH = Diesel-range petroleum hydrocarbons, ORPH = Oil-range petroleum hydrocarbons,
2. mg/kg = milligram per kilogram.
3. The locations of all features shown are approximate.
4. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

N W E S

100 0 100

Feet

Soil Exploration Locations and Chemical Exceedances in Soil - Yardley Office (Main Line Track No. 1)

BNSF Parkwater Railyard Remedial Investigation
Spokane Valley, Washington

GeoEngineers

Figure 7

Office:SPO Path:S:\Spokane\Projects\0\050611717\GIS\12\RI_Report\RIMain_rev\050611712_RI_Exceedances_SpurWest.mxd Map Revised: March 25, 2010 TCK:CRC

Metals Exceedance in Soil
Depth (feet below ground surface [ft bgs])

- 0 to 2 ft bgs
- 4 to 8 ft bgs
- 8 to 15 ft bgs

Volatile Organic Compound Exceedance in Soil
Depth (ft bgs)

- 0 to 4 ft bgs
- 4 to 8 ft bgs
- 8 to 15 ft bgs

No Exceedance in Soil (DRPH, ORPH, Metals, PAHs, VOCs)
Depth (ft bgs)

- 0 to 4 ft bgs
- 4 to 8 ft bgs
- 8 to 15 ft bgs

DP-44b
DP-44a
Cadmium = 2.3 mg/kg
Methylene Chloride = 0.074 mg/kg
DP-44
DP-43
Methylene Chloride = 0.18 mg/kg
DP-42
DP-41

Reference: Aerial photo (June 2007) from City of Spokane.

Notes: 1. PAHs = Polycyclic Aromatic Hydrocarbons, DRPH = Diesel-range petroleum hydrocarbons, ORPH = Oil-range petroleum hydrocarbons, VOCs = Volatile Organic Compounds
2. mg/kg = milligrams per kilogram
3. The locations of all features shown are approximate.
4. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

DP-41 = Labels for 2009 Explorations

N W E S

50 0 50
Feet

Soil Exploration Locations and Chemical Exceedances in Soil - Ralston Lead Track

BNSF Parkwater Railyard Remedial Investigation
Spokane Valley, Washington

GeoEngineers

Figure 8

Office:SPO Path:S:\Spokane\Projects\0\0506117\GIS\12\RI_Report\RIMAin_rev\0506117\12_RI_Exceedances_Ralston.mxd Map Revised: March 25, 2010 TCK:CRC

No Exceedance in Soil (Metals, DRPH, ORPH)
Depth (feet below ground surface [ft bgs])

- 0 to 4 ft bgs
- 4 to 8 ft bgs
- 8 to 16 ft bgs

DP-45

Reference: Aerial photo (June 2007) from City of Spokane.

Notes: 1. PAHs = Polycyclic Aromatic Hydrocarbons, DRPH = Diesel-range petroleum hydrocarbons, ORPH = Oil-range petroleum hydrocarbons, VOCs = Volatile Organic Compounds
2. The locations of all features shown are approximate.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

N W E S

50 0 50
Feet

Soil Exploration Location - TTX Facility

BNSF Parkwater Railyard Remedial Investigation
Spokane Valley, Washington

GeoEngineers

Figure 9

Map Revised: March 25, 2010 TCK:CRC
Path:Spokane\Projects\0\0506117\GIS\12\RI_Report\MainRI_rev\0506117\12_RI_Exceedances_TTXFacility.mxd
Office:SPO

East Union Ave
North Waldo St
East Commerce Ave
North Airport St
North Byrd St
East Trent Ave

MW-10
1882.55
MW-11
1881.59
MW-12
1882.38
MW-13
1884.46
MW-14
1883.70
MW-15
1883.18
MW-16
1883.24
MW-17
1885.74
MW-18
1884.61
MW-19
1884.14
MW-20
1883.70
MW-21
1883.28
MW-22
1884.84
MW-23
1884.29
MW-1
1884.44
MW-4
1885.08
MW-5
1884.87
MW-6
1884.38
MW-7
1884.12
MW-8
1883.23
MW-9
1883.00

1882.0
1882.5
1883.0
1883.5
1884.0
1884.5
1885.0
1885.5

Legend

- MW-18 1884.61 — Monitoring Well Identification, Approximate Location, and Groundwater Elevation (feet)
- 1,882.0 — Groundwater Elevation Contour, 0.5-foot Interval
- Interpreted Groundwater Flow Direction
- Slug Test
- Approximate Limit of Historic Diesel Plume

N
W
E
S

200 0 200
Feet

Reference: 2007 aerial photograph provided by Spokane County.

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. Groundwater elevations are relative to the NAVD 88 datum.

Groundwater Elevations and Flow Direction January 19, 2010

BNSF Parkwater Railyard Remedial Investigation
Spokane, Washington

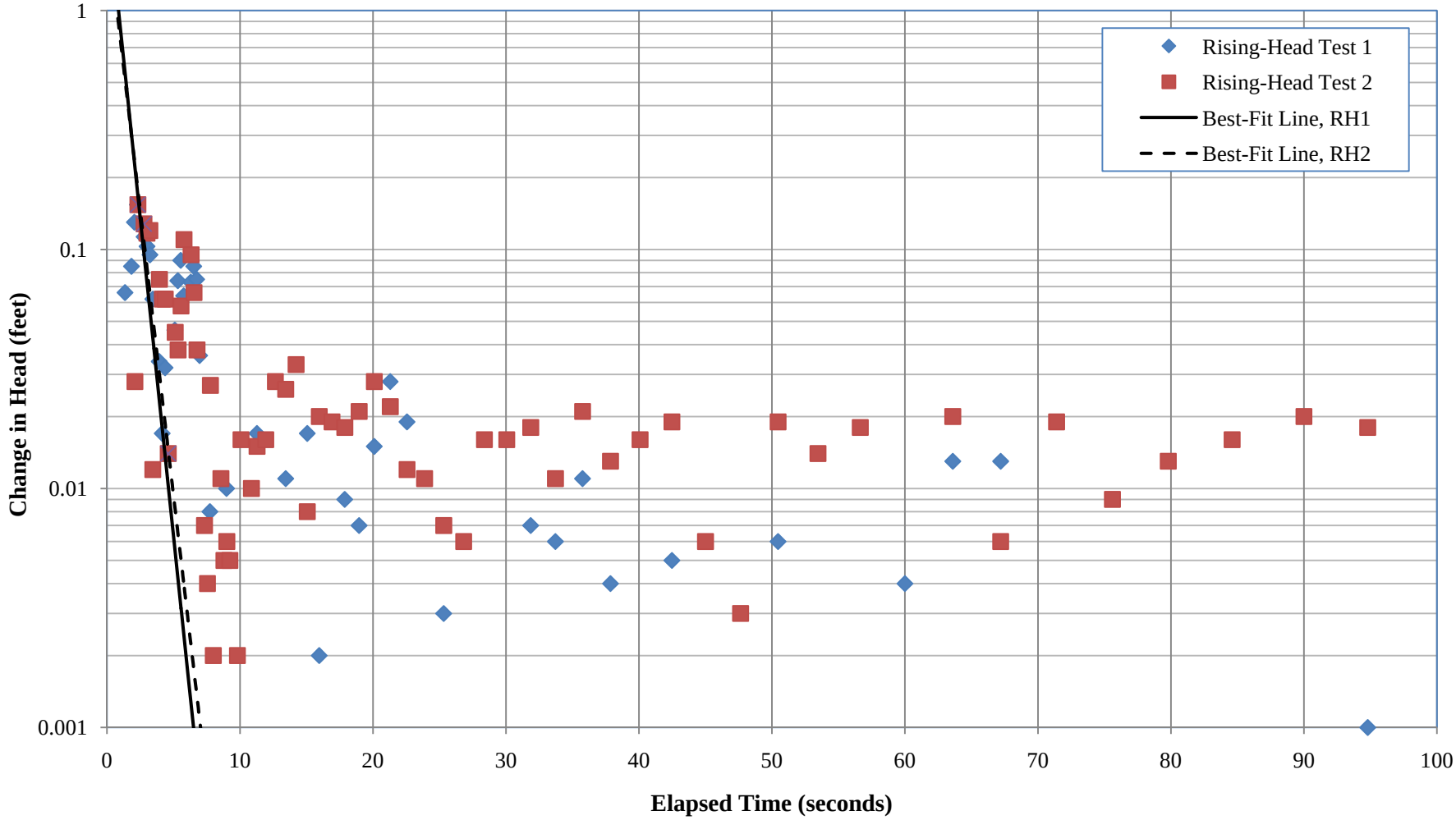
GeoEngineers

Figure 10

Map Revised: May 14, 2010

Path: P:\0\0050611712\GIS\12\RIMain_rev050611712_Figure10_GWCont01_19_2010_table.mxd CRC:TCK:KKS

Spokane

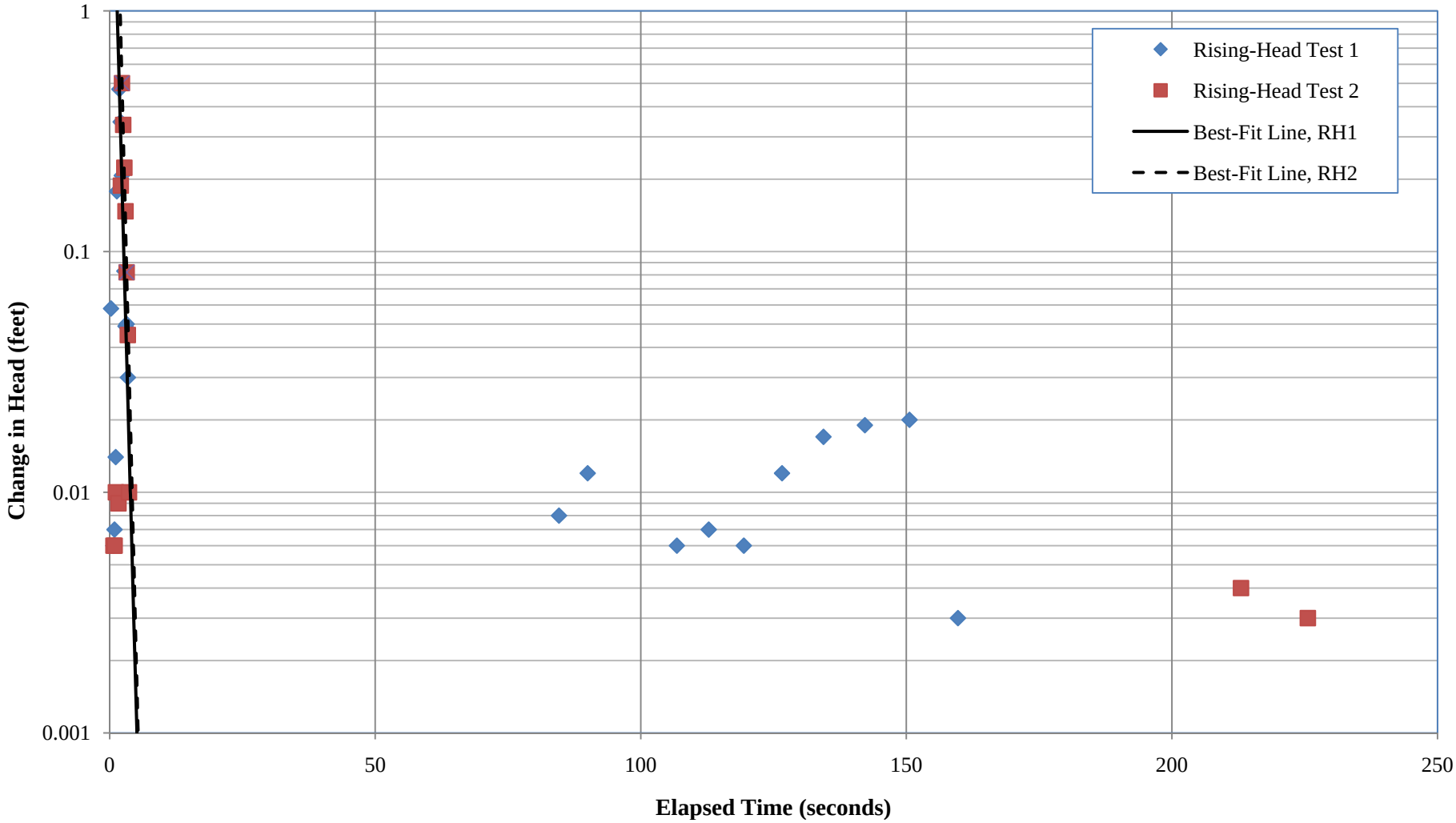


Rising-Head Test Plot, MW-11

BNSF Parkwater Facility Remedial Investigation
Spokane, Washington

GeoEngineers

Figure 11

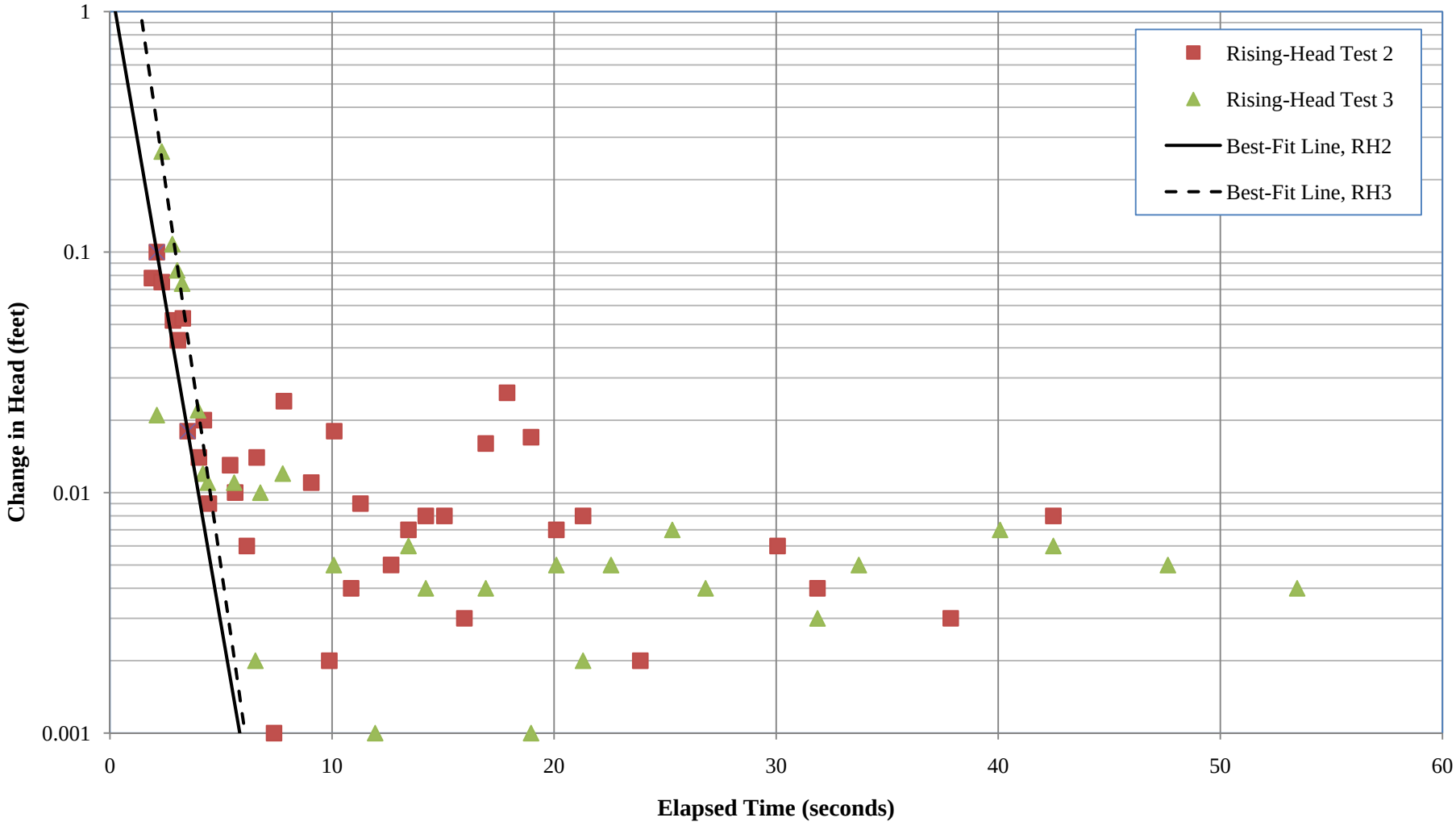


Rising-Head Test Plot, MW-17

BNSF Parkwater Facility Remedial Investigation
Spokane, Washington

GeoEngineers

Figure 12

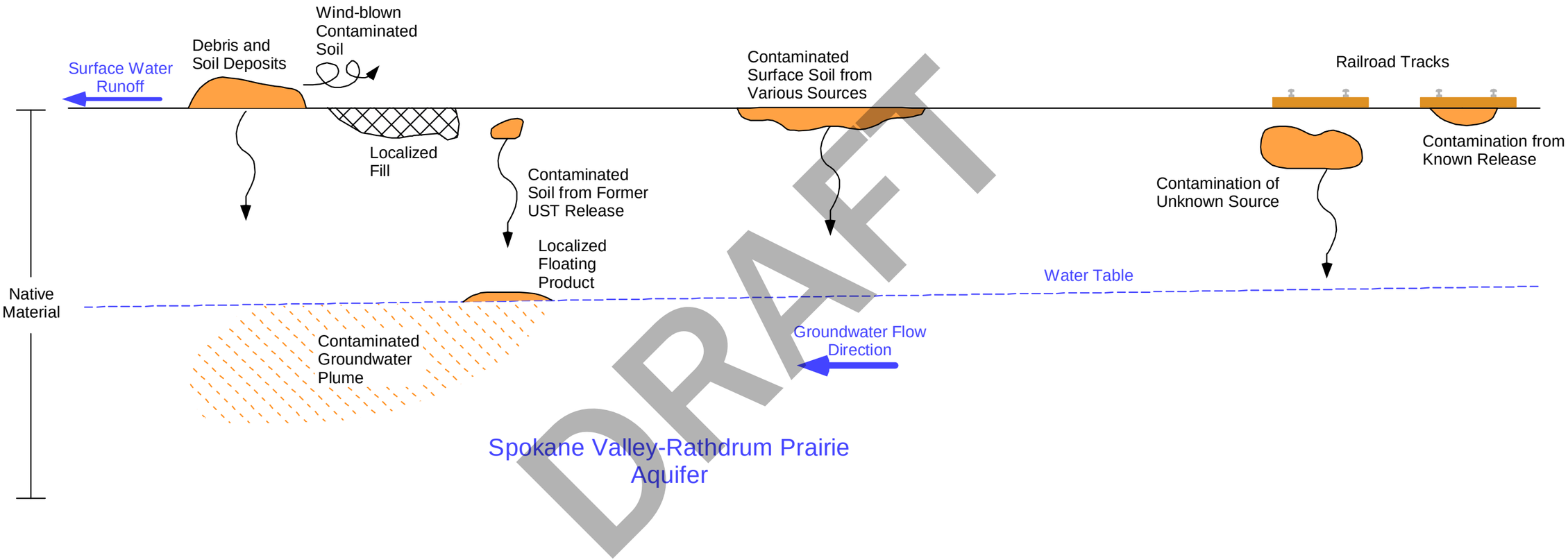


Rising-Head Test Plot, MW-22

BNSF Parkwater Facility Remedial Investigation
Spokane, Washington

GeoEngineers

Figure 13



Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Conceptual Site Model

BNSF Parkwater Railyard
Spokane Valley, Washington

GeoEngineers

Figure 14

Revised: March 15, 2010
Path: P:\0\0506117\GIS\12050611712_Figure14_ConceptualSiteModel TCK
Office:SPO

APPENDICES

GeoEngineers

APPENDIX A
Remedial Investigation Field Methods

APPENDIX A
REMEDIAL INVESTIGATION FIELD METHODS

Field Explorations

Prior to completion of the explorations, GeoEngineers contacted the One-Call Utility Notification Center in accordance with Washington State law. In addition, GeoEngineers subcontracted Advanced Underground Locating Inc., a private underground utility location subcontractor. In cooperation with GeoEngineers, a representative of advanced Underground Locating, Inc. coordinated with Site personnel regarding the presence and location of underground utilities on-site relative to the proposed explorations.

Following clearance of utilities, subsurface conditions at the Site were explored from December 3, 2009 through February 25, 2010 by:

- excavating 22 test pits;
- drilling 38 borings using sonic drilling methods, including 2 monitoring wells, and 2 borings using direct push exploration methods; and
- completing three shallow borings using hand tools.

The approximate exploration locations are shown in Figures 3 through 9. A chronological summary of the completed explorations and the methods used are provided in Table A-1.

TABLE A-1. EXPLORATION SUMMARY

Exploration Number	Date Completed	Exploration Method
MW-22	12/3/09	Sonic Drill
MW-23	12/4/09	Sonic Drill
DP-10, DP-11, DP-45	12/10/09	Geoprobe®, Direct Push
DP-1A, DP-2 through DP-5, DP-6[2], DP-7 through DP-9	12/14/09	Sonic Drill[1]
DP-1, DP-24, DP-26, DP-29, DP-30, DP-31[2]	12/15/09	Sonic Drill[1]
DP-25, DP-27, DP-28, DP-43, DP-44, GTP-54	12/16/09	Sonic Drill[1]
DP-41, DP-42, DP-44B	12/17/09	Sonic Drill[1]
GTP-50 through GTP-53	12/18/09	Backhoe
GTP-46, GTP-48, GTP-49	12/21/09	Backhoe
GTP-37 through GTP-40, GTP-47	12/22/09	Backhoe
DP-13 through DP-23	12/28/09	Sonic Drill[1]
GTP-32 through GTP-35, GTP-35B, GTB-55, GTP-36	1/4/10	Backhoe
DP-12	1/19/10	Geoprobe®, Direct Push
GTP-36A, GTP-36B, GTP-38A	2/9/10	Backhoe
GTP-56 through GTP-58	2/25/10	Hand Auger

Notes:
1. Changed to sonic drill method because direct push method was generally unsuccessful or because surface infrastructure conflicted with test pit methodology.
2. Deleted from exploration program because of surface infrastructure and/or underground utility conflicts.

In accordance with the RI/FS Work Plan, the majority of the borings were planned to be completed using direct push exploration methods. An attempt was made to complete the soil borings, DP-10, DP-11 using direct push exploration methods. However, because of the generally coarse granular subsurface conditions, this method was not effective at reaching the target depths with sufficient recovery. On this basis, with the exception of DP-12, which required low a low clearance drill rig, the remainder of the planned borings were completed using sonic drilling and continuous sampling methods. Additional detail on specific changes between the RI/FS Work Plan and the actual drilling program are provided in the following section.

The test pits discussed above were excavated to depths in the range of 4 to 15 feet using a backhoe operated by NRC Environmental Inc. under subcontract to GeoEngineers. The borings completed using sonic drilling methods were drilled using a truck-mounted Sonic Speedstar 15k owned and operated by Environmental West Exploration, Inc., also under subcontract to GeoEngineers. The sonic borings were typically completed to depths in the range of 15 to 16 feet. The borings completed using direct push exploration methods were completed using a track-mounted Geoprobe® owned and operated by GeoEngineers, Inc. The direct push borings were typically completed to depths in the range of 12 to 16 feet. Hand auger borings were completed to depths of approximately 1½ feet using a 4-inch-diameter extendable hand auger.

Variance between RI/FS Work Plan and Actual Explorations

The following are modifications from the September 30, 2009 Work Plan and rationale for the change.

- Boring DP-6 was not drilled because of underground utilities and surface infrastructure conflicts. However, an additional boring DP-1A, was drilled in the area.
- Borings DP-30 and DP-31 were planned in a relatively small area between the Diesel Shop and Materials Storage buildings. Only one boring (DP-30) was needed to assess the area. Therefore, DP-31 was eliminated from the program.
- Boring DP-22, completed near the Main Line Track No. 1 encountered refusal on a boulder at a depth of approximately 8 feet. Logistical and infrastructure limitations including high frequency train traffic prevented completing a second attempt adjacent to the same location to reach the 15-foot target depth. Based on the results of chemical analysis of other nearby borings, making a second attempt at a later date was not deemed necessary.
- The following test pits were eliminated from the program because of space limitations in the generator storage area relative to caving of the test pit side walls (GTP-31, GTP-32A, GTP-33A, GTP-34A, and GTP-35A). The exploration area was deemed adequately assessed by GTP-32, GTP-33, GTP-34, GTP-35, and GTP-35B, and the addition of three shallow hand auger excavations GTP-56 through GTP-58.
- As discussed in the previous section, the proposed direct push borings were marginally successful at obtaining quality samples. Therefore, the majority of the proposed direct push (DP) borings were completed using sonic drilling. A few proposed test pit locations also were assessed using direct push or sonic drill methods because of surface infrastructure conflicts relative to caving soils within the test pits.

Soil Sampling from Borings and Test Pits

As discussed above, soil borings were completed using sonic, or direct-push drilling techniques by a licensed driller. For sonic drilling methods, subsurface soil samples were obtained continuously by advancing an approximately 4-inch-diameter, 10-foot-long barrel sampler. For the direct-push drilling samples were also continuously obtained using 4-foot-long, 1-inch-diameter acrylic sleeves.

Each boring was continuously monitored by a geologist from our firm to observe and classify the soil encountered, and prepare a detailed log of each boring. Soil encountered in the borings was classified in the field in general accordance with ASTM International (ASTM) D-2488, the Standard Practice for Classification of Soils, Visual-Manual Procedure, which is summarized in Figure A-1. Logs of the test pits are provided in Figures A-2 through A-66. Preservation of VOC samples was completed in accordance with Ecology Memo 5, document number 04-09-087. Sample containers were labeled and placed into an ice chest containing ice/ice packs. Soil samples for VOCs analyses were obtained consistent with EPA Method 5035A. Chain-of-custody procedures were followed during transport of the soil samples.

Sampling equipment was decontaminated between each sampling attempt for either drilling method. Samples were obtained using either a decontaminated soil knife or new, clean nitrile glove and placed into 8-ounce glass sample jars with Teflon lids.

In test pits, soil samples were obtained from the side walls and/or bottom of test pits either by hand if the test pit depth is less than four feet and conditions permit safe entry into the test pit, or from the backhoe bucket if the test pit is greater than four feet deep. Samples were obtained using either a decontaminated soil knife or new, clean nitrile gloves into 8-ounce glass sample jars with Teflon lids.

Samples were placed in a cooler with ice and delivered to the analytical laboratory; standard chain-of-custody procedures were observed during transport of the samples to the laboratory.

Depth Normalization for Sonic Bore Logging

Sonic drilling is an effective method to obtain relatively continuous samples, and optimum sample quantity, for analytical testing. However, certain sampling limitations are inherent to the sonic drilling method in coarse-grained soils. These limitations include: 1) potential consolidation and/or loss of portions of the sample during drilling; and 2) consolidation of the sample during extraction. These limitations are described in further detail below.

During sonic drilling, the drill stem and sampler barrel are vibrated vertically as they are pushed and rotated into the soil. As the drill stem and sampler barrel are advanced, portions of the sample can be “lost” by being pushed into the soil formation outside the sampler barrel. This results in less than 100 percent of the sample being recovered. For example, if the drill advances 10 feet, it is possible that only 6 feet of the sample might be recovered.

After reaching depth, the drill stem and sampler barrel are pulled to the ground surface. To extract the sample from the barrel, the barrel is vibrated. This vibration can cause consolidation of the sample, especially in coarse-grained soil, and if less than 100 percent is recovered. This skews interpretation of the actual depth a soil sample is obtained and the depth at which soil types might

change. To account for these limitations, for the purposes of this RI, the soil sample depth and the depth at which the soil types change, shown on the boring logs, have been normalized to 100 percent recovery. Where appropriate, this was accomplished by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. In general, depths were normalized for run lengths of 5 feet or greater with less than 100 percent recovery. The run length and actual sample recovered, measured in feet, are shown on the Logs of Borings, Figures A-2 through A-41.

Field Screening Methods

A GeoEngineers field geologist performed field screening tests on selected soil samples from the explorations. Field screening results were used to aid in the selection of soil samples for chemical analysis. Screening methods included (1) visual examination, (2) water sheen screening, and (3) headspace vapor screening using a photo-ionization detector (PID). Field screening was completed in accordance with that described in the RI/FS Work Plan, Sampling and Analysis Plan.

Monitoring Well Construction, Development, and Surveying

Monitoring wells MW-22 and MW-23 were constructed in accordance with WAC 173-160, Section 400, Washington State Resource Protection Well Construction Standards. Monitoring well records were submitted in accordance with Washington monitoring well construction standards. Monitoring well installation will be observed by a GeoEngineers field geologist, who maintained a detailed log of the materials and depths of the well. Well construction details, including the depths of the well screen and filter packs are shown on Figures A-40 and A-41.

The two monitoring wells each were constructed using 2-inch-diameter polyvinyl chloride (PVC) well casing. The annular space in each well was sealed between the top of the filter pack and the ground surface with bentonite to prevent infiltration of groundwater into the well bore from shallower zones. A lockable compression-type cap was installed in the top of the PVC well casing. A flush-mount above-grade monument equipped with a watertight cover was installed to protect the PVC well casing. A concrete surface seal was placed around the monument at the ground surface to divert surface water away from the well location.

The monitoring wells were developed to remove water introduced into the well during drilling, stabilize the filter pack and formation materials surrounding the well screen, and restore the hydraulic connection between the well screen and the surrounding soil. The well screen was gently surged with a decontaminated stainless steel bailer or surge-block several times after installation. The wells were allowed to equilibrate following development and sampled on January 19, 2010.

The elevation of the top of each monitoring well casing and the ground surface of each well was surveyed by Thomas, Dean and Hoskins, Inc., on February 4, 2010, relative to an on-site benchmark. A survey reference notch was established on the north side of each monitoring well casing.

Groundwater Sampling

The wells were allowed to equilibrate at least 72 hours after well development and subsequently sampled on January 19, 2010. Each groundwater sample was obtained using low-flow purging

methods. The groundwater samples were transferred in the field to laboratory-prepared sample containers and kept cool during transport to the testing laboratory. The sample containers were filled completely to eliminate headspace in the container. Chain-of-custody procedures were observed from the time of sample collection to delivery to the testing laboratory.

Decontamination Procedures

The objective of the decontamination procedure is to minimize the potential for cross-contamination between sample locations.

A designated decontamination area was established for decontamination of drilling equipment and reusable sampling equipment. Drilling equipment was cleaned using high-pressure/low-volume cleaning equipment.

Sampling equipment was decontaminated in accordance with the following procedures before each sampling attempt or measurement.

1. Brush equipment with a nylon brush to remove large particulate matter.
2. Rinse with potable tap water.
3. Wash with non-phosphate detergent solution (Liquinox® and potable tap water).
4. Rinse with potable tap water.
5. Rinse with distilled water.

Handling of Investigation-Derived Waste

Investigation Derived Waste (IDW), which consists of mainly drill cuttings and decontamination/purge water, typically was placed in DOT-approved 55-gallon drums. Each drum was labeled with the project name, exploration number, general contents, and date. The drummed IDW was stored onsite pending analysis and disposal.

Disposable items, such as sample tubing, disposable bailers, bailer line, gloves and protective overalls, paper towels, etc., were placed in plastic bags after use and deposited in trash receptacles for disposal.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% RETAINED ON NO. 200 SIEVE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	CC	Cement Concrete
	AC	Asphalt Concrete
	CR	Crushed Rock/ Quarry Spalls
	TS	Topsoil/ Forest Duff/Sod

Measured groundwater level in exploration, well, or piezometer

Groundwater observed at time of exploration

Perched water observed at time of exploration

Measured free product in well or piezometer

Graphic Log Contact

Distinct contact between soil strata or geologic units

Approximate location of soil strata change within a geologic soil unit

Material Description Contact

Distinct contact between soil strata or geologic units

Approximate location of soil strata change within a geologic soil unit

Sampler Symbol Descriptions

2.4-inch I.D. split barrel

Standard Penetration Test (SPT)

Shelby tube

Piston

Direct-Push

Bulk or grab

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

A "P" indicates sampler pushed using the weight of the drill rig.

Laboratory / Field Tests

%F	Percent fines
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
OC	Organic content
PM	Permeability or hydraulic conductivity
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen
NT	Not Tested

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

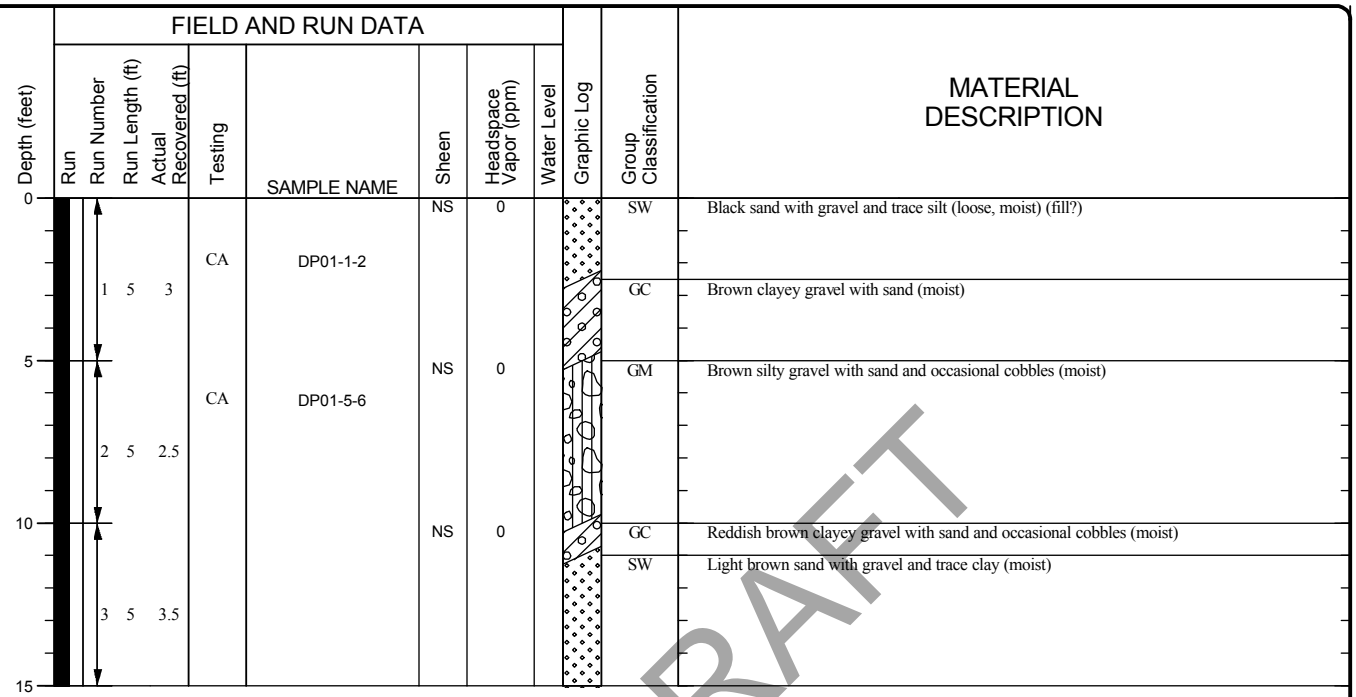
KEY TO EXPLORATION LOGS

GeoEngineers

FIGURE A-1

Drilled	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
12/15/2009	15	KBC / JDL	Environmental West	Sonic

Location	Groundwater		Drilling Equipment
East (X): 2503167 North (Y): 265115 Datum: NAD83 (feet)- State Plane WA (North)	Date Measured	Depth to Water (ft) Not Encountered	Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-1

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-2
Sheet 1 of 1

Drilled	12/14/2009	Total Depth (ft)	15	Logged By / Checked By	KBC / JDL	Driller	Environmental West	Drilling Method	Sonic
Location East (X): 2503197 North (Y): 265108 Datum: NAD83 (feet)- State Plane WA (North)				Groundwater Date Measured:		Depth to Water (ft): Not Encountered		Drilling Equipment	Sonic Speedstar 15k

Depth (feet)	Run	Run Number	Run Length (ft)	Actual Recovered (ft)	Testing	SAMPLE NAME	Sheen	Headspace Vapor (ppm)	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION
0					CA	DP01A-1-2					SW-SM	Dark brown to black sand and gravel with clay (moist) (fill?)
		1	5	3.5							SW	Light gray to light brown sand with gravel and trace silt (dry)
					CA	DP01A-2-3					SW	Orange to brown sand with gravel and trace silt (dry)
5											SP	Light gray fine sand with gravel and trace silt (dry)
											GW	Dark orangish brown gravel with sand, occasional cobbles and trace silt (moist)
10		2	10	6.5								
					CA	DP01A-11-12.5					SP	Light gray fine sand with gravel and occasional cobbles (dry)
15												

Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-1A

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

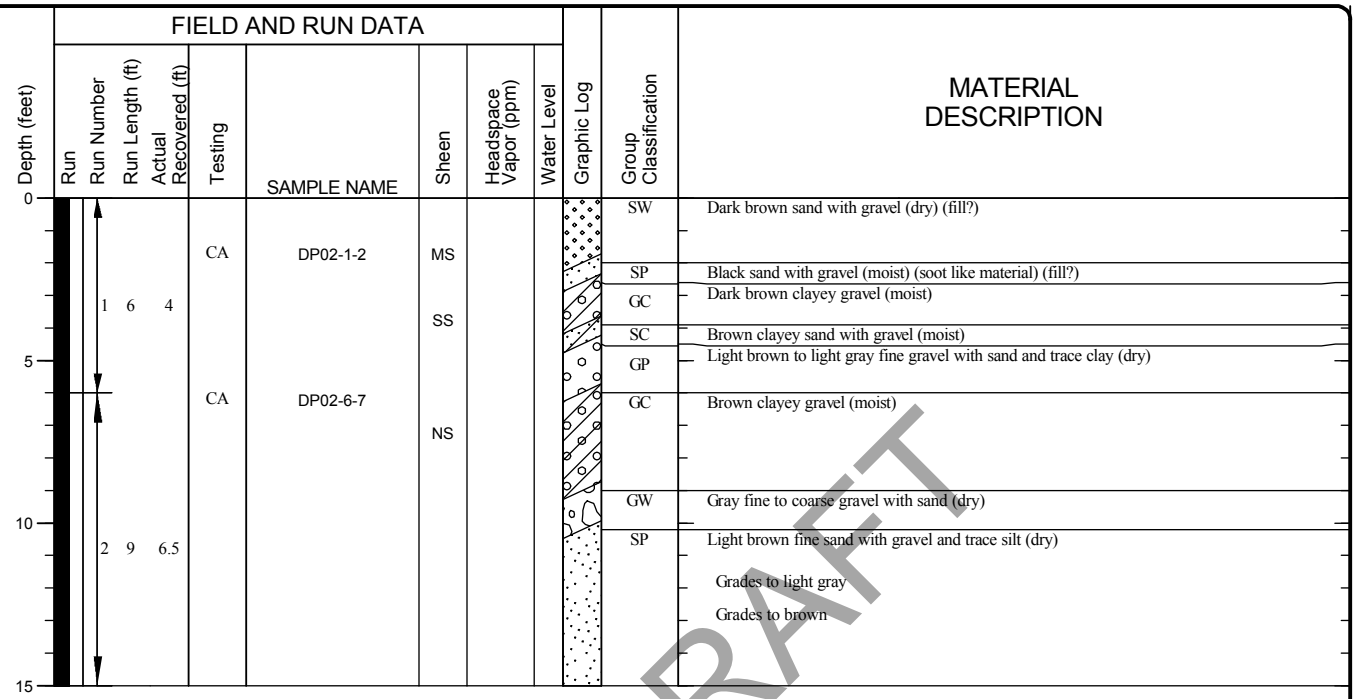
Figure A-3

Drilled	12/14/2009	Total Depth (ft)	15	Logged By / Checked By	KBC / JDL	Driller	Environmental West	Drilling Method	Sonic

Location
East (X): 2503227 North (Y): 265117
Datum: NAD83 (feet)- State Plane WA (North)

Groundwater
Date Measured | Depth to Water (ft)
Not Encountered

Drilling Equipment: Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-2

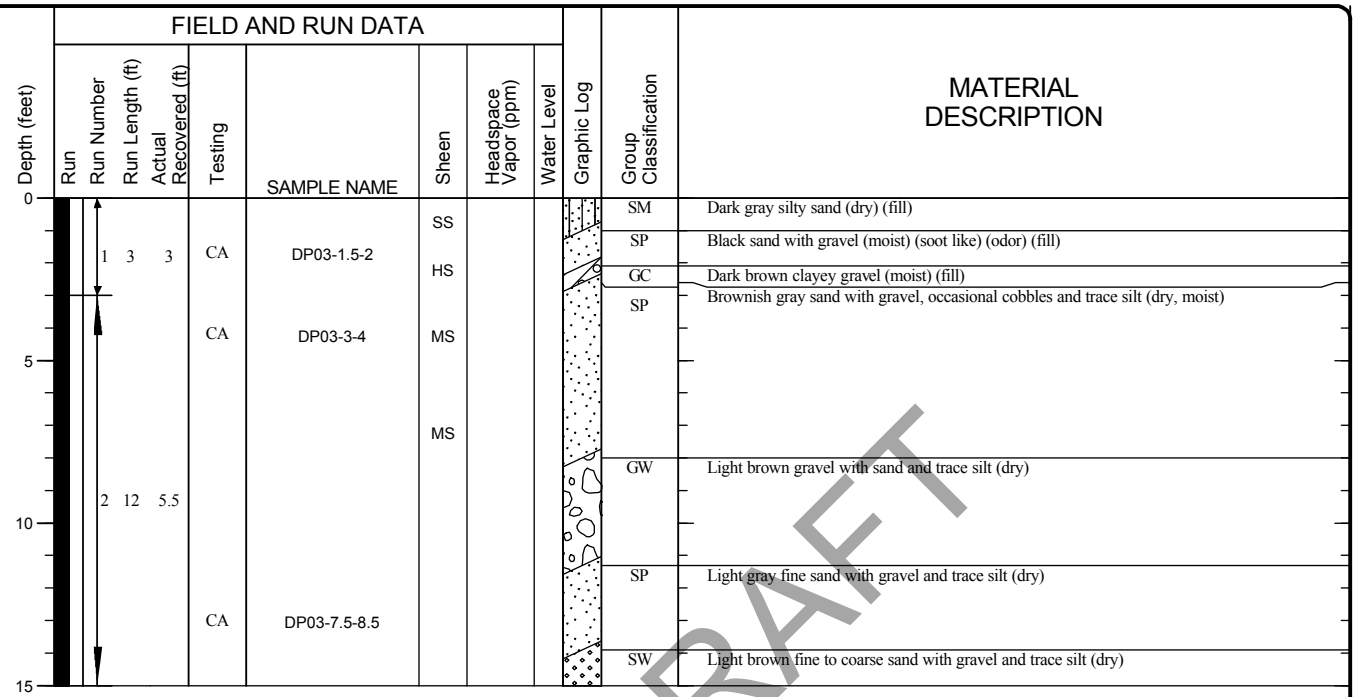
GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-4

Drilled	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
12/14/2009	15	KBC / JDL	Environmental West	Sonic

Location	Groundwater		Drilling Equipment
East (X): 2503271 North (Y): 265131 Datum: NAD83 (feet)- State Plane WA (North)	Date Measured	Depth to Water (ft) Not Encountered	Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-3

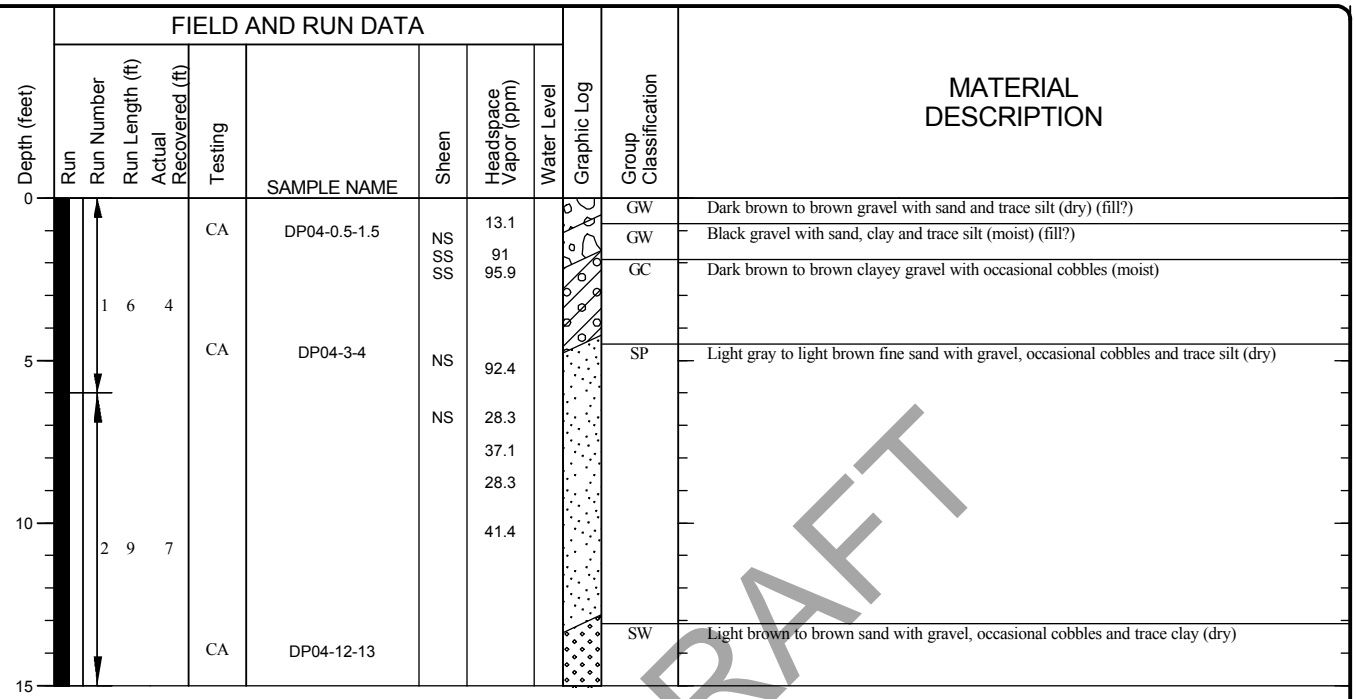
GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-5
Sheet 1 of 1

Drilled	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
12/14/2009	15	KBC / JDL	Environmental West	Sonic

Location	Groundwater		Drilling Equipment
East (X): 2503316 North (Y): 265150 Datum: NAD83 (feet)- State Plane WA (North)	Date Measured	Depth to Water (ft) Not Encountered	Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-4

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-6
Sheet 1 of 1

Drilled	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
12/14/2009	15	KBC / JDL	Environmental West	Sonic

Location	Groundwater		Drilling Equipment
East (X): 2503352 North (Y): 265175 Datum: NAD83 (feet)- State Plane WA (North)	Date Measured	Depth to Water (ft) Not Encountered	Sonic Speedstar 15k

Depth (feet)	Run	Run Number	Run Length (ft)	Actual Recovered (ft)	Testing	SAMPLE NAME	Sheen	Headspace Vapor (ppm)	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION
0								0			SP	Black to dark brown coarse sand with gravel (dry) (fill?)
					CA	DP05-1.3-2.6	NS	0			GC	Dark brown to brown clayey gravel with trace sand (moist) (fill)
		1	5	4.5			NS	0			SW	Light brown to brown medium sand with gravel and trace silt (moist)
							NS	0				
5							NS	0 .5				
											GW-GC	Brown gravel with clay, sand and occasional cobbles (moist)
								.2				
					CA	DP05-8		.4			SP	Light brown medium sand with gravel, occasional cobbles and trace silt (dry)
10		2	10	6.5				.3				
								.3				Grades dark grayish brown
					CA	DP05-10.6		.4				
15								.4				

Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-5

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

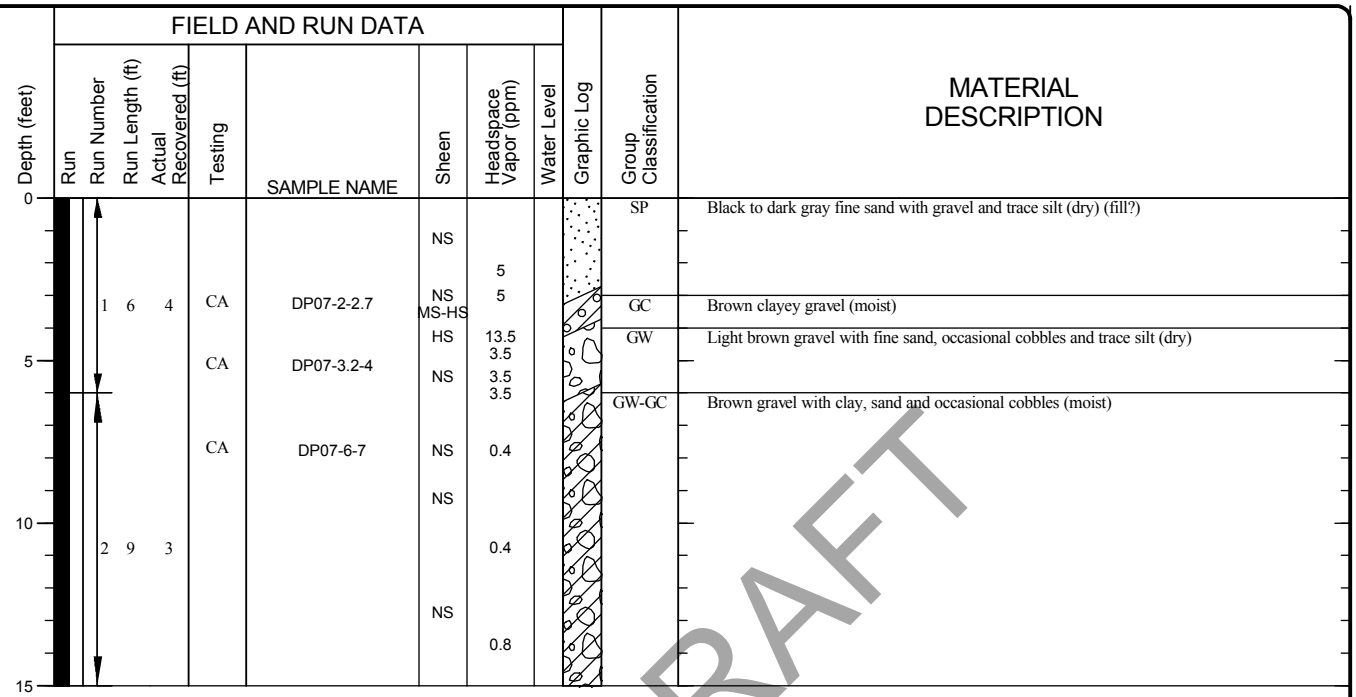
Figure A-7

Drilled	12/14/2009	Total Depth (ft)	15	Logged By / Checked By	KBC / JDL	Driller	Environmental West	Drilling Method	Sonic

Location
East (X): 2503435 North (Y): 265199
Datum: NAD83 (feet)- State Plane WA (North)

Groundwater
Date Measured | Depth to Water (ft)
Not Encountered

Drilling Equipment: Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-7

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

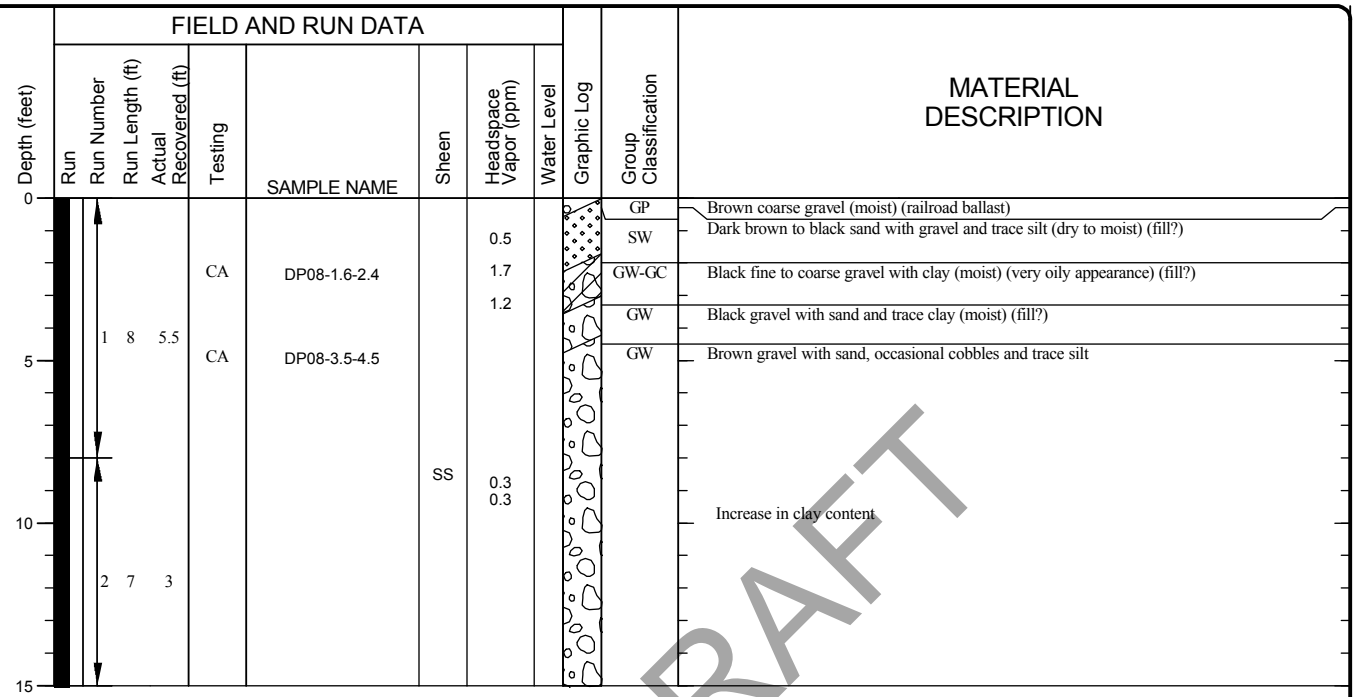
Figure A-8

Drilled	12/14/2009	Total Depth (ft)	15	Logged By / Checked By	KBC / JDL	Driller	Environmental West	Drilling Method	Sonic

Location
East (X): 2503467 North (Y): 265212
Datum: NAD83 (feet)- State Plane WA (North)

Groundwater
Date Measured | Depth to Water (ft)
Not Encountered

Drilling Equipment: Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-8

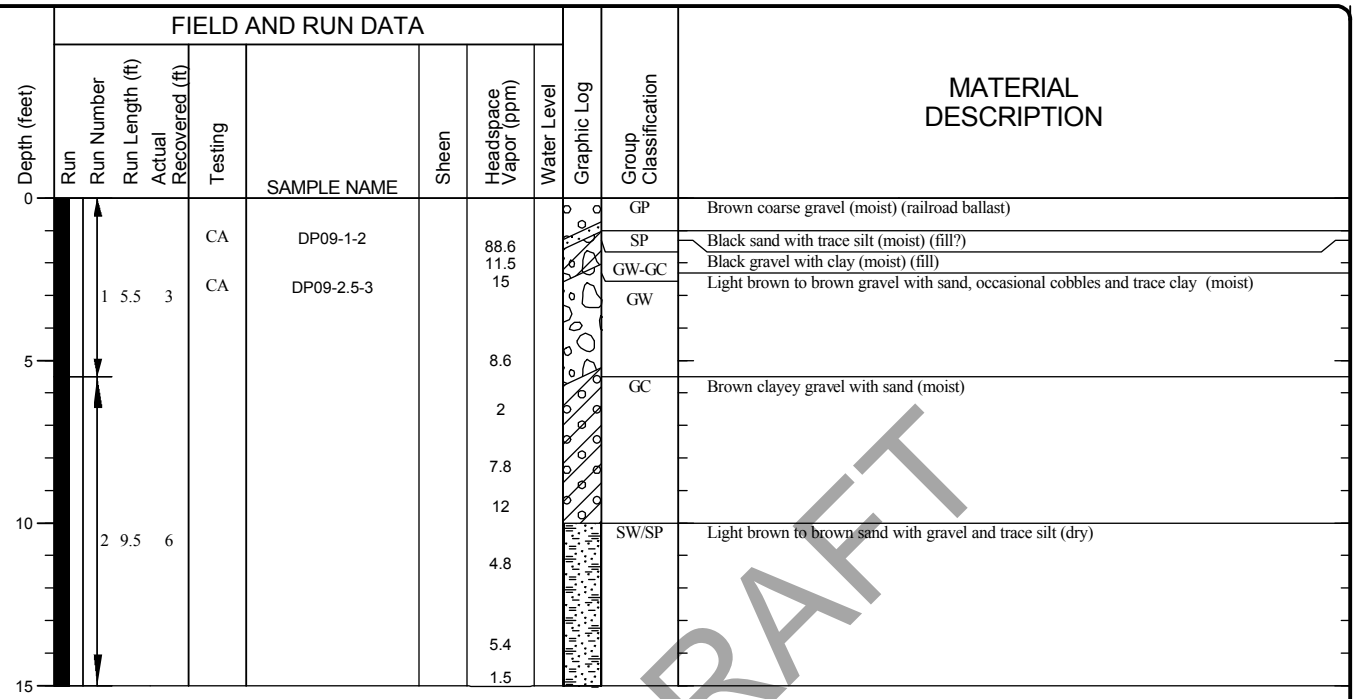
GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-9

Drilled	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
12/14/2009	15	KBC / JDL	Environmental West	Sonic

Location	Groundwater		Drilling Equipment
East (X): 2503509 North (Y): 265224 Datum: NAD83 (feet)- State Plane WA (North)	Date Measured	Depth to Water (ft) Not Encountered	Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

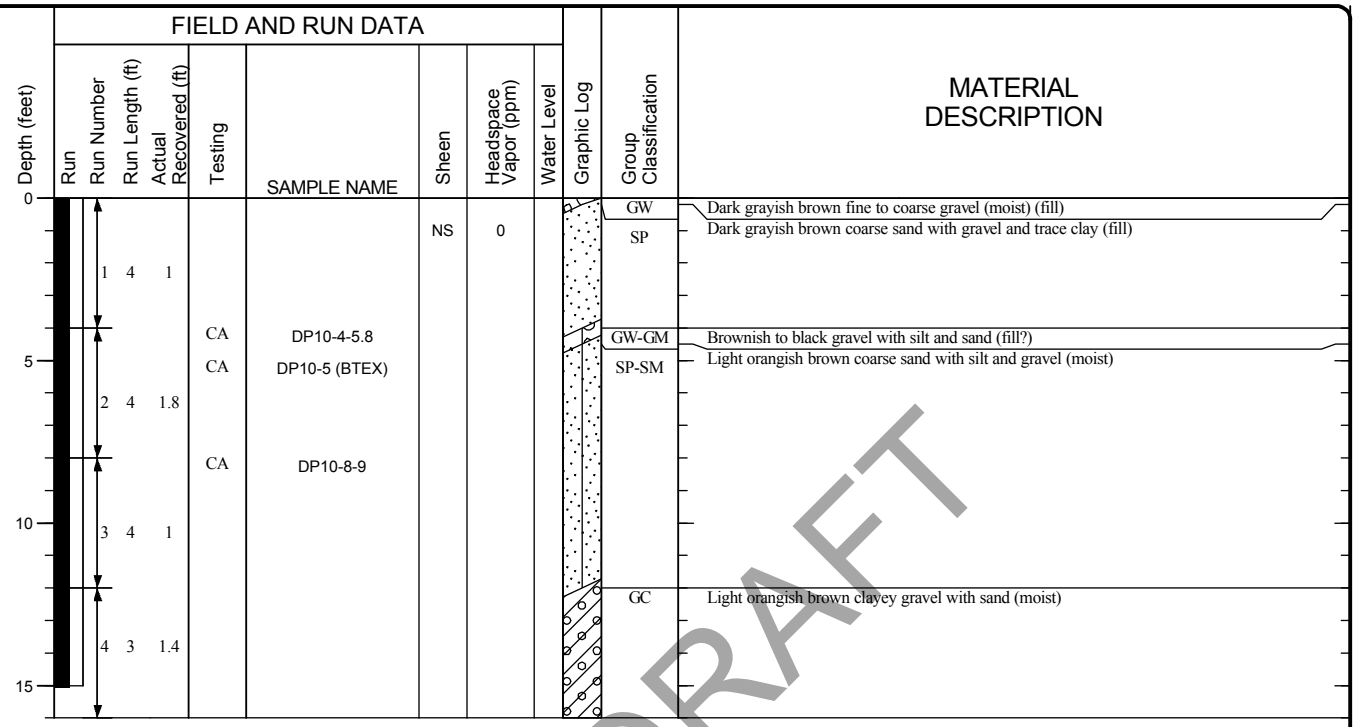
Log of Boring DP-9

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-10
Sheet 1 of 1

Drilled	12/10/2009	Total Depth (ft)	16	Logged By / Checked By	KBC / JDL	Driller	Environmental West	Drilling Method	Direct Push
Location East (X): 2503564 North (Y): 265245 Datum: NAD83 (feet)- State Plane WA (North)				Groundwater Date Measured: — Depth to Water (ft): Not Encountered				Drilling Equipment	Geoprobe



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-10

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

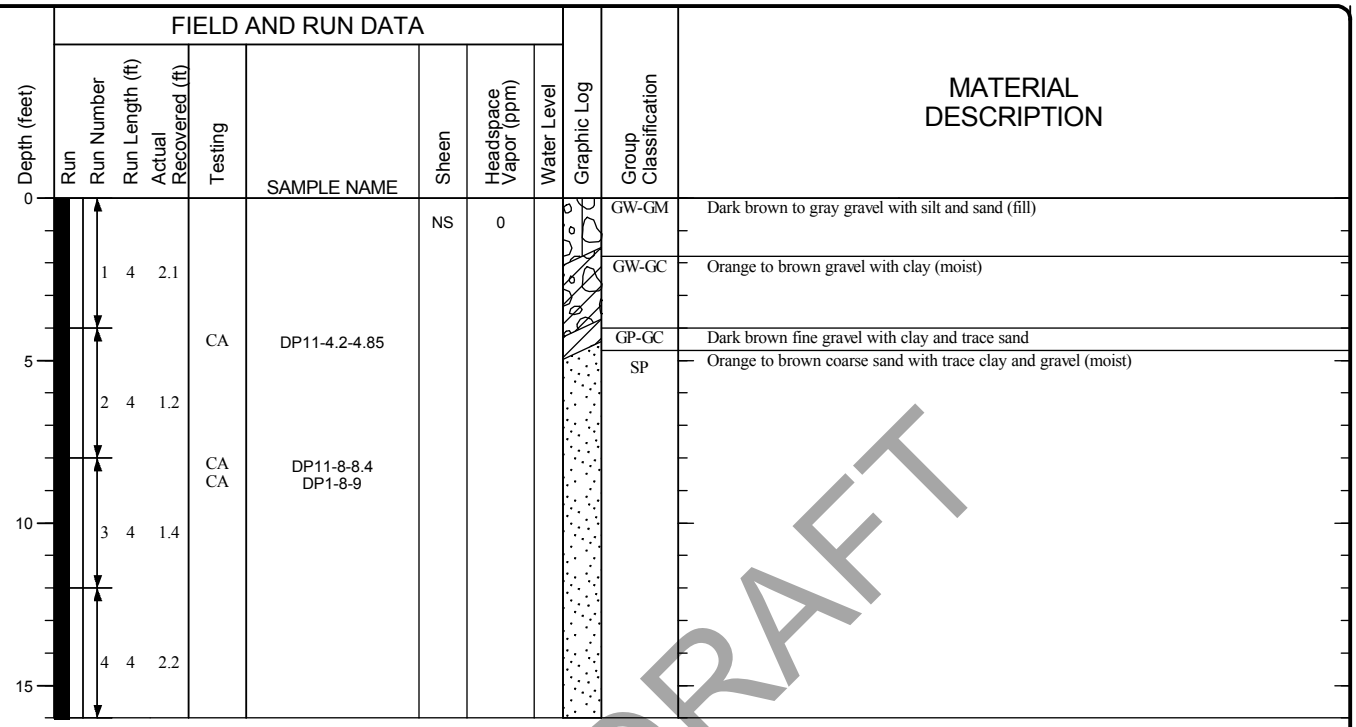
Figure A-11

Drilled	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
12/10/2009	16	KBC / JDL	Environmental West	Direct Push

Location
East (X): 2503616 North (Y): 265266
Datum: NAD83 (feet)- State Plane WA (North)

Groundwater
Date Measured | Depth to Water (ft)
Not Encountered

Drilling Equipment: Geoprobe



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

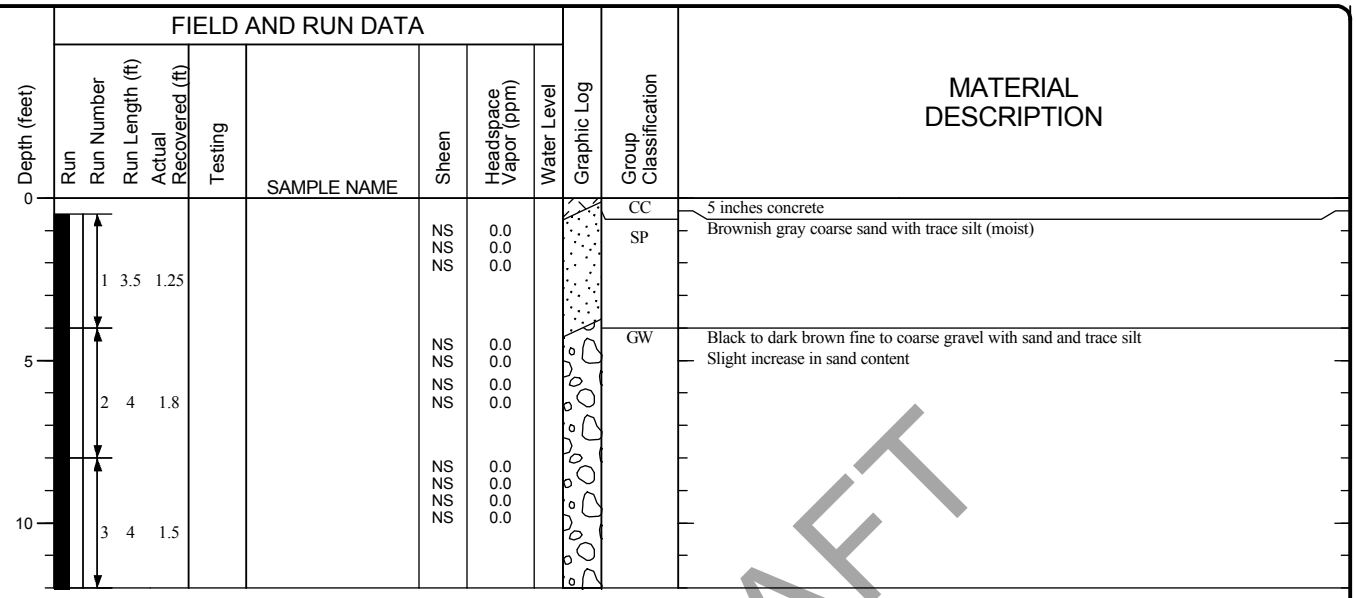
Log of Boring DP-11

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-12
Sheet 1 of 1

Drilled	1/19/2010	Total Depth (ft)	12	Logged By / Checked By	KBC / JDL	Driller	Environmental West	Drilling Method	Direct Push
Location East (X): North (Y):				Groundwater Date Measured:		Depth to Water (ft): Not Encountered		Drilling Equipment	Geoprobe



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-12

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-13

Drilled	12/28/2009	Total Depth (ft)	15	Logged By / Checked By	KBC / JDL	Driller	Environmental West	Drilling Method	Sonic
Location East (X): 2499225 North (Y): 262897 Datum: NAD83 (feet)- State Plane WA (North)				Groundwater Date Measured:		Depth to Water (ft) Not Encountered		Drilling Equipment	Sonic Speedstar 15k

Depth (feet)	Run	Run Number	Run Length (ft)	Actual Recovered (ft)	Testing	SAMPLE NAME	Sheen	Headspace Vapor (ppm)	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION
0					CA	DP13-1-2	NS	39.3			GP	Black gravel with sand, clay and occasional cobbles (moist) (railroad ballast)
							NS	15.0				
							NS	17.8			GC	Dark brown clayey gravel with sand and occasional cobbles (moist)
5							NS	10.9			GP	Brown coarse gravel with sand and trace clay (moist)
		1	15	10			NS	19.1				
					CA	DP13-6-7	NS	20.8				
10							NS	10.8				Decrease in clay content
							NS	10.3			GW	Brown fine to coarse gravel with sand, occasional cobbles and trace silt (dry)
15							NS	11.0				

Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-13

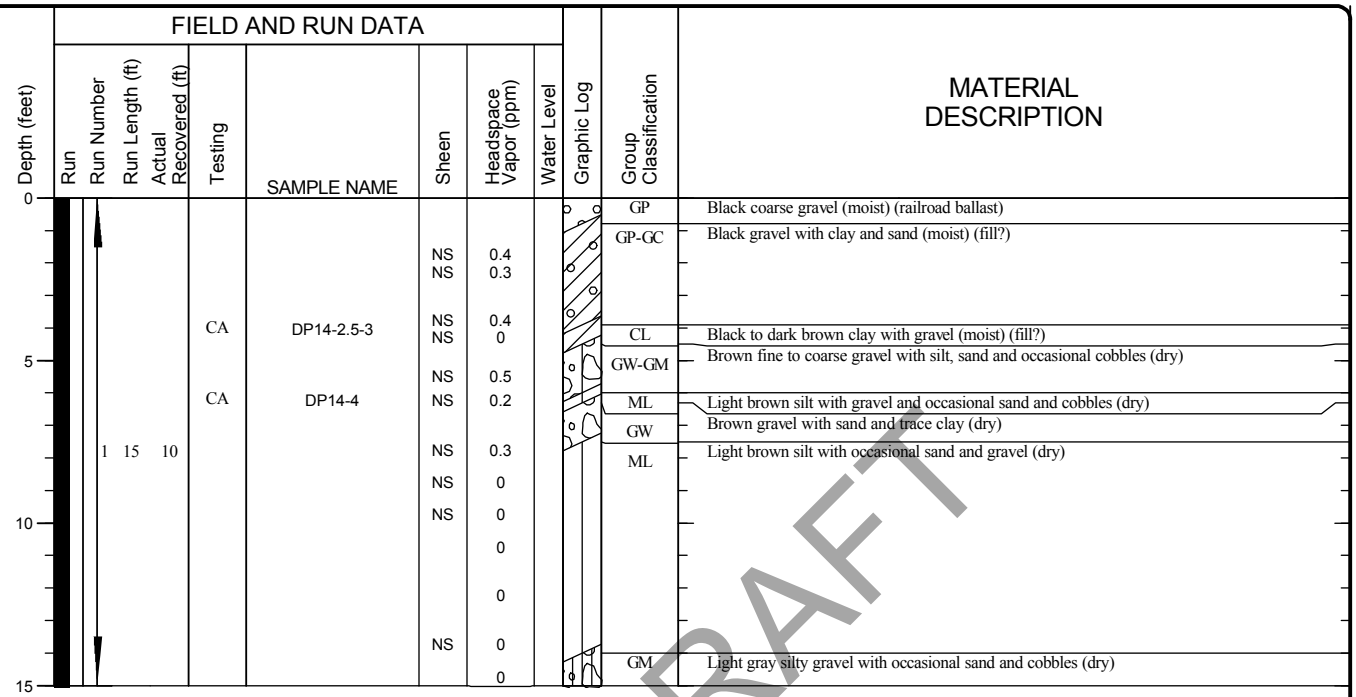
GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-14

Drilled	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
12/28/2009	15	KBC / JDL	Environmental West	Sonic

Location	Groundwater		Drilling Equipment
East (X): 2499267 North (Y): 262895 Datum: NAD83 (feet)- State Plane WA (North)	Date Measured	Depth to Water (ft) Not Encountered	Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-14

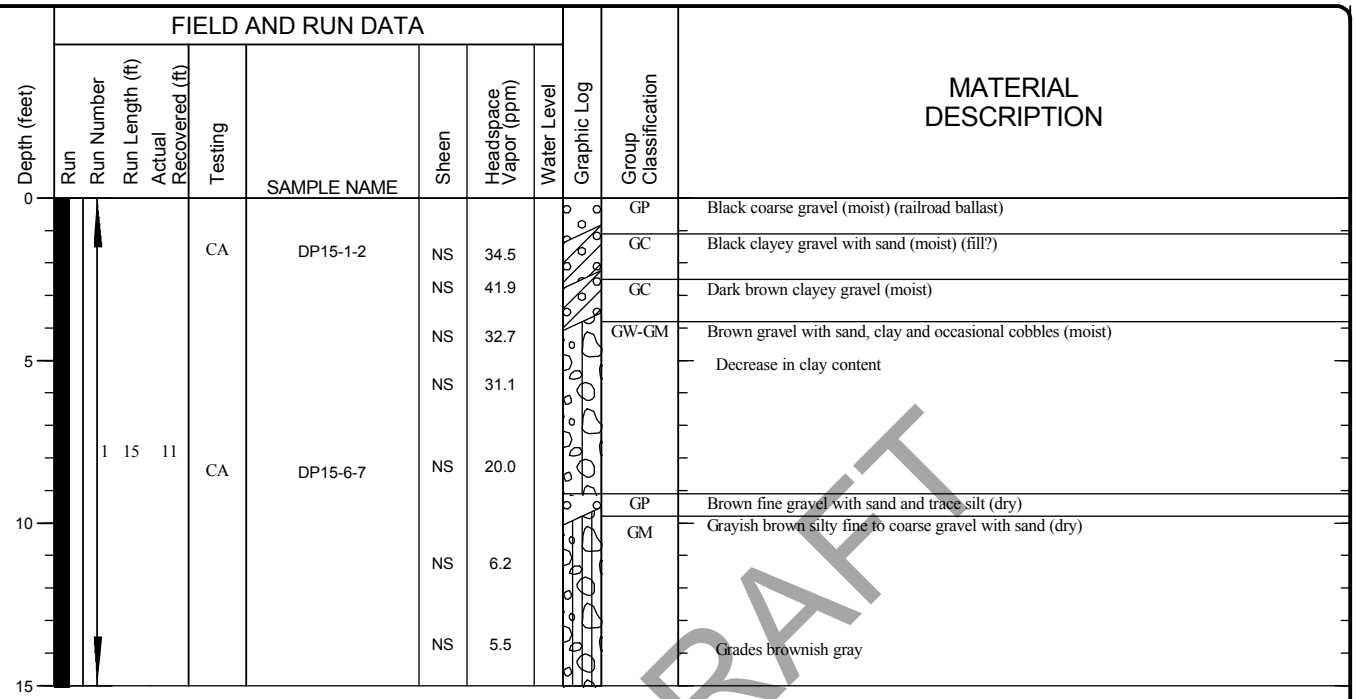
GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-15

Drilled	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
12/28/2009	15	KBC / JDL	Environmental West	Sonic

Location	Groundwater		Drilling Equipment
East (X): 2499309 North (Y): 262918 Datum: NAD83 (feet)- State Plane WA (North)	Date Measured	Depth to Water (ft) Not Encountered	Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-15

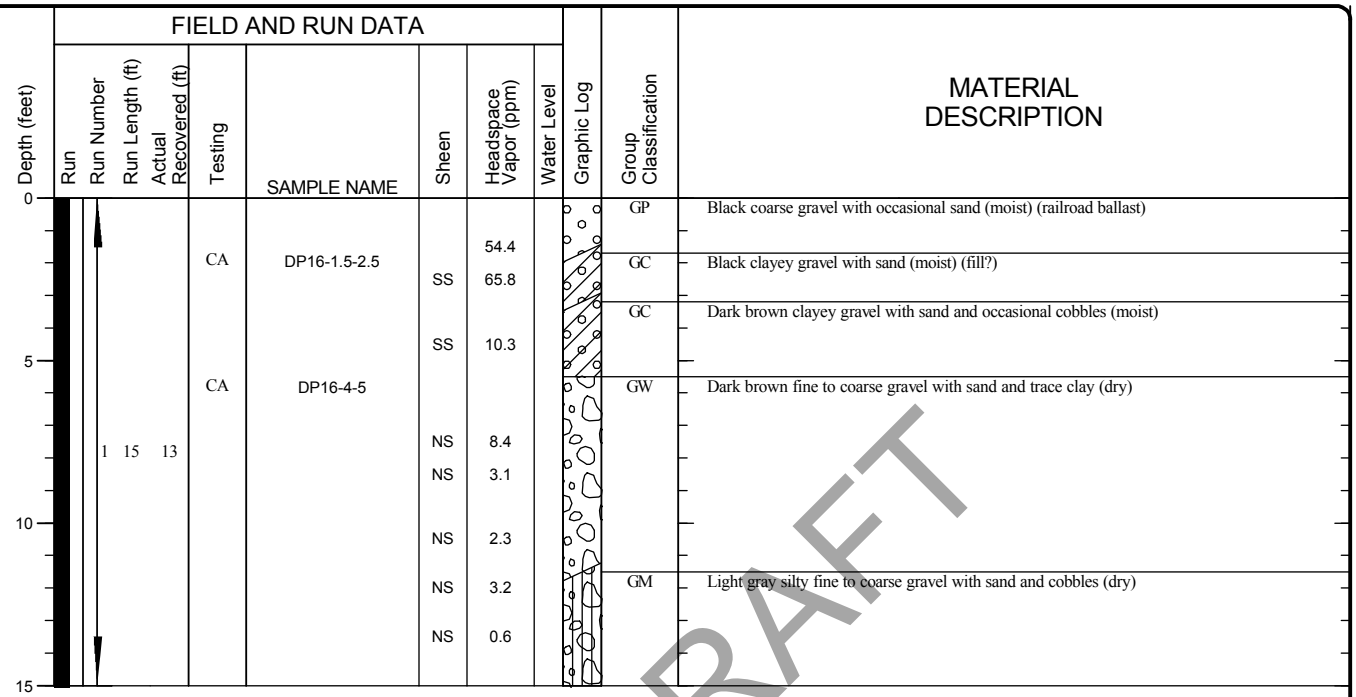
GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-16

Drilled	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
12/28/2009	15	KBC / JDL	Environmental West	Sonic

Location	Groundwater		Drilling Equipment
East (X): 2499355 North (Y): 262923 Datum: NAD83 (feet)- State Plane WA (North)	Date Measured	Depth to Water (ft) Not Encountered	Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-16

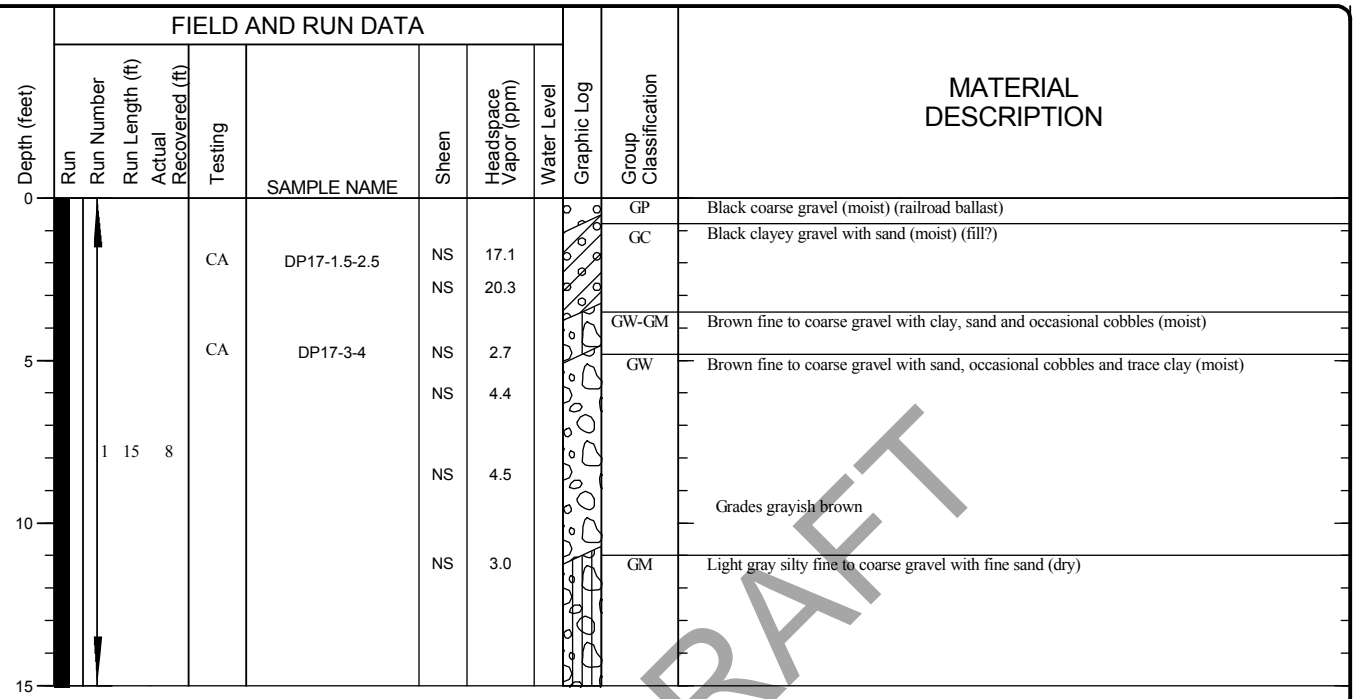
GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-17

Drilled	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
12/28/2009	15	KBC / JDL	Environmental West	Sonic

Location	Groundwater		Drilling Equipment
East (X): 2499396 North (Y): 262945 Datum: NAD83 (feet)- State Plane WA (North)	Date Measured	Depth to Water (ft) Not Encountered	Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-17

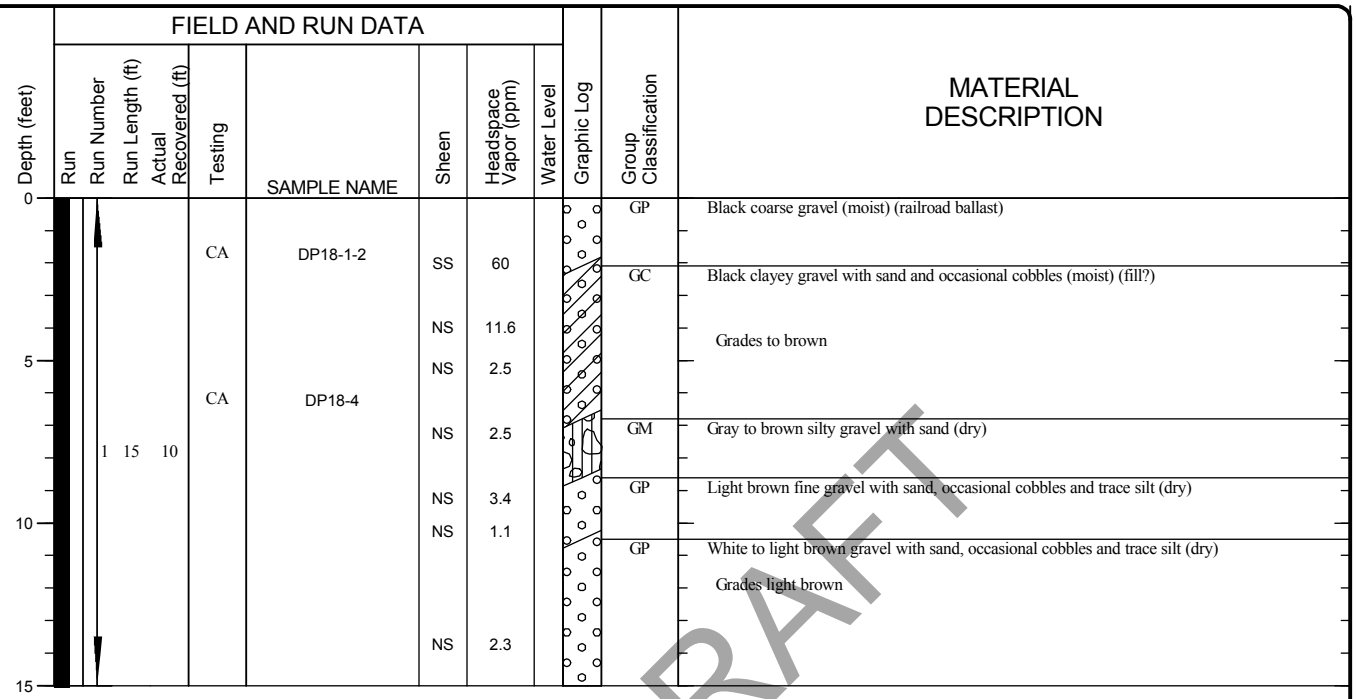
GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-18
Sheet 1 of 1

Drilled	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
12/28/2009	15	KBC / JDL	Environmental West	Sonic

Location	Groundwater		Drilling Equipment
East (X): 2499443 North (Y): 262955 Datum: NAD83 (feet)- State Plane WA (North)	Date Measured	Depth to Water (ft) Not Encountered	Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-18

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-19

Drilled	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
12/28/2009	15	KBC / JDL	Environmental West	Sonic

Location	Groundwater		Drilling Equipment
East (X): 2499486 North (Y): 262965 Datum: NAD83 (feet)- State Plane WA (North)	Date Measured	Depth to Water (ft) Not Encountered	Sonic Speedstar 15k

Depth (feet)	Run	Run Number	Run Length (ft)	Actual Recovered (ft)	Testing	SAMPLE NAME	Sheen	Headspace Vapor (ppm)	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION
0											GP	Black coarse gravel with sand, trace clay and occasional concrete (moist) (railroad ballast)
					CA	DP19-2	NS	83				
							NS	40			GC	Black clayey fine gravel with sand and occasional cobbles (moist) (fill?)
5											GW-GC	Brown fine to coarse gravel with sand, clay and occasional cobbles (moist)
							NS	45				
					CA	DP19-5					GM	Grayish brown silty fine to coarse coarse gravel with occasional sand and cobbles (dry)
		1	15	8								
10							NS	32			GM	Whitish gray silty coarse gravel with occasional cobbles
											GW-GC	Brown fine to coarse gravel with clay, sand and occasional cobbles (moist to dry)
					CA	DP19-7-8						
15							NS	15.2				

Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-19

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-20

Drilled	12/28/2009	Total Depth (ft)	15	Logged By / Checked By	KBC / JDL	Driller	Environmental West	Drilling Method	Sonic
Location East (X): 2499528 North (Y): 262982 Datum: NAD83 (feet)- State Plane WA (North)				Groundwater Date Measured:		Depth to Water (ft): Not Encountered		Drilling Equipment	Sonic Speedstar 15k

Depth (feet)	Run	Run Number	Run Length (ft)	Actual Recovered (ft)	Testing	SAMPLE NAME	Sheen	Headspace Vapor (ppm)	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION
0											GP	Black coarse gravel (moist) (railroad ballast)
											GC	Black clayey gravel with sand (moist) (fill?)
					CA	DP20-2	SS	123				
							NS	83.6			GC	Dark brown to brown clayey fine to coarse gravel with sand and occasional cobbles
5							NS	52.6				Increase in clay content with occasional cobbles
					CA	DP20-5-6	NS	47.6				
		1	15	8			NS	12			GP	Brown gravel with sand, occasional cobbles and trace clay (moist)
							NS	0.4			GW	Light brown fine to coarse gravel with sand, occasional cobbles and trace clay (dry)
10											GM	Gray silty coarse gravel with occasional cobbles and trace sand (dry)
15												

Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-20

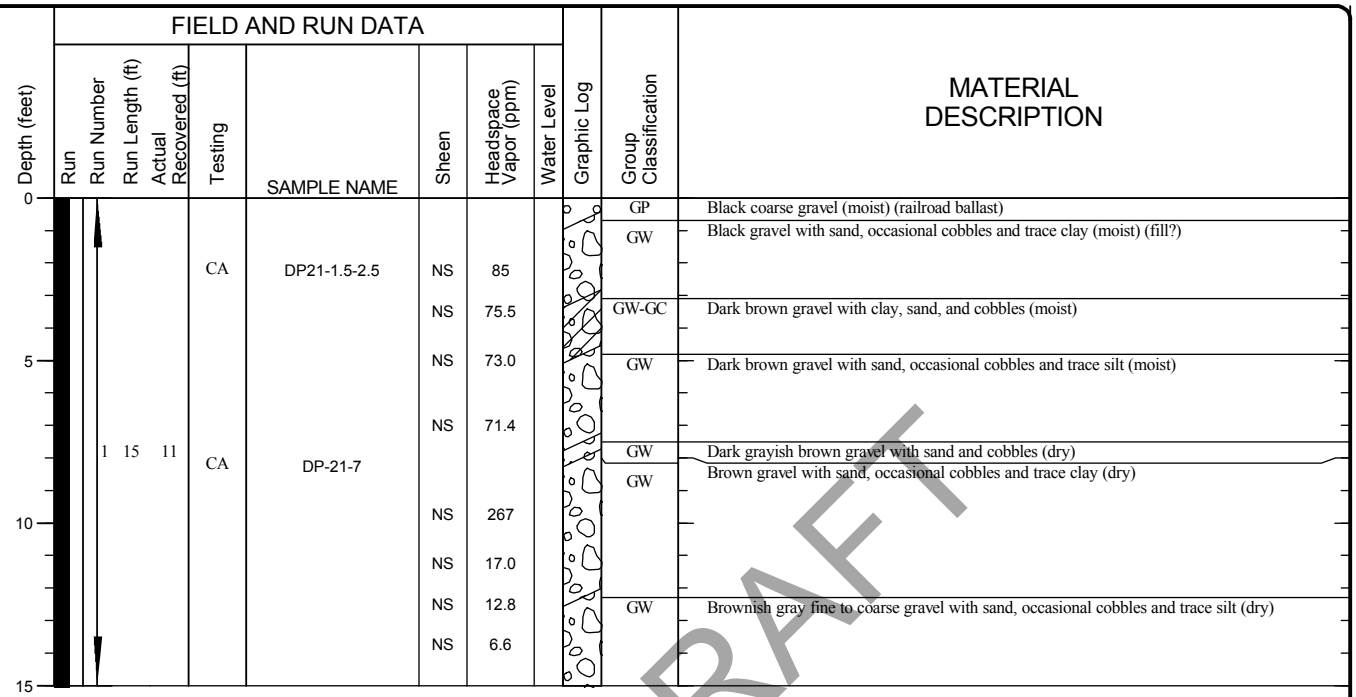
GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-21

Drilled	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
12/28/2009	15	KBC / JDL	Environmental West	Sonic

Location	Groundwater		Drilling Equipment
East (X): 2499566 North (Y): 263006 Datum: NAD83 (feet)- State Plane WA (North)	Date Measured	Depth to Water (ft) Not Encountered	Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

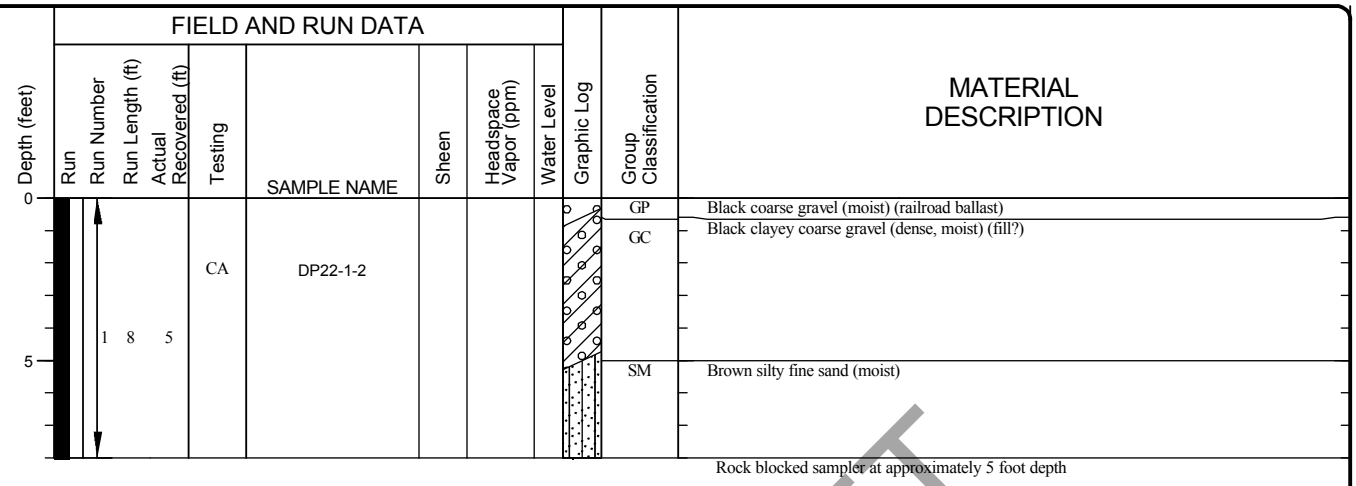
Log of Boring DP-21

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-22

Drilled	12/28/2009	Total Depth (ft)	8	Logged By / Checked By	KBC / JDL	Driller	Environmental West	Drilling Method	Sonic
Location East (X): North (Y):				Groundwater Date Measured:		Depth to Water (ft): Not Encountered		Drilling Equipment	Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-22

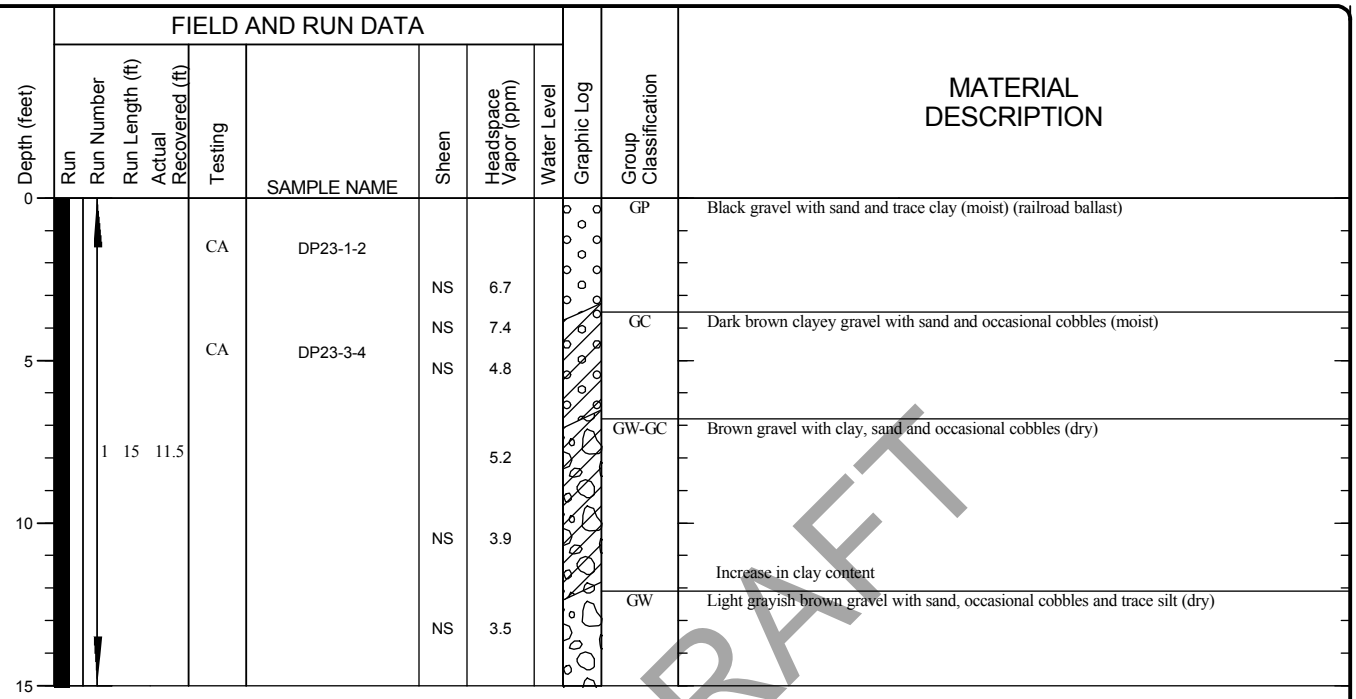
GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-23
Sheet 1 of 1

Drilled	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
12/28/2009	15	KBC / JDL	Environmental West	Sonic

Location	Groundwater		Drilling Equipment
East (X): 2499683 North (Y): 263050 Datum: NAD83 (feet)- State Plane WA (North)	Date Measured	Depth to Water (ft)	Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

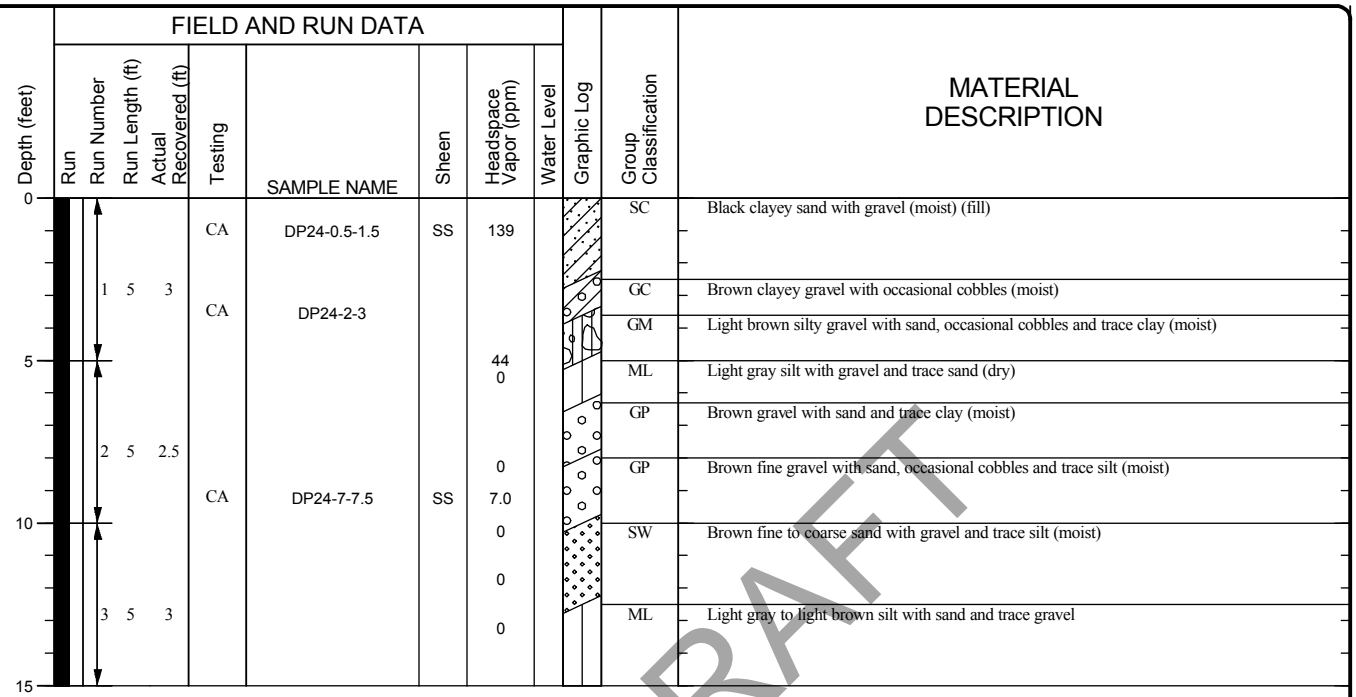
Log of Boring DP-23

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-24

Drilled	12/15/2009	Total Depth (ft)	15	Logged By / Checked By	KBC / JDL	Driller	Environmental West	Drilling Method	Sonic
Location East (X): 2503113 North (Y): 265201 Datum: NAD83 (feet)- State Plane WA (North)				Groundwater Date Measured / Depth to Water (ft)				Drilling Equipment	Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-24

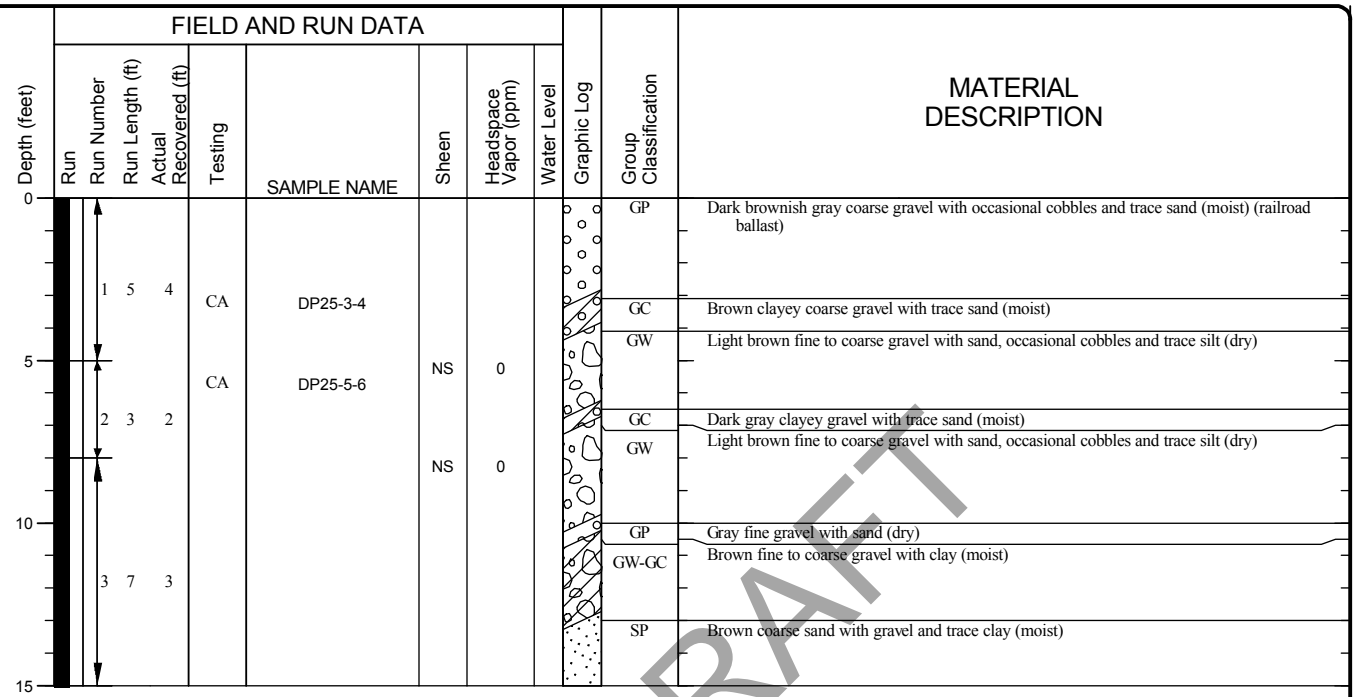
GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-25

Drilled	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
12/16/2009	15	KBC / JDL	Environmental West	Sonic

Location	Groundwater		Drilling Equipment
East (X): 2503201 North (Y): 265286 Datum: NAD83 (feet)- State Plane WA (North)	Date Measured	Depth to Water (ft) Not Encountered	Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-25

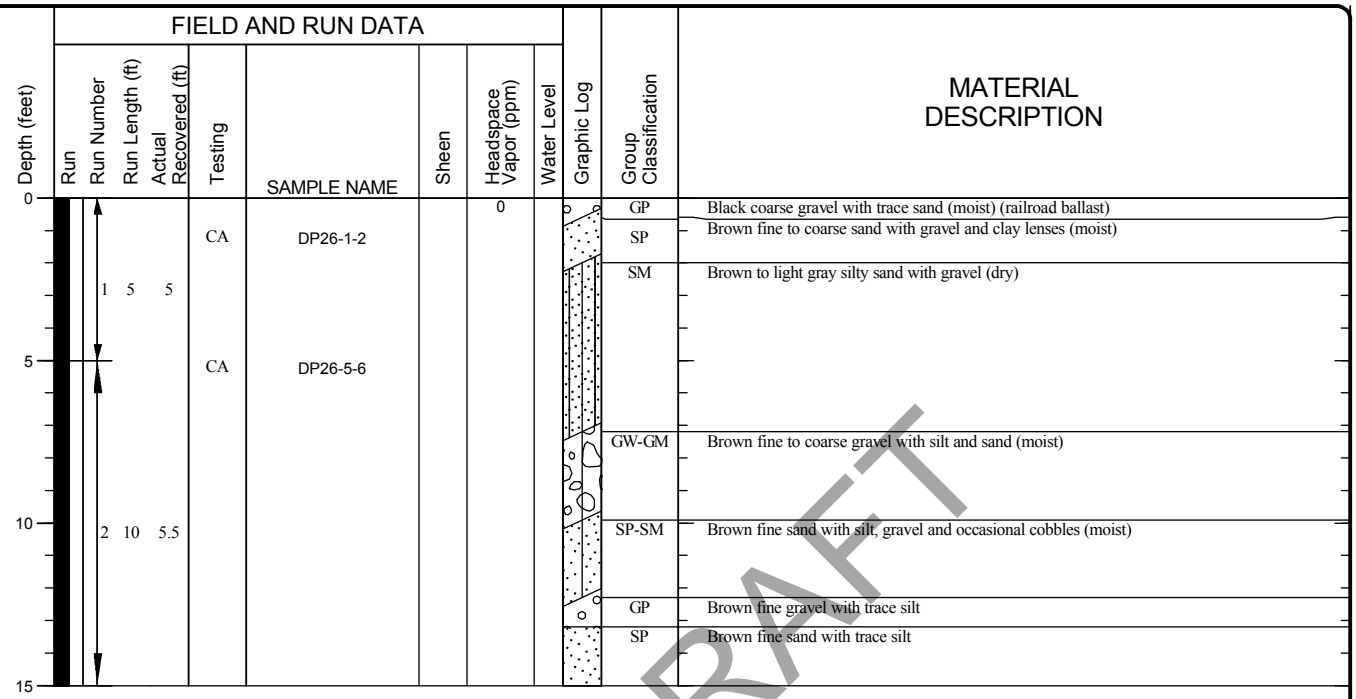
GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-26

Drilled	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
12/15/2009	15	KBC / JDL	Environmental West	Sonic

Location	Groundwater		Drilling Equipment
East (X): 2503217 North (Y): 265243 Datum: NAD83 (feet)- State Plane WA (North)	Date Measured	Depth to Water (ft) Not Encountered	Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-26

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-27

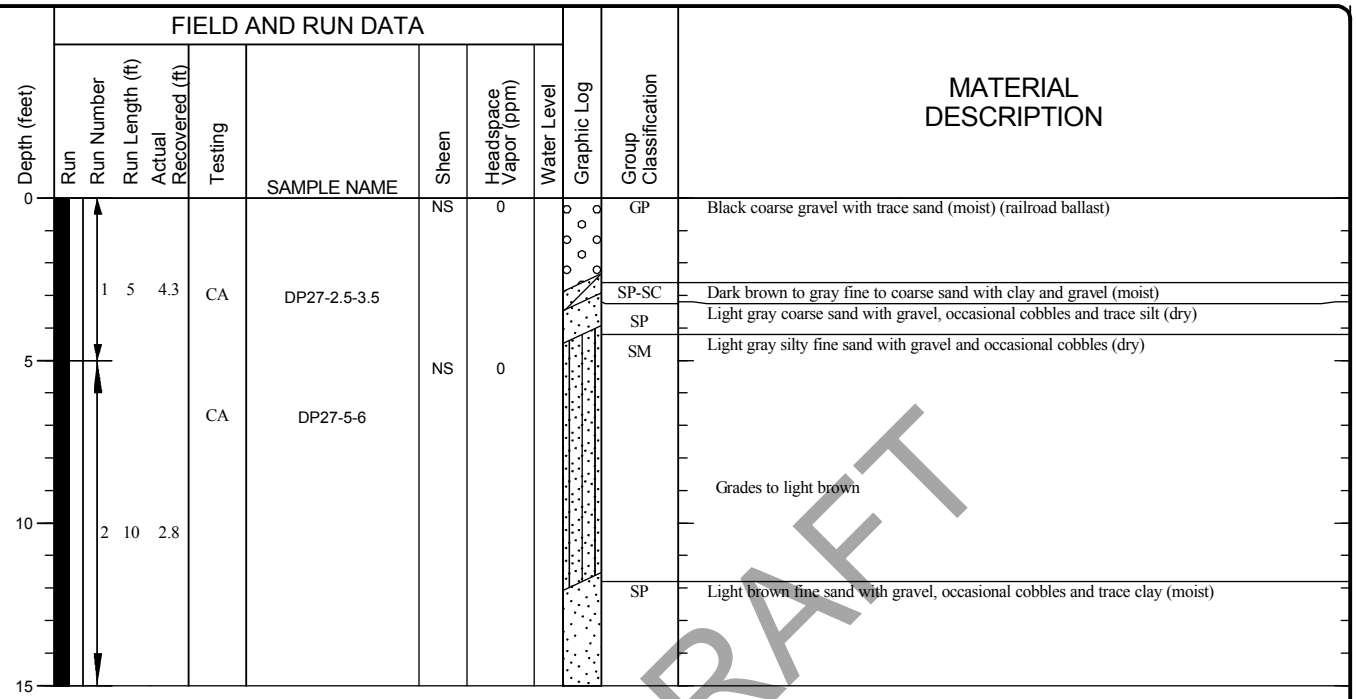
Drilled	12/16/2009	Total Depth (ft)	15	Logged By / Checked By	KBC / JDL	Driller	Environmental West	Drilling Method	Sonic

Location
East (X): 2503244 North (Y): 265301
Datum: NAD83 (feet)- State Plane WA (North)

Groundwater

Date Measured	Depth to Water (ft)
	Not Encountered

Drilling Equipment: Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

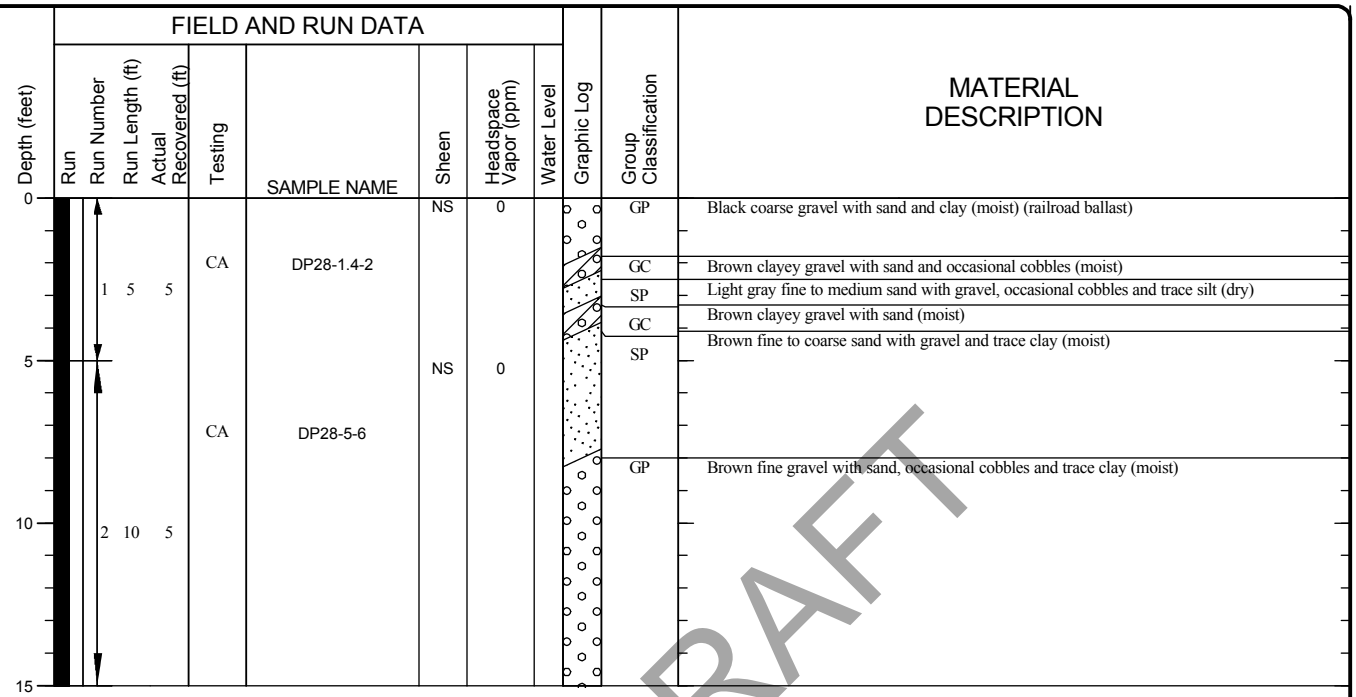
Log of Boring DP-27

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-28

Drilled	12/16/2009	Total Depth (ft)	15	Logged By / Checked By	KBC / JDL	Driller	Environmental West	Drilling Method	Sonic
Location East (X): 2503295 North (Y): 265322 Datum: NAD83 (feet)- State Plane WA (North)				Groundwater Date Measured:		Depth to Water (ft) Not Encountered		Drilling Equipment	Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-28

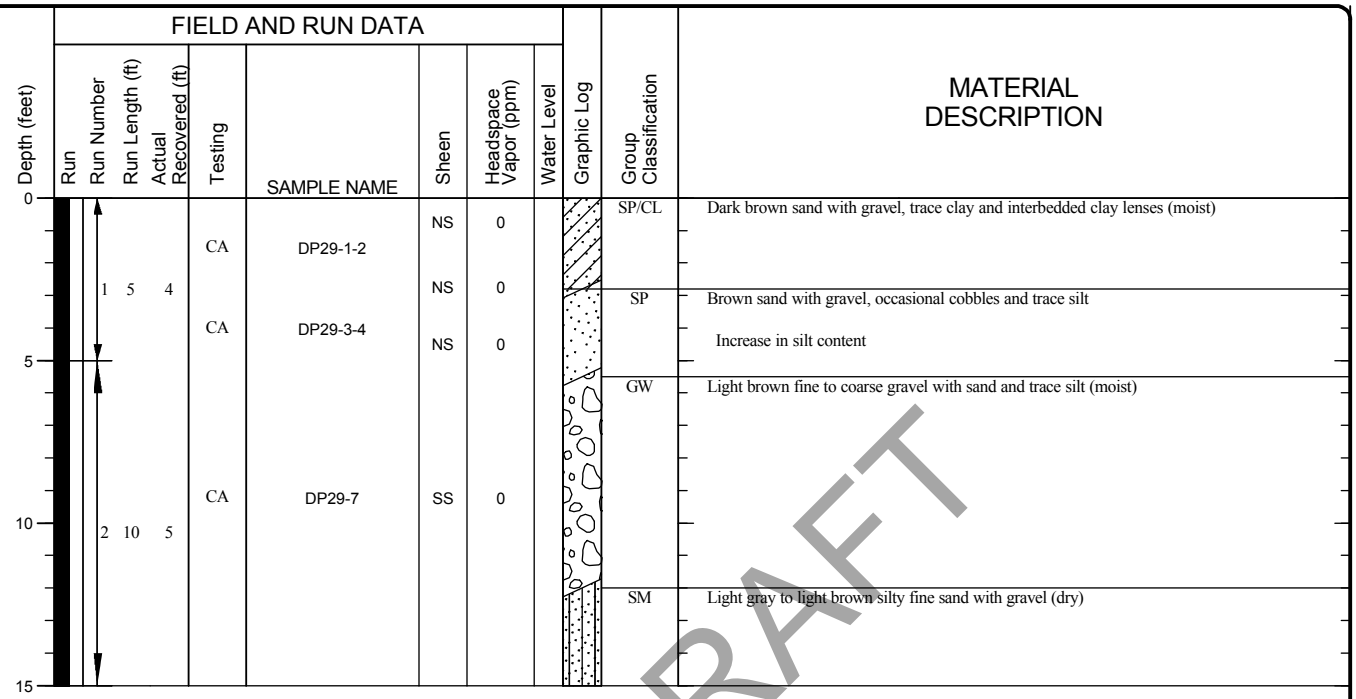
GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-29
Sheet 1 of 1

Drilled	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
12/15/2009	15	KBC / JDL	Environmental West	Sonic

Location	Groundwater		Drilling Equipment
East (X): 2503314 North (Y): 265276 Datum: NAD83 (feet)- State Plane WA (North)	Date Measured	Depth to Water (ft)	Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-29

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-30

Drilled	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
12/15/2009	15	KBC / JDL	Environmental West	Sonic

Location	Groundwater		Drilling Equipment
East (X): 2503501 North (Y): 265325 Datum: NAD83 (feet)- State Plane WA (North)	Date Measured	Depth to Water (ft)	Sonic Speedstar 15k

Depth (feet)	Run	Run Number	Run Length (ft)	Actual Recovered (ft)	Testing	SAMPLE NAME	Sheen	Headspace Vapor (ppm)	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION
0					CA	DP30-1-2		0.4			SP	Light to gray fine sand with gravel and trace silt (dry)
		1	5	4.5				15.5				
								14.4			SP	Brown fine to coarse sand with gravel and trace silt (dry)
5					CA	DP30-4					GC	Brown clayey gravel with occasional cobbles and trace sand (moist)
10		2	10	2.5			NS	2.1			ML	Light grayish brown silt with sand, gravel, and occasional cobbles (moist)
					CA	DP30-6-7					SP	Brown to gray sand with gravel and trace clay (moist)
							NS	0.5			SM	Silty sand with gravel (moist)
15												

Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

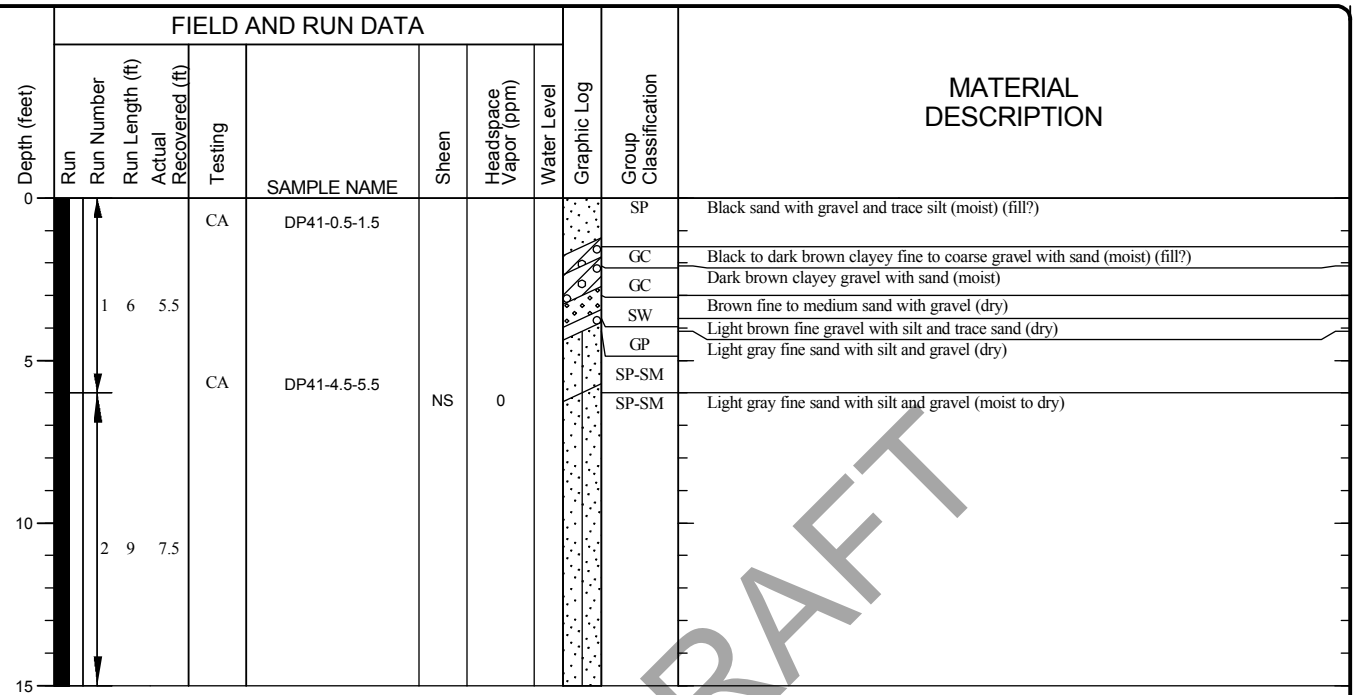
Log of Boring DP-30

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-31

Drilled	12/17/2009	Total Depth (ft)	15	Logged By / Checked By	KBC / JDL	Driller	Environmental West	Drilling Method	Sonic
Location East (X): 2501946 North (Y): 265205 Datum: NAD83 (feet)- State Plane WA (North)				Groundwater Date Measured / Depth to Water (ft)				Drilling Equipment	Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-41

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-32

Drilled	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
12/17/2009	15	KBC / JDL	Environmental West	Sonic

Location	Groundwater		Drilling Equipment
East (X): 2501964 North (Y): 265224 Datum: NAD83 (feet)- State Plane WA (North)	Date Measured	Depth to Water (ft)	Sonic Speedstar 15k

Depth (feet)	Run	Run Number	Run Length (ft)	Actual Recovered (ft)	Testing	SAMPLE NAME	Sheen	Headspace Vapor (ppm)	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION
0											SP	Black sand with gravel and trace silt (moist) (fill?)
								16.5			SP	Brown sand with gravel and trace silt (moist)
		1	6	6				4.6				
					CA	DP42-4-5		17.7			GP	Light brown fine gravel with trace silt and sand (dry)
5								1.9			SP	Light gray to white fine sand with gravel, occasional cobbles and trace silt (dry
					CA	DP42-7-7.5		30				
					CA	DP42-8		0			SP	Light brown fine sand with gravel, occasional cobbles and trace silt
10		2	9	6								
15												

Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

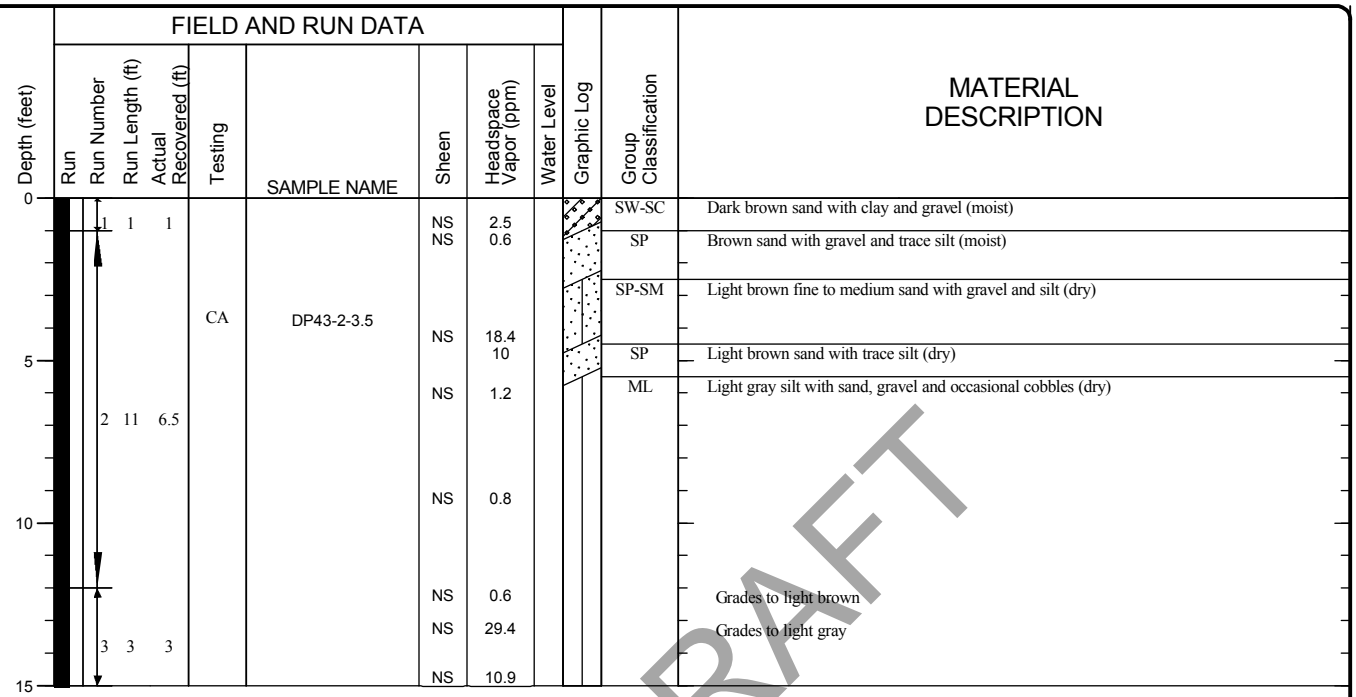
Log of Boring DP-42

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-33

Drilled	12/19/2009	Total Depth (ft)	15	Logged By / Checked By	KBC / JDL	Driller	Environmental West	Drilling Method	Sonic
Location East (X): 2501994 North (Y): 265241 Datum: NAD83 (feet)- State Plane WA (North)		Groundwater Date Measured / Depth to Water (ft)				Drilling Equipment	Sonic Speedstar 15k		



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

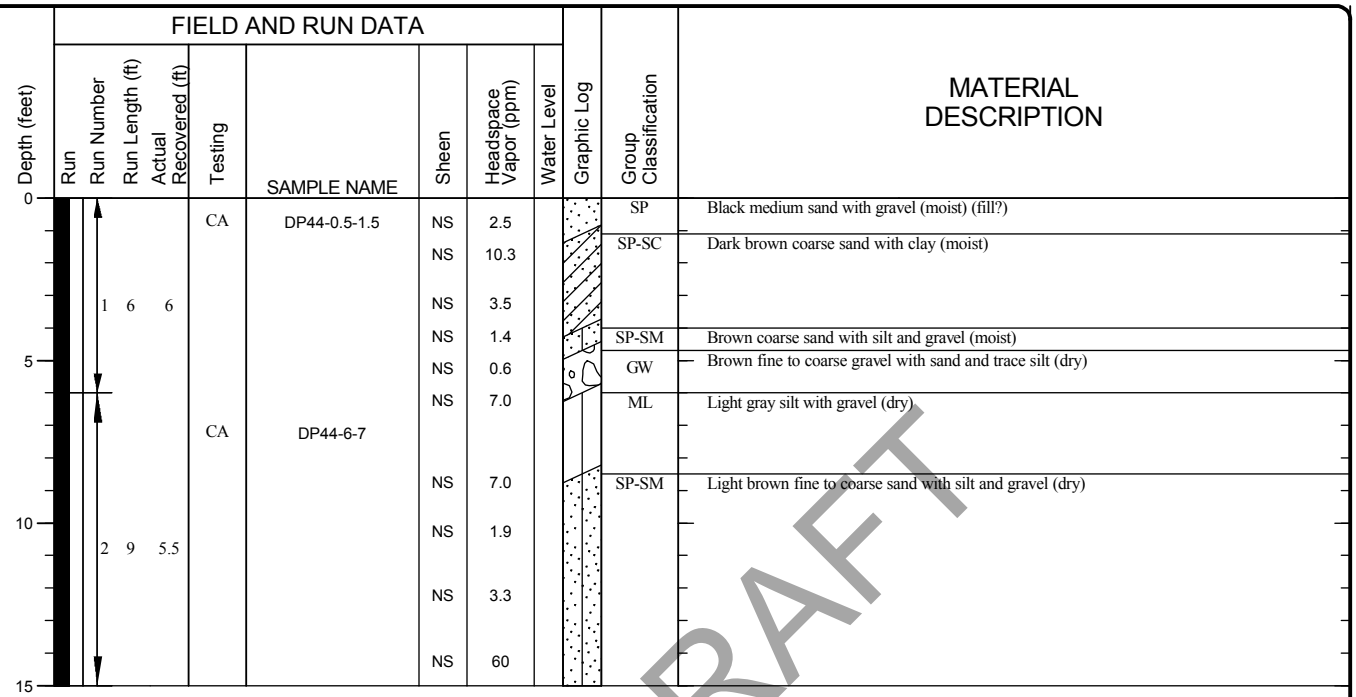
Log of Boring DP-43

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-34

Drilled	12/19/2009	Total Depth (ft)	15	Logged By / Checked By	KBC / JDL	Driller	Environmental West	Drilling Method	Sonic
Location East (X): 2502028 North (Y): 265261 Datum: NAD83 (feet)- State Plane WA (North)				Groundwater Date Measured / Depth to Water (ft)				Drilling Equipment	Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-44

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-35

Drilled	12/16/2009	Total Depth (ft)	15	Logged By / Checked By	KBC / JDL	Driller	Environmental West	Drilling Method	Sonic
Location East (X): North (Y):				Groundwater Date Measured:		Depth to Water (ft): Not Encountered		Drilling Equipment	Sonic Speedstar 15k

Depth (feet)	Run	Run Number	Run Length (ft)	Actual Recovered (ft)	Testing	SAMPLE NAME	Sheen	Headspace Vapor (ppm)	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION
0											SP	Black sand with gravel and trace clay (sooty fill)
		1	5	3							GC	Dark brown clayey gravel with trace sand (moist)
											GW	Brown gravel with sand and trace clay (moist)
5							NS	0			GW	Brown to light gray coarse gravel with trace clay and sand (moist)
		2	2	1.2			NS	1.1				
							NS	103			ML	Light gray silt with gravel and trace sand
		3	2	2			NS	15.4			SP	Brown sand with gravel and trace silt (moist)
					CA	DP44a-9	NS	19.3				
10								0				Grades to light brown
		4	6	6								Grades light gray clay
15												

Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

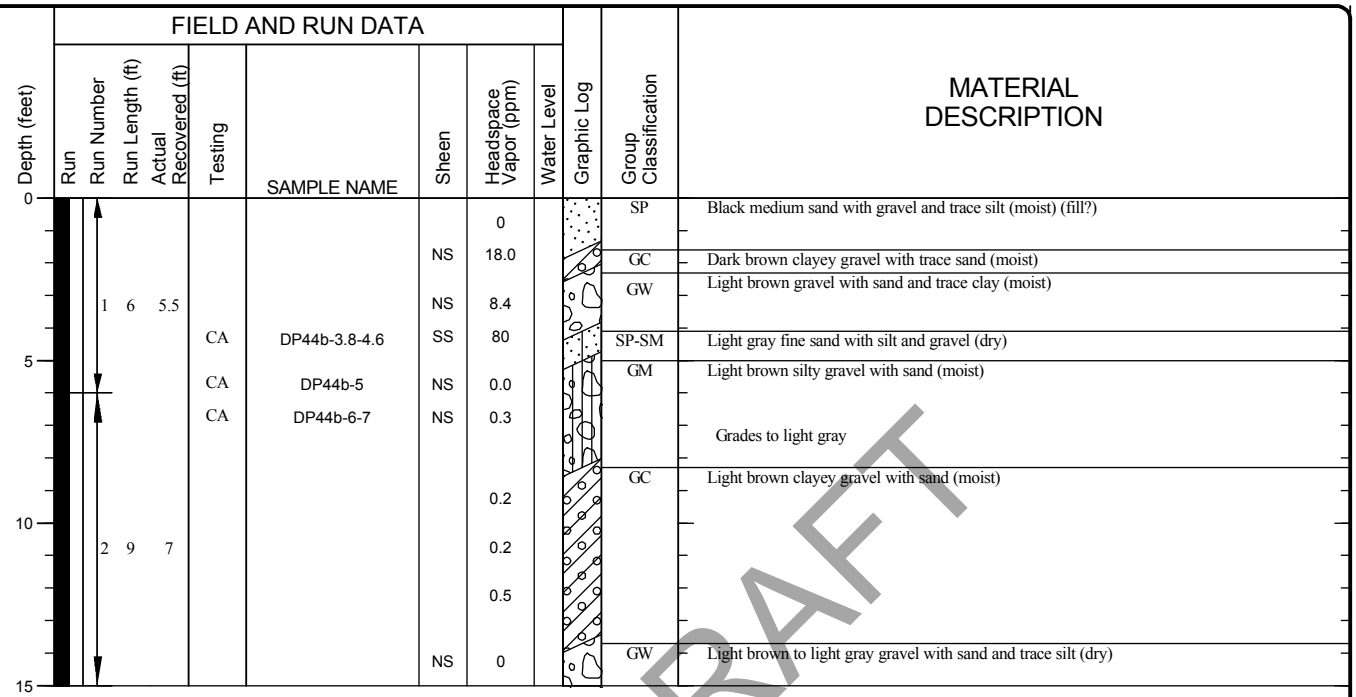
Log of Boring DP-44A

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-36
Sheet 1 of 1

Drilled	12/17/2009	Total Depth (ft)	15	Logged By / Checked By	KBC / JDL	Driller	Environmental West	Drilling Method	Sonic
Location East (X): 2502228 North (Y): 265366 Datum: NAD83 (feet)- State Plane WA (North)				Groundwater Date Measured:		Depth to Water (ft) Not Encountered		Drilling Equipment	Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

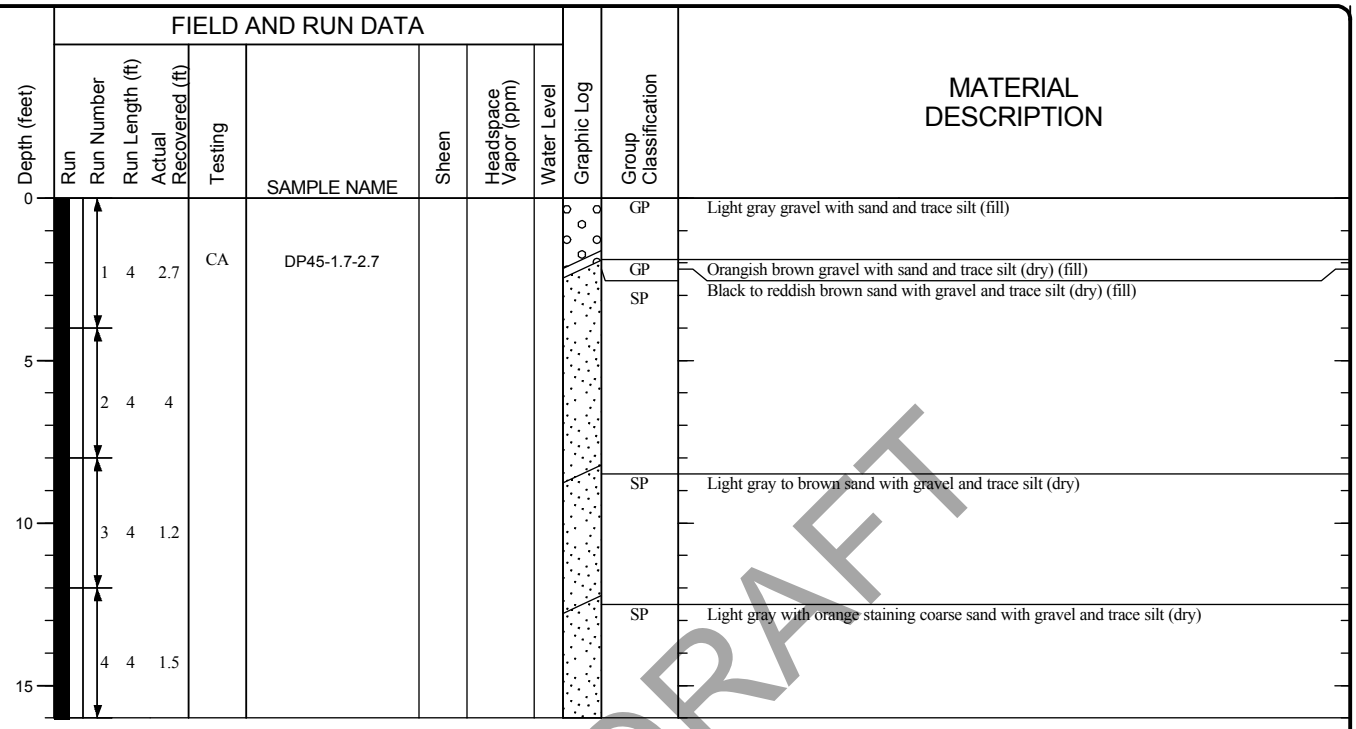
Log of Boring DP-44B

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-37
Sheet 1 of 1

Drilled	12/10/2009	Total Depth (ft)	16	Logged By / Checked By	KBC / JDL	Driller	GeoEngineers	Drilling Method	Direct Push
Location East (X): 2504205 North (Y): 265073 Datum: NAD83 (feet)- State Plane WA (North)				Groundwater Date Measured	Depth to Water (ft) Not Encountered			Drilling Equipment	Geoprobe



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

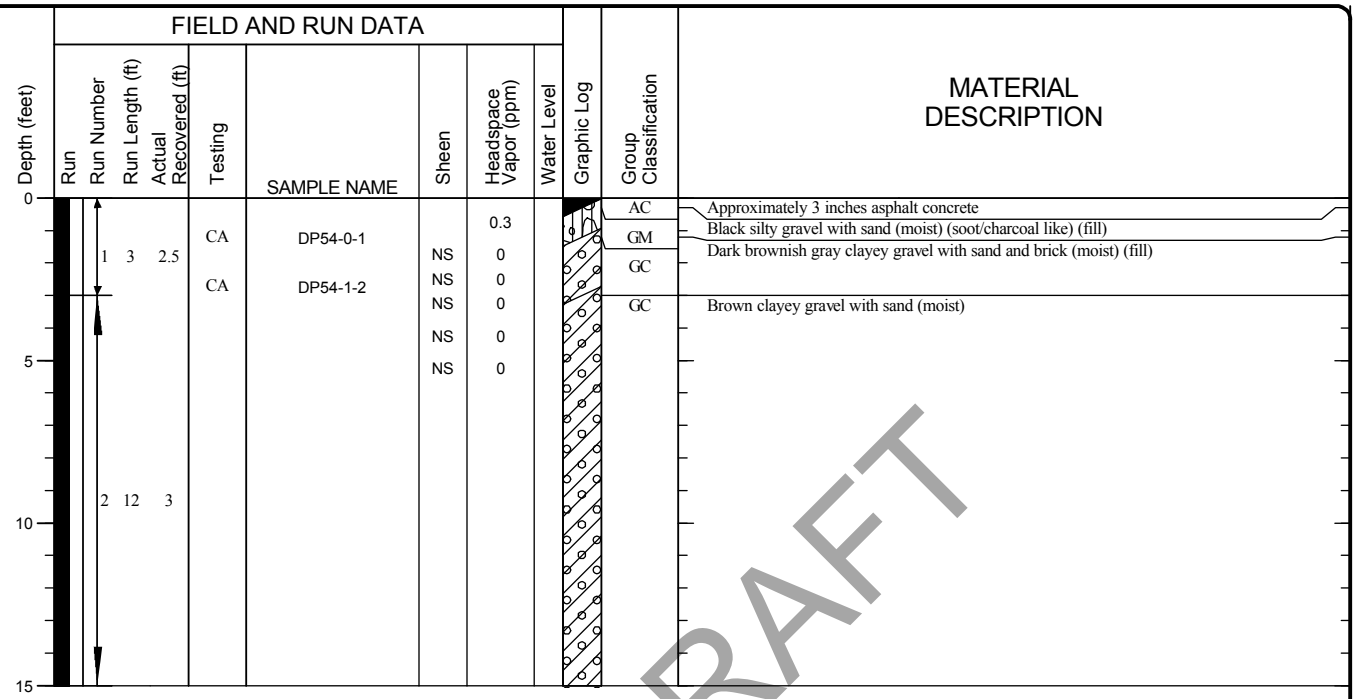
Log of Boring DP-45

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-38
Sheet 1 of 1

Drilled	12/16/2009	Total Depth (ft)	15	Logged By / Checked By	KBC / JDL	Driller	Environmental West	Drilling Method	Sonic
Location East (X): 2503694 North (Y): 265482 Datum: NAD83 (feet)- State Plane WA (North)				Groundwater Date Measured: — Depth to Water (ft): Not Encountered				Drilling Equipment	Sonic Speedstar 15k



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Boring DP-54

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-39

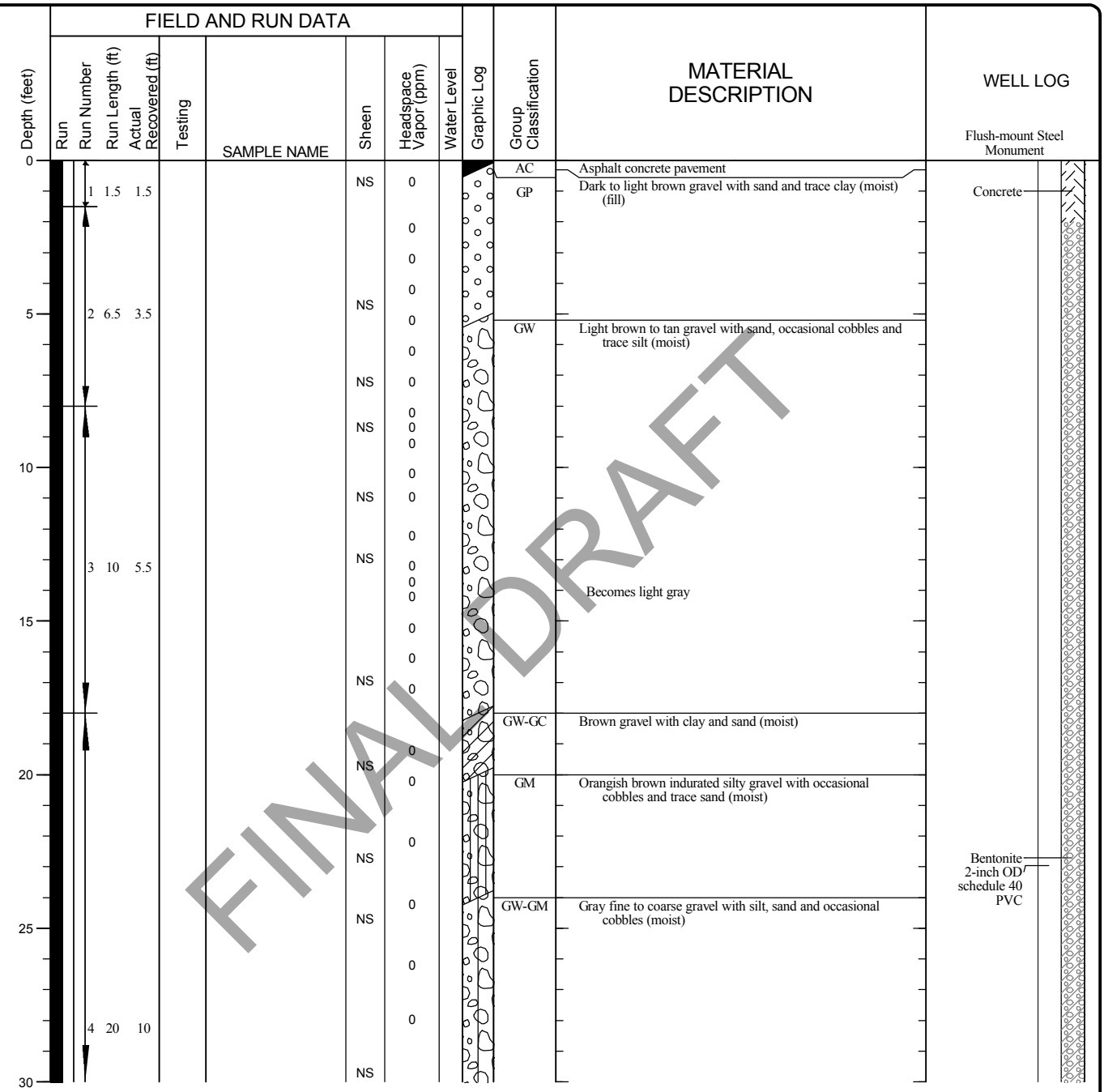
Drilled	12/4/2009	Total Depth (ft)	75.9	Logged By / Checked By	KBC / JDL	Driller	Environmental West	Drilling Method	Sonic

Location
Top of Casing Elevation: 1951.72 (ft)
East (X): North (Y):

Groundwater

Date Measured	Depth to Water (ft)
1/19/10	66.88

Drilling Equipment: Sonic Speedstar 15k

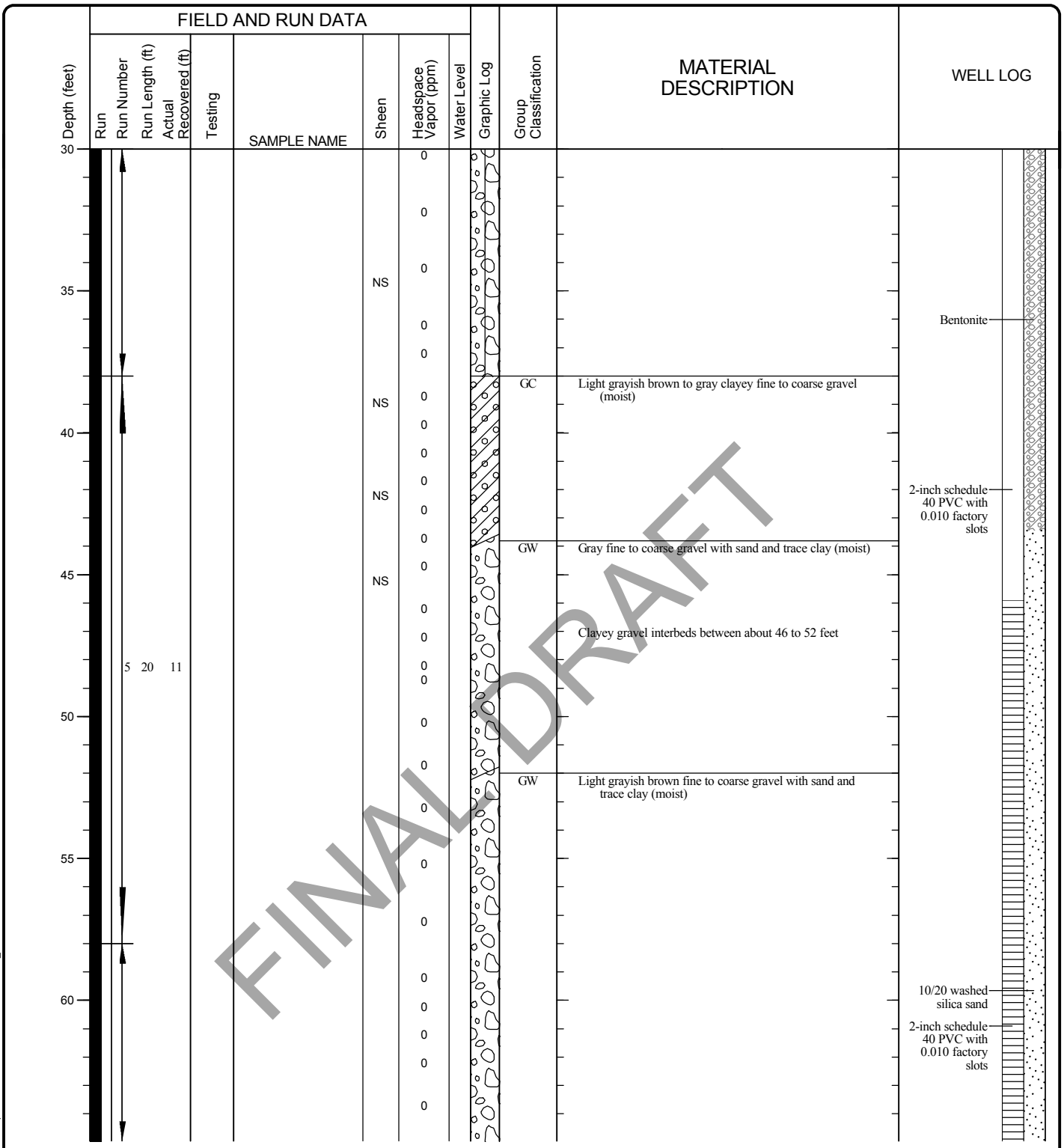


Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Monitoring Well MW-22

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12



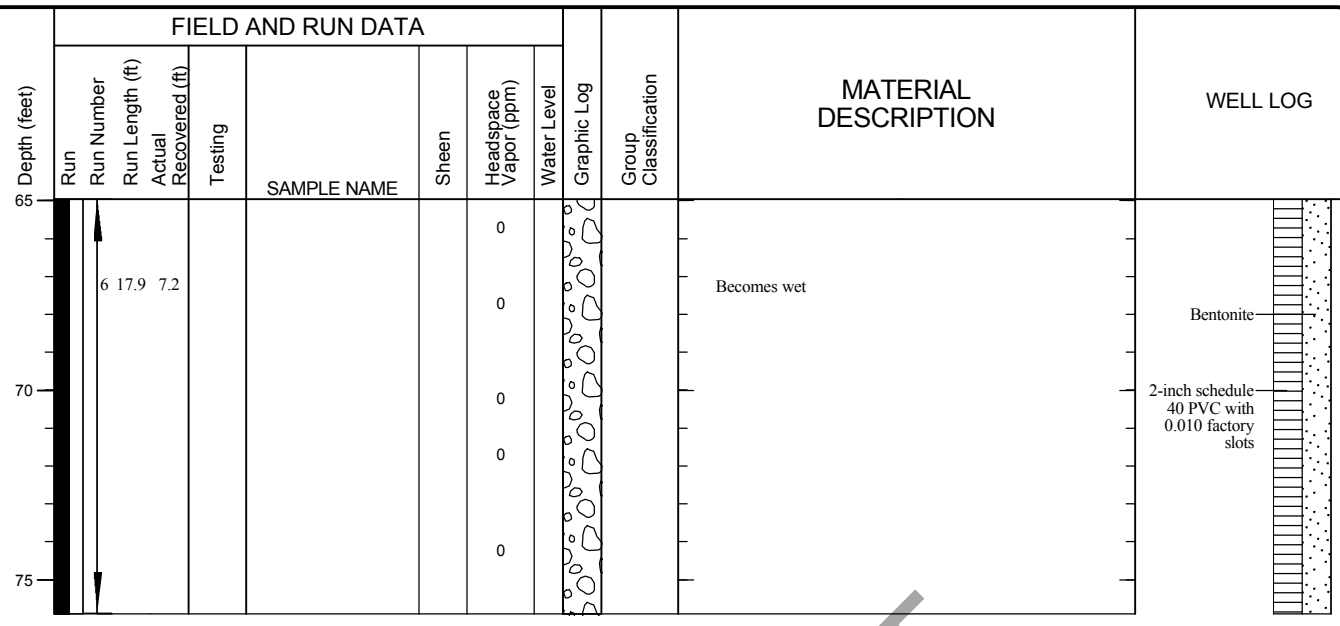
Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Monitoring Well MW-22 (continued)

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-40



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Monitoring Well MW-22 (continued)

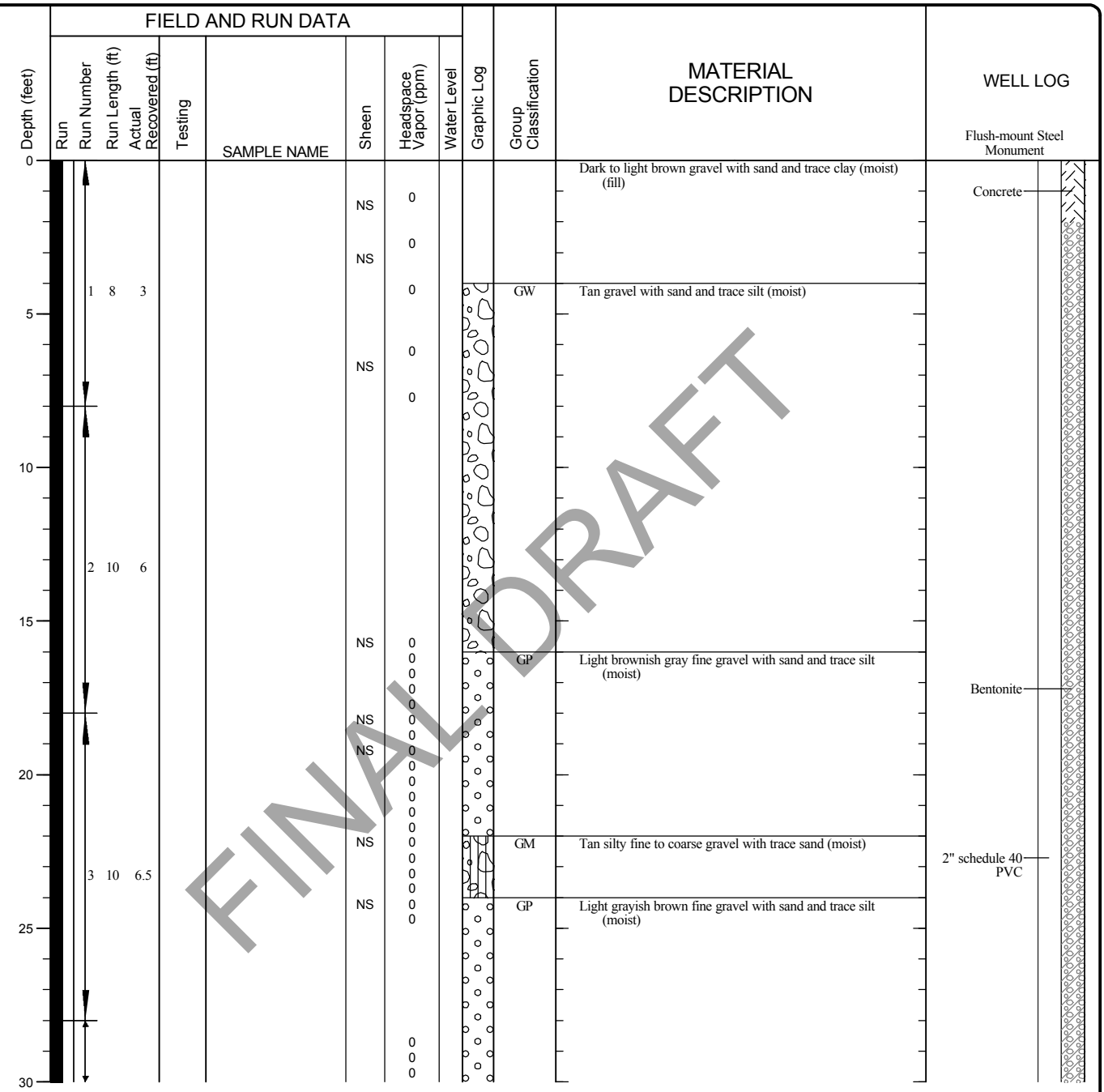
GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-40
Sheet 3 of 3

Drilled	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
12/3/2009	75	KBC / JDL	Environmental West	Sonic

Location	Groundwater		Drilling Equipment
Top of Casing Elevation: 1951.35 (ft) East (X): North (Y):	Date Measured	Depth to Water (ft)	Sonic Speedstar 15k
	1/22/10	67.06	



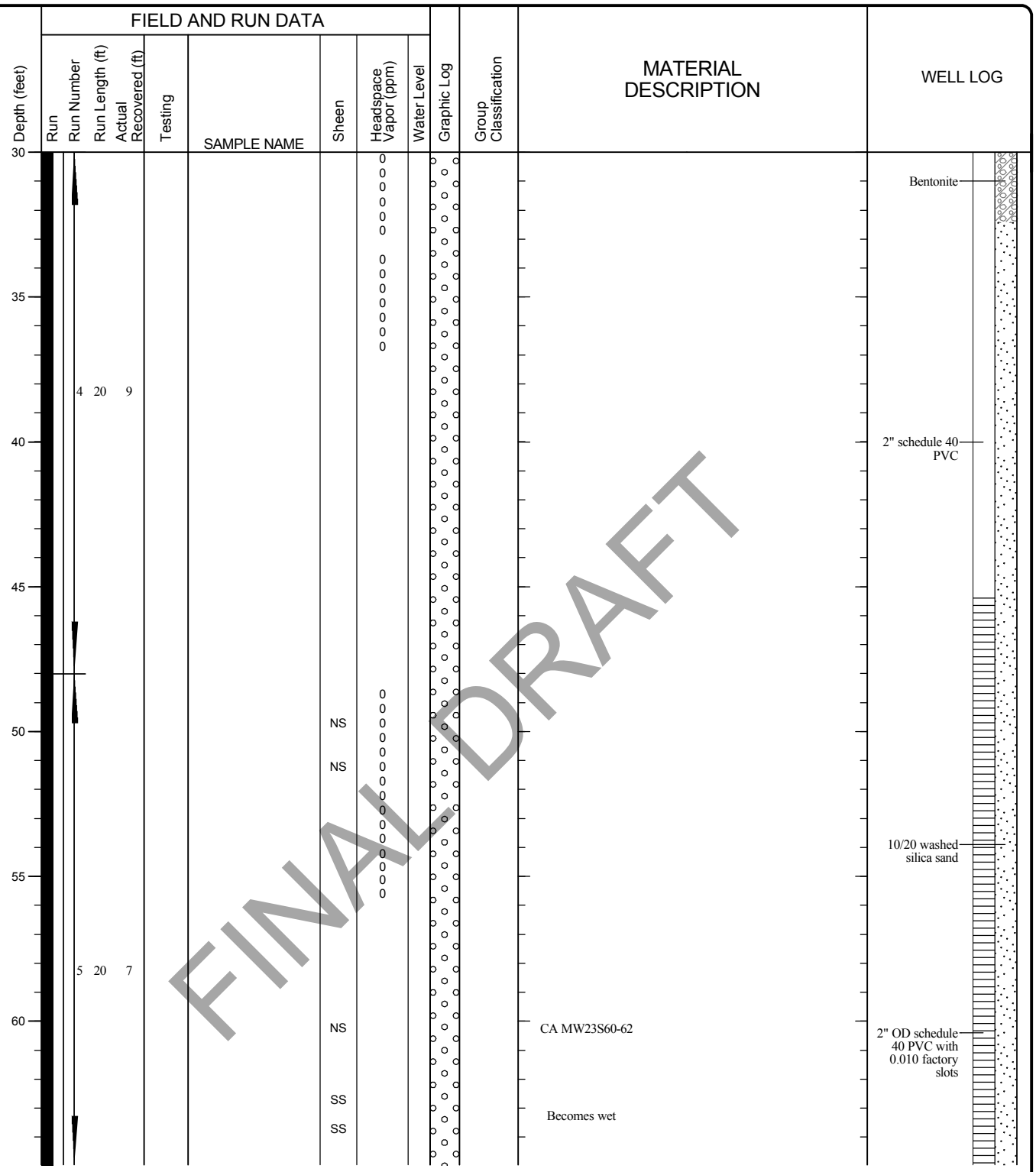
Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Monitoring Well MW-23

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-41



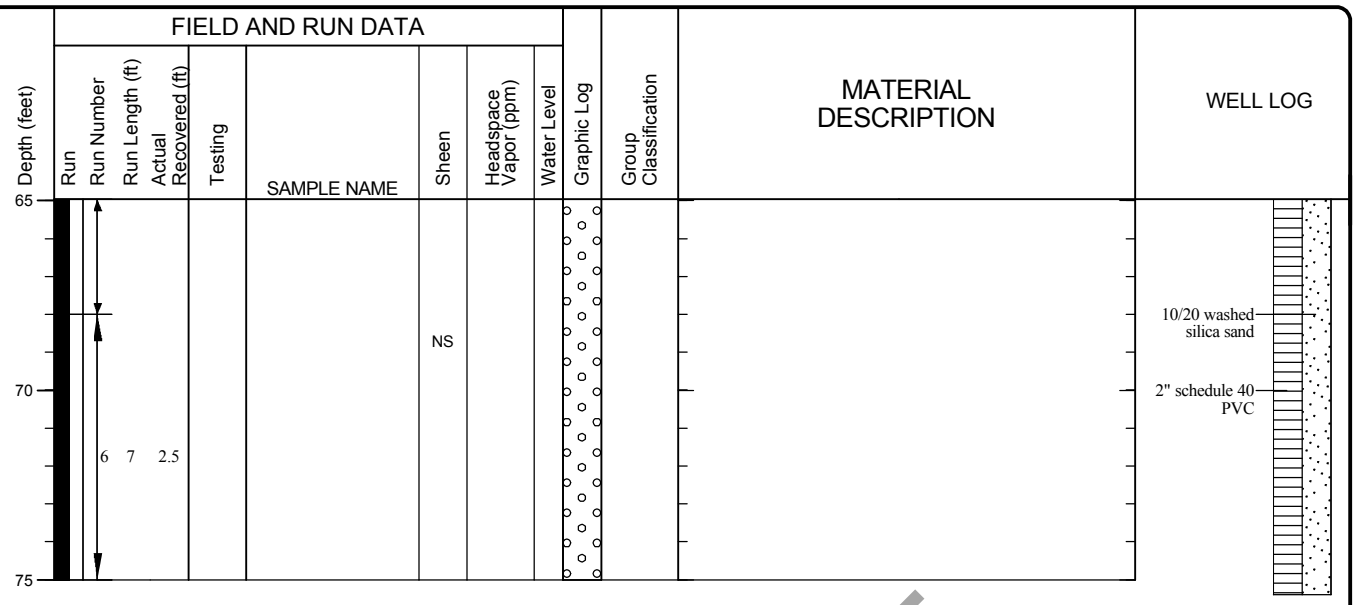
Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Monitoring Well MW-23 (continued)

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-41
Sheet 2 of 3



Notes:
1. Please see figure A-1 for explanation of symbols.
2. Where appropriate, the soil sample depth and the depth at which the soil types change, shown on this log, have been normalized to 100 percent recovery by applying the ratio of the drilling run length and the amount of soil recovered, to the measured depths logged in the field. Refer to Appendix A of the attached report for discussion of the depth modifications.

Log of Monitoring Well MW-23 (continued)

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-41

Date Excavated: 1/4/2010 Logged By: KBC

Equipment: Backhoe Total Depth (ft) 8.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
0			SM		Black silty sand intermixed with debris (wood, brick, clay, tiles and metal) (medium dense, moist) (fill)		
1	CA						GTP32-1-2
2			GM		Dark brown silty gravel with trace sand (loose, moist)		
3	CA				Grades to medium brown		GTP32-3-4
4			GW		Light orangish brown fine to coarse gravel with sand, occasional cobbles and trace silt (loose to medium dense, moist)		
5							
6							
7							
8					Test pit completed at approximately 8 foot depth No groundwater seepage observed Minor caving observed		

Notes: Please see Figure A-1 for explanation of symbols.

Log of Test Pit GTP-32

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation

Project Location: Spokane, Washington

Project Number: 0506-117-12

Figure A-42

Sheet 1 of 1

Date Excavated: 1/4/2010 Logged By: KBC

Equipment: Backhoe Total Depth (ft) 4.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
1	CA		GM		Black silty fine to coarse gravel with sand intermixed with debris (coal, wood and asphalt) (medium dense, moist) (fill)		GTP33-1-2
2			GM		Dark brownish gray to brown silty gravel with trace sand (loose, moist)		
3	CA						GTP33-3-4
4							

Test pit completed at approximately 4 foot depth
No groundwater seepage observed
Minor caving observed

Notes: Please see Figure A-1 for explanation of symbols.

Log of Test Pit GTP-33

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-43
Sheet 1 of 1

Date Excavated: 1/4/2010 Logged By: KBC

Equipment: Backhoe Total Depth (ft) 8.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
0			SM		Black silty fine to coarse sand intermixed with debris (metal, wood and coal) (medium dense, moist) (fill)		
1	CA						GTP34-1-2
2			GM		Dark brown silty gravel with trace sand (medium dense, moist)		
3			GW		Light orangish brown fine to coarse gravel with sand, occasional cobbles and trace silt (loose to medium dense, moist)		
4	CA						GTP34-4
5							
6							
7							
8					Test pit completed at approximately 8 foot depth No groundwater seepage observed Minor caving observed		

Notes: Please see Figure A-1 for explanation of symbols.

Log of Test Pit GTP-34

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation

Project Location: Spokane, Washington

Project Number: 0506-117-12

Figure A-44

Sheet 1 of 1

Date Excavated: 1/4/2010 Logged By: KBC

Equipment: Backhoe Total Depth (ft) 8.0

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
	0				SM		Black to dark brown silty fine to coarse sand with gravel intermixed with debris (metal, wood and coal) (medium dense, moist) (fill)		
	1		CA						GTP35-1-2
	2				GM		Dark brown to brown silty gravel with trace sand (medium dense, moist)		
	3		CA						GTP35-3-4
	4				GW		Light orangish brown fine to coarse gravel with sand, occasional cobbles and trace silt (loose to medium dense, moist)		
	5								
	6								
	7								
	8						Test pit completed at approximately 8 foot depth No groundwater seepage observed Minor caving observed		

Notes: Please see Figure A-1 for explanation of symbols.

Log of Test Pit GTP-35

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation

Project Location: Spokane, Washington

Project Number: 0506-117-12

Figure A-45

Sheet 1 of 1

Date Excavated: 1/4/2010 Logged By: KBC

Equipment: Backhoe Total Depth (ft) 8.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
1	CA		SM		Black to brown silty fine to coarse sand with occasional gravel intermixed with orange lenses of burnt material, coal and asphalt (loose,very light weight, moist) (fill)		GTP35B-1.5
2							
3	CA		GM		Dark brown silty fine to coarse gravel with sand (loose, moist)		GTP35B-3
4			GW		Light orangish brown gravel with sand, occasional cobbles and trace clay (medium dense, moist)		
5							
6							
7							
8					Test pit completed at approximately 8 foot depth No groundwater seepage observed Minor caving observed		

Notes: Please see Figure A-1 for explanation of symbols.

Log of Test Pit GTP-35B

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation

Project Location: Spokane, Washington

Project Number: 0506-117-12

Figure A-46

Sheet 1 of 1

Date Excavated: 1/4/2010 Logged By: KBC

Equipment: Backhoe Total Depth (ft) 10.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
0–1	CA		SM		Black to brown silty fine to coarse sand intermixed with debris (wood, metal, tile and glass) (medium dense, moist) (fill)		GTP36-1-2
1–5			GW		Dark brown fine to coarse gravel with sand and trace silt (loose, moist)		
5–10	CA		GW-GM		Light orangish brown fine to coarse gravel with sand, silt and occasional cobbles (loose, moist)		GTP36-5

Test pit completed at approximately 10 foot depth
No groundwater seepage observed
Minor caving observed

Notes: Please see Figure A-1 for explanation of symbols.

Log of Test Pit GTP-36

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-47
Sheet 1 of 1

Date Excavated: 2/9/2010 Logged By: KLR

Equipment: Backhoe Total Depth (ft) 10.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
0			ML		Black to brownish black silt with sand, gravel, cobbles and debris (brick, tile, metal pipe and broken glass) (fill)		
1							
2							
3	1						
4			GM		Brown silty fine to coarse gravel with sand, cobbles and boulders (medium dense to dense, moist)		
5							
6							
7							
8	2						
9							
10					Test pit completed at approximately 10 foot depth No groundwater seepage observed Moderate caving observed		

Notes: Please see Figure A-1 for explanation of symbols.

Log of Test Pit GTP-36A

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation

Project Location: Spokane, Washington

Project Number: 0506-117-12

Figure A-48

Sheet 1 of 1

Date Excavated: 2/9/2010 Logged By: KLR

Equipment: Backhoe Total Depth (ft) 10.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
1	1		SM		Black silty sand with gravel and debris (metal, glass, tile and brick) (low density fluffy texture) (fill)		
2			GM		Brown silty gravel with sand, cobbles and boulders (dense to very dense, moist)		
7	2						
10					Test pit completed at approximately 10 foot depth No groundwater seepage observed Moderate caving observed		

Notes: Please see Figure A-1 for explanation of symbols.

Log of Test Pit GTP-36B

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation

Project Location: Spokane, Washington

Project Number: 0506-117-12

Figure A-49

Sheet 1 of 1

Date Excavated: 12/22/2009 Logged By: KBC

Equipment: Backhoe Total Depth (ft) 11.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
0			SW		Black fine to coarse sand with gravel, occasional cobbles and boulders intermixed with debris (metal, glass and tile) (loose to medium dense, dry to moist) (fill)		
5	CA						GTP37-5
6			GW		Dark brown fine to coarse gravel with sand and trace silt (medium dense, dry to moist)		
7					Stained at contact with debris layer at 6 foot depth		
9	CA		GW		Light orangish brown fine to coarse gravel with sand, occasional cobbles and trace silt (loose to medium dense, moist)		GTP37-9
11					Test pit completed at approximately 11 foot depth No groundwater seepage observed Minor caving observed		

Notes: Please see Figure A-1 for explanation of symbols.

Log of Test Pit GTP-37

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation

Project Location: Spokane, Washington

Project Number: 0506-117-12

Figure A-50

Sheet 1 of 1

Date Excavated: 12/22/2009 Logged By: KBC

Equipment: Backhoe Total Depth (ft) 11.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
0			SM		Black to dark gray silty fine to coarse sand with gravel and occasional cobbles intermixed with debris (brick, tile, metal, drywall and asphalt) (loose, dry to moist) (fill)		
4	CA						GTP38-4
5			GW		Dark brown fine to coarse gravel with sand and trace silt (loose to medium dense, dry to moist)		
7			GW		Light orangish brown fine to coarse gravel with sand, occasional cobbles and trace silt (medium dense, moist)		
9	CA						GTP38-9
11					Test pit completed at approximately 11 foot depth No groundwater seepage observed Minor caving observed		

Notes: Please see Figure A-1 for explanation of symbols.

Log of Test Pit GTP-38

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation

Project Location: Spokane, Washington

Project Number: 0506-117-12

Figure A-51

Sheet 1 of 1

Date Excavated: 2/9/2010 Logged By: KLR

Equipment: Backhoe Total Depth (ft) 7.5

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
1	☒	1		GM		Dark brown to black silty gravel with sand (medium dense, moist) (fill)		
2				GM		Brown silty fine to coarse gravel with cobbles and occasional boulders (dense to very dense, moist) (fill)		
3								
4								
5	☒	2						
6						Boulders from 5½ to 6 feet deep		
7								

Test pit completed at approximately 7½ foot depth
No groundwater seepage observed
Moderate to severe caving observed

Notes: Please see Figure A-1 for explanation of symbols.

Log of Test Pit GTP-38A

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-52
Sheet 1 of 1

Date Excavated: 12/22/2009 Logged By: KBC

Equipment: Backhoe Total Depth (ft) 11.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
0			SP		White fine sand (sandblasting sand?) thickness varies laterally (fill)		
1							
2			SW		Black to dark brown fine to coarse sand with gravel and trace silt intermixed with debris (glass, metal, plastic and cloth) (loose to medium dense, moist) (fill)		
3							
4							
5	CA						GTP39-5
6							
7			GW		Dark brown fine to coarse gravel with sand and trace silt (loose to medium dense, moist) (fill)		
8							
9			GW-GM		Light orangish brown fine to coarse gravel with silt and sand (loose to medium dense, moist to dry)		
10	CA						GTP39-10-11
11					Test pit completed at approximately 11 foot depth No groundwater seepage observed Minor caving observed]		

Notes: Please see Figure A-1 for explanation of symbols.

Log of Test Pit GTP-39

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation

Project Location: Spokane, Washington

Project Number: 0506-117-12

Figure A-53

Sheet 1 of 1

Date Excavated: 12/22/2009 Logged By: KBC

Equipment: Backhoe Total Depth (ft) 11.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
0			GW		Black to dark brown fine to coarse gravel with sand and trace silt intermixed with debris (hose, glass, wood and scrap metal)		
1					Significant stained/oily appearing areas, discontinuous in pit sidewalls. Appears debris thickness decreases at north side of test pit and thickens to the south.		
2	CA						GTP40-2
3							
4							
5							
6							
7							
8							
9	CA		SW		Light orangish brown sand with trace silt (loose to medium dense, dry)		GTP40-9
10							
11					Test pit completed at approximately 11 foot depth No groundwater seepage observed Minor caving observed]		

Notes: Please see Figure A-1 for explanation of symbols.

Log of Test Pit GTP-40

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation

Project Location: Spokane, Washington

Project Number: 0506-117-12

Figure A-54

Sheet 1 of 1

Date Excavated: 12/21/2009 Logged By: KBC

Equipment: Backhoe Total Depth (ft) 12.0

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
	0				GW		Black fine to coarse gravel with sand, trace silt and debris (burned matted) (loose, wet) (fill) (fuel odor in upper 2 feet of soil)		
	1		CA						GTP46-1
	2								
	3				GC		Dark brown clayey fine to coarse gravel with sand (loose to medium dense, wet)		
	4								
	5				GW-GM		Orangish brown fine to coarse gravel with sand, silt and occasional cobbles (loose, moist)		
	6		CA						GTP46-6-7
	7						Grades to grayish brown with decrease in sand content		
	8								
	9								
	10								
	11		CA						GTP46-11-12
	12						Test pit completed approximately 12 foot depth No groundwater seepage observed Minor caving observed		

Notes: Please see Figure A-1 for explanation of symbols.

Log of Test Pit GTP-46

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation

Project Location: Spokane, Washington

Project Number: 0506-117-12

Figure A-55

Sheet 1 of 1

Date Excavated: 12/22/2009 Logged By: KBC

Equipment: Backhoe Total Depth (ft) 11.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
0			GW		Black to dark brown fine to coarse gravel with sand, trace silt and debris (asphalt) (loose, wet) (fill)		
1	CA						GTP47-1
2			GW		Dark brown coarse gravel with sand and trace silt (loose, dry)		
3							
4	CA		GW		Grayish brown fine to coarse gravel with sand, occasional cobbles and boulders and trace silt (loose to medium dense, dry)		GTP47-4
5							
6							
7							
8							
9							
10							
11	CA						GTP47-11

Test pit completed at approximately 11 foot depth
No groundwater seepage observed
Minor caving observed

Notes: Please see Figure A-1 for explanation of symbols.

Log of Test Pit GTP-47

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation
Project Location: Spokane, Washington
Project Number: 0506-117-12

Figure A-56
Sheet 1 of 1

Date Excavated: 12/21/2009 Logged By: KBC

Equipment: Backhoe Total Depth (ft) 11.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
0			SW		Black fine to coarse sand with gravel and lenses of tar/asphalt (fill)		
1	CA						GTP48-1
2			GC		Dark brown clayey fine to coarse gravel with trace sand (wet)		
3			GW		Brown fine to coarse gravel with sand and trace silt (loose, moist)		
4	CA		GW-GM		Light orangish brown fine to coarse gravel with silt, sand and occasional cobbles (loose to medium dense, moist)		GTP48-4-5
5							
6							
7							
8							
9							
10			GW		Brown fine to coarse gravel with sand (loose to medium dense to dense, moist)		
11					Test pit completed at approximately 11 foot depth No groundwater seepage observed Minor caving observed		

Notes: Please see Figure A-1 for explanation of symbols.

Log of Test Pit GTP-48

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation

Project Location: Spokane, Washington

Project Number: 0506-117-12

Figure A-57

Sheet 1 of 1

Date Excavated: 12/21/2009 Logged By: KBC

Equipment: Backhoe Total Depth (ft) 12.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
0			GW		Black fine to coarse gravel with sand and trace clay (loose, moist) (fill)		
1	CA		GC		Dark brown clayey gravel with gravel (loose, moist) (fill)		GTP49-1
2			GC		Brown to light brown clayey gravel with sand (loose, moist) (fill)		
3	CA		GW-GM		Light orangish brown fine to coarse gravel with silt and sand (loose to medium dense, moist)		GTP49-3-4
4							
5							
6							
7							
8							
9							
10			GW		Light brown fine to coarse gravel with sand and trace silt (loose to medium dense, moist)		
11							
12					Test pit completed at approximately 12 foot depth No groundwater seepage observed Minor caving observed		

Notes: Please see Figure A-1 for explanation of symbols.

Log of Test Pit GTP-49

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation

Project Location: Spokane, Washington

Project Number: 0506-117-12

Figure A-58

Sheet 1 of 1

Date Excavated: 12/18/2009 Logged By: KBC

Equipment: Backhoe Total Depth (ft) 11.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
0			SW		Black fine to coarse sand with gravel and tar lenses (loose, moist) (fill)		
1	CA						GTP50-1
2			GC		Brown clayey gravel with sand (loose, moist) (fill)		
3					Burned trash and metal bucket with tar (north side of pit at 2 feet deep)		
4							
5	CA		GW		Light brown fine to coarse gravel with sand and trace silt (loose to medium dense, moist)		GTP50-5-6
6							
7							
8							
9							
10							
11					Test pit completed at approximately 11 foot depth No groundwater seepage observed Minor caving observed		

Notes: Please see Figure A-1 for explanation of symbols.

Log of Test Pit GTP-50

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation

Project Location: Spokane, Washington

Project Number: 0506-117-12

Figure A-59

Sheet 1 of 1

Date Excavated: 12/18/2009 Logged By: KBC

Equipment: Backhoe Total Depth (ft) 12.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
0			ML		Black silt with gravel and trace sand (loose, moist) (fill)		
1	CA						GTP51-1-2
2			SW-SM		Brown fine to coarse sand with silt and gravel (loose, moist)		
3							
4	CA		GW		Light brown fine to coarse gravel with sand, occasional cobbles and trace silt (loose to medium dense, moist)		GTP51-4
5							
6							
7							
8							
9							
10							
11							
12					Test pit completed at approximately 12 foot depth No groundwater seepage observed Minor caving observed		

Notes: Please see Figure A-1 for explanation of symbols.

Log of Test Pit GTP-51

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation

Project Location: Spokane, Washington

Project Number: 0506-117-12

Figure A-60

Sheet 1 of 1

Date Excavated: 12/18/2009 Logged By: KBC

Equipment: Backhoe Total Depth (ft) 12.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
0			SW		Black to brown sand with gravel, trace silt, and debris (brick, asphalt and tar chunks) (fill)		
1	CA						GTP52-1
2							
3	CA		GC		Orange to brown clayey gravel with sand (loose, moist)		GTP52-3-4
4			GW		Light orangish brown fine to coarse gravel with sand, occasional cobbles and trace silt (loose, moist)		
5							
6							
7							
8							
9							
10							
11							
12					Test pit completed at approximately 12 foot depth No groundwater seepage observed Minor caving observed		

Notes: Please see Figure A-1 for explanation of symbols.

Log of Test Pit GTP-52

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation

Project Location: Spokane, Washington

Project Number: 0506-117-12

Figure A-61

Sheet 1 of 1

Date Excavated: 12/18/2009 Logged By: KBC

Equipment: Backhoe Total Depth (ft) 15.0

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
	0				SP		Black fine to coarse sand with gravel and trace silt (loose, moist) (fill)		
	1		CA						GTP53-1
	2				GW		Dark brown to light brown fine to coarse gravel with sand, occasional cobbles and trace silt (loose, moist)		
	3		CA						GTP53-3-5
	4								
	5								
	6								
	7								
	8								
	9								
	10								
	11								
	12				SP		Coarse sand with gravel and trace silt (loose to medium dense, moist)		
	13								
	14								
	15						Test pit completed at approximately 15 foot depth No groundwater seepage observed Minor caving observed		

Notes: Please see Figure A-1 for explanation of symbols.

Log of Test Pit GTP-53

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation

Project Location: Spokane, Washington

Project Number: 0506-117-12

Figure A-62

Sheet 1 of 1

Date Excavated: 1/4/2010 Logged By: KBC

Equipment: Backhoe Total Depth (ft) 9.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
0			GW		Black fine to coarse gravel with sand; underlain by 3 inches of reddish pink gravel; underlain by black to light yellow powdery material (fill)		
1	CA		GW		Black, dark brown and orangish brown fine to coarse gravel with variable sand and silt content and wood/timber debris (loose, moist) (fill)		GTP55-1-2
2							
3	CA						GTP55-3-4
4			GW-GC		Red to grayish brown fine to coarse gravel with sand and clay (loose to medium dense, moist)		
5							
6							
7							
8	CA						GTP55-8-9
9					Test pit completed at approximately 9 foot depth No groundwater seepage observed Minor caving observed		

Notes: Please see Figure A-1 for explanation of symbols.

Log of Test Pit GTP-55

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation

Project Location: Spokane, Washington

Project Number: 0506-117-12

Figure A-63

Sheet 1 of 1

Date Excavated: 2/25/2010 Logged By: KBC

Equipment: Backhoe Total Depth (ft) 1.5

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
1	1		SP		Black fine to medium sand with gravel and trace silt (soil includes sand to gravel-sized whitish and orange substance with metal fragments) (loose, moist) (fill)		Hard in-place, at ground surface, becomes loose when disturbed.
					Hand auger completed at approximately 1½ foot depth		

Notes: Please see Figure A-1 for explanation of symbols.

Log of Hand Auger GTP-56

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation

Project Location: Spokane, Washington

Project Number: 0506-117-12

Figure A-64

Sheet 1 of 1

Date Excavated: 2/25/2010 Logged By: KBC

Equipment: Backhoe Total Depth (ft) 1.5

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
1	1		SP		Dark brown and black fine to medium sand with gravel and trace silt (soil includes sand to gravel-sized whitish and orange substance with metal fragments) (loose, moist) (fill)		Hard in-place, at ground surface, becomes loose when disturbed.
					Hand auger completed at approximately 1½ foot depth		

Notes: Please see Figure A-1 for explanation of symbols.

Log of Hand Auger GTP-57

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation

Project Location: Spokane, Washington

Project Number: 0506-117-12

Figure A-65

Sheet 1 of 1

Date Excavated: 2/25/2010 Logged By: KBC

Equipment: Backhoe Total Depth (ft) 1.5

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Moisture Content, %	REMARKS
1	1		SP		Black fine to medium sand with gravel and trace silt (soil includes sand to gravel-sized whitish and orange substance with metal fragments) (loose, moist) (fill)		Hard in-place, at ground surface, becomes loose when disturbed.
					Hand auger completed at approximately 1½ foot depth		

Notes: Please see Figure A-1 for explanation of symbols.

Log of Hand Auger GTP-58

GeoEngineers

Project: BNSF Parkwater Facility Remedial Investigation

Project Location: Spokane, Washington

Project Number: 0506-117-12

Figure A-66

Sheet 1 of 1

1515
1516

APPENDIX B
Soil Chemical Analytical Results Tables

Table B-1

Summary of Chemical Analytical Data in Soil [1]

Total Petroleum Hydrocarbons (TPH), RCRA 8 Metals and Polychlorinated Biphenyls
BNSF Parkwater Facility Remedial Investigation
Spokane, Washington

			TPH [2] (mg/kg)			Metals [3] (mg/kg)								Polychlorinated Biphenyls [4] (mg/kg)									
Sample Name	**Sample Date**	**Depth [5] (feet)**	**Gasoline-range Petroleum Hydrocarbons**	**Diesel-range Petroleum Hydrocarbons**	**Oil-Range Petroleum Hydrocarbons**	**Arsenic**	**Barium**	**Cadmium**	**Total Chromium**	**Lead**	**Mercury**	**Selenium**	**Silver**	**PCB-aroclor 1016**	**PCB-aroclor 1221**	**PCB-aroclor 1232**	**PCB-aroclor 1242**	**PCB-aroclor 1248**	**PCB-aroclor 1254**	**PCB-aroclor 1260**	**PCB-aroclor 1262**	**PCB-aroclor 1268**	**Total PCB aroclors (Detects and NDs = Reporting Limit)**
MTCA Method A Industrial Cleanup Criteria			100	2,000	2,000	20	NE	2	2,000	1,000	2	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	10
Former Koch Materials Lease Area																							
GTP46-1	12/21/09	1	--	4,120	6,940	6.6	883	1.2	14.8	76.1	0.17	2.7	ND	--	--	--	--	--	--	--	--	--	--
GTP46-11-12	12/21/09	11 - 12	--	ND	ND	11.9	44.3	0.92	8.1	10.4	ND	1.5	ND	--	--	--	--	--	--	--	--	--	--
GTP46-6-7	12/21/09	6 - 7	--	ND	ND	7.4	37.4	0.93	8.9	7.1	ND	1.8	ND	--	--	--	--	--	--	--	--	--	--
GTP47-1	12/22/09	4	--	467	2,130	4.9	267	0.2	11.8	67.3	0.26	0.95	ND	--	--	--	--	--	--	--	--	--	--
GTP47-11	12/22/09	11	--	ND	ND	5.1	48.5	ND	9.9	12.6	ND	ND	ND	--	--	--	--	--	--	--	--	--	--
GTP47-4	12/22/09	4	--	ND	ND	5.6	58.1	0.053	14	11.6	ND	ND	ND	--	--	--	--	--	--	--	--	--	--
DUPLICATE-2	12/22/09	4	--	ND	ND	7.6	52.9	0.074	12.7	10.8	ND	ND	ND	--	--	--	--	--	--	--	--	--	--
GTP48-1	12/21/09	1	--	31 J	264 J	13.4	368	1.4	18.6	42.5	0.053	2.2	ND	--	--	--	--	--	--	--	--	--	--
GTP48-4-5	12/21/09	4 - 5	--	ND	ND	9.6	50.2	1.3	12.1	11	ND	1.9	ND	--	--	--	--	--	--	--	--	--	--
GTP49-1	12/21/09	1	--	55.4	347	26.4	870	3.3	28.9	509	2	4.4	0.67	--	--	--	--	--	--	--	--	--	--
GTP49-3-4	12/21/09	3 - 4	--	ND	ND	12.4	138	1.7	10.9	73	0.037	2.3	ND	--	--	--	--	--	--	--	--	--	--
GTP50-1	12/18/09	1	--	40.7 J	285 J	11.3	258	1.5	16.9	35.1	0.3	2.4	ND	--	--	--	--	--	--	--	--	--	--
GTP50-5-6	12/18/09	5 - 6	--	ND	ND	8.5	62.5	1.1	9.2	9.2	ND	2.1	ND	--	--	--	--	--	--	--	--	--	--
GTP51-1-2	12/18/09	1 - 2	--	32.8	215	10.7	1,780	1.8	156	414	0.28	3.5	ND	--	--	--	--	--	--	--	--	--	--
GTP51-4	12/18/09	4	--	ND	ND	8	54.9	1.1	10.7	8.9	0.053	2	ND	--	--	--	--	--	--	--	--	--	--
DUPLICATE-1	12/18/09	4	--	ND	ND	9.3	56.7	1.3	12.1	11.8	ND	2.2	ND	--	--	--	--	--	--	--	--	--	--
GTP52-1	12/18/09	1	--	35 J	256	12.7	486	1.5	15.8	55.1	0.056	2.2	ND	--	--	--	--	--	--	--	--	--	--
GTP52-3-4	12/18/09	3 - 4	--	ND	ND	8.6	79.3	1.3	13.1	12.4	ND	2.6	ND	--	--	--	--	--	--	--	--	--	--
GTP53-1	12/18/09	1	--	104	400	7.6	662	1	12.9	26	0.025	1.6	ND	--	--	--	--	--	--	--	--	--	--
GTP53-3-5	12/18/09	3 - 5	--	ND	ND	8.9	46.9	1.2	12.7	10.7	ND	1.9	ND	--	--	--	--	--	--	--	--	--	--
Diesel Shop and Materials Storage Building																							
DP01-1-2	12/15/09	1.7 - 3.3	--	222	1,080	6.3	176	1.2	21.2	21.1	0.025	2.7	ND	--	--	--	--	--	--	--	--	--	--
DP01-5-6	12/15/09	5 - 7	--	76	187	9.9	42.1	1.3	15.4	8.6	ND	3.2	ND	--	--	--	--	--	--	--	--	--	--
DP01A-1-2	12/14/09	1.4 - 2.9	--	91.2	316	9.6	401	1.9	226	81.1	0.049	4.3	ND	--	--	--	--	--	--	--	--	--	--
DP01A-2-3	12/14/09	2.9 - 5	--	ND	ND	8.4	81	1.2	11.3	10.7	ND	2	ND	--	--	--	--	--	--	--	--	--	--
DP01A-11-12.5	12/14/09	14.2 - 15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP02-1-2	12/14/09	1.5 - 3	--	3,950	2,330	6.1	338	1.3	63.4	69.4	0.027	2.5	ND	--	--	--	--	--	--	--	--	--	--
DP02-6-7	12/14/09	6 - 7.4	--	ND	ND	10.7	201	1.5	37.2	12.9	ND	3.1	ND	--	--	--	--	--	--	--	--	--	--
DP03-1.5-2	12/14/09	1.5 - 2	--	12,800	10,600	2.5	367	0.9	11.1	74	0.037	2.4	ND	--	--	--	--	--	--	--	--	--	--
DP03-3-4	12/14/09	3 - 5.2	--	158	304	8.3	57.3	1.1	11	10	ND	2.4	ND	--	--	--	--	--	--	--	--	--	--
DP03-7.5-8.5	12/14/09	12.8 - 15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP04-0.5-1.5	12/14/09	0.8 - 2.3	--	355	1,060	11.3	65.4	1.7	6.4	34.9	ND	3	ND	--	--	--	--	--	--	--	--	--	--
DP04-3-4	12/14/09	4.5 - 6	--	ND	ND	4.2	214	1.1	4.1	4.4	ND	2.5	ND	--	--	--	--	--	--	--	--	--	--
DP04-12-13	12/14/09	12.7 - 15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP05-1.3-2.6	12/14/09	1.3 - 2.6	--	ND	ND	7.1	78.8	1.2	12.2	10.6	ND	3.4	ND	--	--	--	--	--	--	--	--	--	--
DP05-8	12/14/09	9.6	--	ND	ND	12.8	38.5	0.74	9.2	10.2	ND	1.2	ND	--	--	--	--	--	--	--	--	--	--
DP05-10.6	12/14/09	13.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP07-2-2.7	12/14/09	3 - 4	--	4,630	10,200	9	139	1.4	14.8	15.4	ND	3	ND	--	--	--	--	--	--	--	--	--	--
DP07-3.2-4	12/14/09	4.9 - 6	--	ND	ND	7.3	90.5	1.2	12.5	13.6	ND	2.4	ND	--	--	--	--	--	--	--	--	--	--
DP07-6-7	12/14/09	6 - 9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP08-1.6-2.4	12/14/09	2.1 - 3.2	--	968	4,570	6.5	283	1.2	18.4	30.8	0.043	2.3	ND	--	--	--	--	--	--	--	--	--	--
DP08-3.5-4.5	12/14/09	4.7 - 6	--	154	1,170	11.7	60.7	1.5	11	16.3	0.13	2.8	ND	--	--	--	--	--	--	--	--	--	--

Sample Name	Sample Date	Depth [5] (feet)	TPH [2] (mg/kg)			Metals [3] (mg/kg)								Polychlorinated Biphenyls [4] (mg/kg)									
			Gasoline-range Petroleum Hydrocarbons	Diesel-range Petroleum Hydrocarbons	Oil-Range Petroleum Hydrocarbons	Arsenic	Barium	Cadmium	Total Chromium	Lead	Mercury	Selenium	Silver	PCB-aroclor 1016	PCB-aroclor 1221	PCB-aroclor 1232	PCB-aroclor 1242	PCB-aroclor 1248	PCB-aroclor 1254	PCB-aroclor 1260	PCB-aroclor 1262	PCB-aroclor 1268	Total PCB aroclors (Detects and NDs = Reporting Limit)
MTCA Method A Industrial Cleanup Criteria			100	2,000	2,000	20	NE	2	2,000	1,000	2	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	10
DP09-1-2	12/14/09	1 - 2	--	519	1,700	7.3	708	1.6	98.2	68.7	0.029	2.7	ND	--	--	--	--	--	--	--	--	--	--
DP09-2.5-3	12/14/09	2.5 - 3	--	ND	ND	8.4	122	1.3	5.8	6.5	ND	2.7	ND	--	--	--	--	--	--	--	--	--	--
DP10-4-5.8	12/10/09	4 - 5.8	--	ND	ND	12.7	78.8	0.15	11.1	40.1	0.21	ND	ND	--	--	--	--	--	--	--	--	--	--
DP10-5	12/10/09	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP10-8-9	12/10/09	8 - 9	--	ND	ND	3.4	18.5	ND	3.9	5	0.023	0.85	ND	--	--	--	--	--	--	--	--	--	--
DP11-4.2-4.85	12/10/09	4.2 - 4.85	--	ND	ND	7	107	0.06	17.1	14.6	ND	ND	ND	--	--	--	--	--	--	--	--	--	--
DP11-8-8.4	12/10/09	8 - 8.4	--	ND	ND	3.8	24.1	ND	5	13.5	ND	ND	ND	--	--	--	--	--	--	--	--	--	--
DP11-8-9	12/10/09	8 - 9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP24-0.5-1.5	12/15/09	0.8 - 2.5	--	ND	ND	16.5	312	1.8	16.9	59.4	0.04	3	ND	--	--	--	--	--	--	--	--	--	--
DP24-2-3	12/15/09	3.3 - 5	--	ND	ND	6.9	71.9	1	8.9	8	ND	3	ND	--	--	--	--	--	--	--	--	--	--
DP24-7-7.5	12/15/09	9 - 10	--	ND	ND	7.3	36.2	0.69	7.9	8.3	ND	1.6	ND	--	--	--	--	--	--	--	--	--	--
DP25-3-4	12/16/09	3.8 - 5	--	ND	ND	8.4	53.3	1.1	9	11.2	ND	2.3	ND	--	--	--	--	--	--	--	--	--	--
DP25-5-6	12/16/09	5 - 6.5	--	ND	ND	9.5	50.7	0.84	9.7	13.1	ND	2	ND	--	--	--	--	--	--	--	--	--	--
DP26-1-2	12/15/09	1 - 2	--	ND	ND	8.9	135	1.6	13.8	15.1	ND	3.7	ND	--	--	--	--	--	--	--	--	--	--
DP26-5-6	12/15/09	5 - 6.8	--	ND	ND	4.6	44.3	0.64	8.7	5.2	ND	1.4	ND	--	--	--	--	--	--	--	--	--	--
DP27-2.5-3.5	12/16/09	2.8 - 4	--	ND	ND	7.3	131	1.3	17.9	11.4	ND	3.3	ND	--	--	--	--	--	--	--	--	--	--
DP27-5-6	12/16/09	5 - 8.6	--	ND	ND	4.8	55.7	0.54	7.7	7.3	ND	1	ND	--	--	--	--	--	--	--	--	--	--
DP28-1.4-2	12/16/09	1.8 - 2.5	--	33.2	237	10	308	1.6	137	81	ND	2.7	ND	--	--	--	--	--	--	--	--	--	--
DP28-5-6	12/16/09	5 - 8.5	--	ND	ND	9.1	63.4	1.2	11.6	11.5	ND	2.8	ND	--	--	--	--	--	--	--	--	--	--
DP29-1-2	12/15/09	1.3 - 2.5	--	ND	ND	9	108	1.6	15.1	12.4	ND	3.2	ND	--	--	--	--	--	--	--	--	--	--
DP29-3-4	12/15/09	3.8 - 5	--	ND	ND	7.8	57.4	1.2	13.2	9.8	ND	2.2	ND	--	--	--	--	--	--	--	--	--	--
DP29-7	12/15/09	9 - 9	--	ND	ND	8.7	40.8	0.88	10	9.6	ND	1.8	ND	--	--	--	--	--	--	--	--	--	--
DP30-1-2	12/15/09	1.1 - 2.2	--	ND	ND	5.1	64.7	0.5	10	5.3	ND	1.3	ND	--	--	--	--	--	--	--	--	--	--
DP30-4	12/15/09	4.4	--	ND	ND	5.2	148	0.93	19.5	6.5	ND	1.8	ND	--	--	--	--	--	--	--	--	--	--
DP30-6-7	12/15/09	10 - 13	--	ND	ND	8.9	50.7	0.56	10.3	6.9	ND	1.3	ND	--	--	--	--	--	--	--	--	--	--
Western Fruit Express (Generator Storage Area)																							
DP12-0.5-1.25	01/19/10	0.5 - 1.25	--	68	438	9.9	168	7.3	20.1	225	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP12-4-5.8	01/19/10	4 - 5.8	--	ND	ND	2.9	147	ND	47.5	11.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP12-8-9.5	01/19/10	8 - 9.5	--	ND	ND	6.1	93.3	0.3	17.4	45.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP13-1-2	12/28/09	1.5 - 3	--	34.5	160	16.3	126 J	0.89	14.3	126	0.11 J	ND	ND	--	--	--	--	--	--	--	--	--	
GTP32-1-2	01/04/10	1 - 2	--	152	711	98.9	922	9	68.6	34,700	0.3	ND	5.4 J	ND	ND	ND	ND	ND	ND	ND	0.2	ND	0.5712
GTP32-3-4	01/04/10	3 - 4	--	ND	ND	4.8	60.6	ND	12.4	31.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP33-1-2	01/04/10	1 - 2	--	ND	ND	8.5	525	2.4	9.9	1,690	0.11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP33-3-4	01/04/10	3 - 4	--	ND	ND	6.8	126	0.088	12.6	30.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP34-1-2	01/04/10	1 - 2	--	ND	ND	95.2	746	6.7	41.7	44,200	0.71	ND	7.3 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP34-4	01/04/10	4	--	ND	ND	8.6	117	0.11	12.9	40 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DUPLICATE-6	01/04/10	4	--	ND	ND	6.9	117	0.05	15.3	18.8 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP35-1-2	01/04/10	1 - 2	--	37.9	180	204	478	653	6.6	48,200	6.1	3.1	235 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP35-3-4	01/04/10	3 - 4	--	ND	ND	8.2	91	0.11	15.2	23.6	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP35B-1.5	01/04/10	1.5	--	29.1	ND	13.2	311	3.3	21.5	3,100	0.16	1.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP35B-3	01/04/10	3	--	ND	ND	5.2	88.2	ND	11.7	17.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP56-1.3-1.5	02/25/10	1.3 - 1.5	--	33.2	ND	1.4	551	1	5.7	45.6	0.063	ND	ND	--	--	--	--	--	--	--	--	--	
GTP57-1.3-1.5	02/25/10	1.3 - 1.5	--	35.5	136	0.81	822	1.6	9.2	115	ND	1.2	ND	--	--	--	--	--	--	--	--	--	
GTP58-1.3-1.5	02/25/10	1.3 - 1.5	--	33.5	126	4	560	0.97	6.6	132	ND	1.1	ND	--	--	--	--	--	--	--	--	--	
Dismantling Spur and East and West Debris and Soil Deposit Areas																							
GTP36-1-2	01/04/10	1 - 2	--	58	303	22.9	380	36.8	218	1,120	0.16	1 U	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP36-5	01/04/10	5	--	ND	ND	6.5	66.5	0.18	10.7	29.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP36A-2.5	02/09/10	2.5	--	34.4	127	11.9	647	1.9	12.5	196	0.063	3.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP36A-8	02/09/10	8	--	ND	ND	8.4	109	0.57	11	51.9	0.031	3.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Sample Name	Sample Date	Depth [5] (feet)	TPH [2] (mg/kg)			Metals [3] (mg/kg)								Polychlorinated Biphenyls [4] (mg/kg)									
			Gasoline-range Petroleum Hydrocarbons	Diesel-range Petroleum Hydrocarbons	Oil-Range Petroleum Hydrocarbons	Arsenic	Barium	Cadmium	Total Chromium	Lead	Mercury	Selenium	Silver	PCB-aroclor 1016	PCB-aroclor 1221	PCB-aroclor 1232	PCB-aroclor 1242	PCB-aroclor 1248	PCB-aroclor 1254	PCB-aroclor 1260	PCB-aroclor 1262	PCB-aroclor 1268	Total PCB aroclors (Detects and NDs = Reporting Limit)
MTCA Method A Industrial Cleanup Criteria			100	2,000	2,000	20	NE	2	2,000	1,000	2	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	10
GTP36B-1	02/09/10	1	--	543	1850	15.6	965	4.9	27.1	494	0.87	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP36B-7	02/09/10	7	--	ND	ND	10	81.2	0.13	11.5	17.2	ND	3.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP37-5	12/22/09	5	--	50.1	228	91.9	559	39.2	34.8	3,130	0.49	ND	54.7 J	ND	ND	ND	ND	ND	ND	0.198	ND	ND	0.5188
GTP37-9	12/22/09	9	--	ND	ND	8.1	57.4	0.24	9.4	23.8	0.026	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP38-4	12/22/09	4	--	37.5 J	518	30.9	610	12	33.7	1,560	0.24	ND	16.8 J	ND	ND	ND	ND	ND	ND	0.111	ND	ND	0.4270
GTP38-9	12/22/09	9	--	ND	ND	9.3	65.4	0.38	12.8	44.2	0.024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP38A-1	02/09/10	1	--	118	205	25.8	556	1.9	30.1	666	0.075	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP38A-5	02/09/10	5	--	ND	ND	5.1	63.7	ND	11.4	9.8	ND	1.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP39-5	12/22/09	5	--	72.2	477	5.4	417	0.68	19.7	133	0.063	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP39-10-11	12/22/09	10 - 11	--	ND	ND	4.9	44.8	0.051	9.3	18.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP40-2	12/22/09	2	--	ND	ND	9.3	99.3	0.51	14.8	77	0.18	ND	ND	ND	ND	ND	ND	ND	ND	0.0548	ND	ND	0.3420
GTP40-9	12/22/09	9	--	ND	ND	12.6	49.6	0.26	5.6	11.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Yardley Office Area																							
DP13-6-7	12/28/09	9 - 10.5	--	ND	ND	7	38.7 J	0.075	8.8	10	ND	ND	ND	--	--	--	--	--	--	--	--	--	
DP14-2.5-3	12/28/09	2.5 - 3	--	ND	ND	5.8	145 J	0.06	13.8	15.5	ND	ND	ND	--	--	--	--	--	--	--	--	--	
DP14-4	12/28/09	6 - 6	--	ND	ND	5.1	68.1 J	ND	13.9	10.3	ND	ND	ND	--	--	--	--	--	--	--	--	--	
DP15-1-2	12/28/09	1.4 - 2.7	--	ND	ND	21.2	167 J	0.44	16.5	27.9	ND	ND	ND	--	--	--	--	--	--	--	--	--	
DP15-6-7	12/28/09	8.2 - 9.5	--	ND	ND	5.6	52.2 J	ND	10.4	9.6	ND	ND	ND	--	--	--	--	--	--	--	--	--	
DUPLICATE-4	12/28/09	8.2 - 9.5	--	ND	ND	9.9	51.9 J	0.08	11.7	11.8	ND	ND	ND	--	--	--	--	--	--	--	--	--	
DP16-1.5-2.5	12/28/09	1.7 - 2.9	--	ND	ND	7.4	157 J	0.098	11.3	33.8	ND	ND	ND	--	--	--	--	--	--	--	--	--	
DP16-4-5	12/28/09	5.6 - 5.8	--	ND	ND	6.3	59.9 J	ND	12.7	11.5	ND	ND	ND	--	--	--	--	--	--	--	--	--	
DP17-1.5-2.5	12/28/09	1.7 - 2.9	--	ND	ND	7.2	112 J	0.11	11.5	13.9	ND	ND	ND	--	--	--	--	--	--	--	--	--	
DP17-3-4	12/28/09	3.5 - 4.8	--	ND	ND	8.8	79.8 J	0.077	10.2	12.3	ND	ND	ND	--	--	--	--	--	--	--	--	--	
DP18-1-2	12/28/09	1.5 - 2.3	--	31.3 J	286 J	11	177 J	0.71	25.8	97	0.11 J	ND	ND	--	--	--	--	--	--	--	--	--	
DUPLICATE-3	12/28/09	1.5 - 2.3	--	39.8 J	362 J	16.1	202 J	0.89	27.3	129	0.085 J	ND	ND	--	--	--	--	--	--	--	--	--	
DP18-4	12/28/09	6	--	ND	ND	4.4	87.2 J	ND	9	8.4	ND	ND	ND	--	--	--	--	--	--	--	--	--	
DP19-2	12/28/09	2	--	ND	ND	10.9	181 J	0.36	20.2	81.2	0.051 J	ND	ND	--	--	--	--	--	--	--	--	--	
DP19-5	12/28/09	7.5	--	ND	ND	2.5	135 J	ND	11.4	7.1	ND	ND	ND	--	--	--	--	--	--	--	--	--	
DP19-7-8	12/28/09	13 - 15	--	ND	ND	11.2	45.6 J	0.053	9.5	8.1	ND	ND	ND	--	--	--	--	--	--	--	--	--	
DP20-2	12/28/09	2	--	28.9 J	222 J	16	159 J	1.3	29.6	160	0.14 J	ND	ND	--	--	--	--	--	--	--	--	--	
DP20-5-6	12/28/09	6.3 - 7.5	--	ND	ND	8.4	42.8 J	0.096	10.4	10.8	ND	ND	ND	--	--	--	--	--	--	--	--	--	
DP21-1.5-2.5	12/28/09	2 - 3.4	--	ND	ND	38.3	207 J	3.8	11.1	79.1	0.061 J	4	ND	--	--	--	--	--	--	--	--	--	
DP21-7	12/28/09	9.5 - 9.5	--	ND	ND	11.9	65.4 J	1.2	17.2	9.9	ND	1.9	ND	--	--	--	--	--	--	--	--	--	
DP22-1-2	12/28/09	2 - 4	--	ND	ND	9.7	130 J	0.11	12.6	52.6	0.041 J	ND	ND	--	--	--	--	--	--	--	--	--	
DP23-1-2	12/28/09	1.3 - 2.6	--	36.5	222	53.9	221 J	5.2	18.1	458	0.098 J	3.2	1.1 J	--	--	--	--	--	--	--	--	--	
DP23-3-4	12/28/09	3.9 - 5.2	--	ND	ND	10.8	134 J	1.8	13.8	14.2	ND	2.9	ND	--	--	--	--	--	--	--	--	--	
Ralston Lead Track																							
DP41-0.5-1.5	12/17/09	0.5 - 1.5	--	23.7	151	7.3	282	0.19	12.7	50.6 J	0.039	2.8	0.56	--	--	--	--	--	--	--	--	--	
DP41-4.5-5.5	12/17/09	4.5 - 6	--	ND	ND	6.4	128	ND	7.5	6.6 J	ND	0.82	0.43	--	--	--	--	--	--	--	--	--	
DP42-4-5	12/17/09	4 - 5	--	ND	ND	7	42.3	ND	8.7	5.4 J	ND	1.1	0.38	--	--	--	--	--	--	--	--	--	
DP42-7-7.5	12/17/09	7.5 - 8.3	--	ND	ND	6.5	59.3	ND	9.3	10.8 J	ND	1.4	0.45	--	--	--	--	--	--	--	--	--	
DP42-8	12/17/09	9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
DP43-0-1	12/16/09	0 - 1	--	ND	159	10.7	266	1.8	17.6	84	0.053	4	ND	--	--	--	--	--	--	--	--	--	
DP43-2-3.5	12/16/09	2.5 - 4.3	--	ND	ND	9.8	48.3	1.4	11.9	19.8	ND	3.4	ND	--	--	--	--	--	--	--	--	--	
DP44-0.5-1.5	12/16/09	0.5 - 1.5	--	ND	ND	9.3	139	1.4	11.1	15	ND	3.7	ND	--	--	--	--	--	--	--	--	--	
DP44-6-7	12/16/09	6 - 7.6	--	ND	ND	5.4	78.3	0.93	12.6	9.8	ND	2.4	ND	--	--	--	--	--	--	--	--	--	
DP44A-0-1	12/16/09	0 - 1.7	--	--	--	13.4	389	2.3	16.1	65.9	--	4.3	ND	--	--	--	--	--	--	--	--	--	
DP44A-2-3	12/16/09	3 - 3.5	--	ND	ND	9.7	72.4	1.4	13.8	11.3	ND	3.5	ND	--	--	--	--	--	--	--	--	--	
DP44A-9	12/16/09	9	--	ND	ND	11.7	141	1	20.8	15.4	ND	2.5	ND	--	--	--	--	--	--	--	--	--	

Sample Name	Sample Date	Depth [5] (feet)	TPH [2] (mg/kg)			Metals [3] (mg/kg)								Polychlorinated Biphenyls [4] (mg/kg)									
			Gasoline-range Petroleum Hydrocarbons	Diesel-range Petroleum Hydrocarbons	Oil-Range Petroleum Hydrocarbons	Arsenic	Barium	Cadmium	Total Chromium	Lead	Mercury	Selenium	Silver	PCB-aroclor 1016	PCB-aroclor 1221	PCB-aroclor 1232	PCB-aroclor 1242	PCB-aroclor 1248	PCB-aroclor 1254	PCB-aroclor 1260	PCB-aroclor 1262	PCB-aroclor 1268	Total PCB aroclors (Detects and NDs = Reporting Limit)
MTCA Method A Industrial Cleanup Criteria			100	2,000	2,000	20	NE	2	2,000	1,000	2	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	10
DP44B-3.8-4.6	12/17/09	4.1 - 5	--	ND	ND	**5.2**	**193**	ND	**14.6**	**8.2 J**	ND	**2.8**	**0.49**	--	--	--	--	--	--	--	--	--	
DP44B-5	12/17/09	5.5 - 5.5	--	--	--	--	--	--	--	--	--	--	-	--	--	--	--	--	--	--	--	--	
DP44B-6-7	12/17/09	6 - 7.3	--	ND	ND	**11.7**	**61.1**	**0.094**	**8.6**	**8.7 J**	ND	**1.7**	**0.5**	--	--	--	--	--	--	--	--	--	
TTX Facility																							
DP45 1.7-2.7	12/10/09	1.7 - 2.7	--	ND	ND	**6.5**	**142**	**0.15**	**12.1**	**15.3**	ND	ND	ND	--	--	--	--	--	--	--	--	--	
Former Building Labeled "Paint"																							
DP54-0-1	12/16/09	0 - 1.2	--	--	--	--	--	--	--	**146**	--	--	--	--	--	--	--	--	--	--	--	--	
DP54-1-2	12/16/09	1.2 - 2.4	--	--	--	--	--	--	--	**12.5**	--	--	--	--	--	--	--	--	--	--	--	--	
Former Gasoline UST																							
GTP55-1-2	01/04/10	1 - 2	ND	--	--	--	--	--	--	**15.9**	--	--	--	--	--	--	--	--	--	--	--	--	
DUPLICATE-5	01/04/10	1 - 2	ND	--	--	--	--	--	--	**14.9**	--	--	--	--	--	--	--	--	--	--	--	--	
GTP55-3-4	01/04/10	3 - 4	ND	ND	**117**	--	--	--	--	**76**	--	--	--	--	--	--	--	--	--	--	--	--	
GTP55-8-9	01/04/10	8 - 9	ND	--	--	--	--	--	--	**12.6**	--	--	--	--	--	--	--	--	--	--	--	--	
Fueling Area																							
MW23-60-62	12/03/09	60 - 62	--	**50.7**	ND	**10.6**	**41.5**	**0.066**	**9.6**	**9.3**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

[1]Analyses completed by Pace Analytical, Minneapolis, Mn.

[2]TPH analyzed by method NWTPH-Gx/8021 and NWTPH-Dx.

[3]RCRA 8 metals analyzed by Method EPA 6010 and EPA 7471.

[4]PCBs analyzed by Method EPA 8082.

[5]As a consequence of the sonic drilling method, where appropriate, the soil sample depths have been normalized to 100 percent recovery. Therefore, the depth indicated in the sample name may vary from the normalized sample depth shown. Refer to Appendix A of the attached report for rationale and discussion of the depth modifications.

ND = Compound was not detected at the Method Reporting Limit (MRL); mg/kg = milligrams per kilogram; J = estimated value greater than MRL; value is estimated typically because of sample dilution or QC recovery issues. See discussion in Appendix C; - = not tested;

NE = screening criteria not established; Bold indicates a value was detected greater than reporting limit; shading indicates value was detected exceeding Method B Industrial Cleanup level

Table B-2

Summary of Chemical Analytical Data in Soil [1]

Benzene, Ethybenzene, Toluene, Xylene (BETX) and Volatile Organic Compounds (VOCs)
BNSF Parkwater Facility Remedial Investigation
Spokane, Washington

			BETX [2] (mg/kg)						VOC [3] (mg/kg)											
Sample ID	**Sample Data**	**Sample Depth [4]**	**Benzene**	**Ethylbenzene**	**Toluene**	**Total Xylenes**	**Xylene, m-,p-**	**Xylene, o-**	**1,1,1,2-Tetrachloroethane**	**1,1,1-Trichloroethane**	**1,1,2,2-Tetrachloroethane**	**1,1,2-Trichloroethane**	**1,1-Dichloroethane**	**1,1-Dichlorothene**	**1,1-Dichloropropene**	**1,2,3-Trichlorobenzene**	**1,2,3-Trichloropropane**	**1,2,4-Trichlorobenzene**	**1,2,4-Trimethylbenzene**	**1,2-Dibromo-3-Chloropropane**
MTCA Method A Industrial Cleanup Criteria			0.03	6	7	9	NE	NE	NE	2	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Former Koch Materials Lease Area																				
GTP46-1	12/21/09	1	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
GTP46-11-12	12/21/09	11 - 12	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
GTP46-6-7	12/21/09	6 - 7	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
Diesel Shop and Materials Storage Building																				
DP01-1-2	12/15/09	1.7 - 3.3	ND	ND	**0.0874**	**0.204**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP01-5-6	12/15/09	5 - 7	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
DP01A-1-2	12/14/09	1.4 - 2.9	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP01A-11-12.5	12/14/09	14.2 - 15	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
DP02-1-2	12/14/09	1.5 - 3	ND	**0.247**	**0.183**	**0.725**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP02-6-7	12/14/09	6 - 7.4	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
DP03-1.5-2	12/14/09	1.5 - 2	ND	**2.08**	ND	**2.9**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP03-7.5-8.5	12/14/09	12.8 - 15	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
DP04-0.5-1.5	12/14/09	0.8 - 2.3	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP04-12-13	12/14/09	12.7 - 15	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
DP05-1.3-2.6	12/14/09	1.3 - 2.6	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP05-10.6	12/14/09	13.6	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
DP07-2-2.7	12/14/09	3 - 4	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP07-6-7	12/14/09	6 - 9	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
DP08-1.6-2.4	12/14/09	2.1 - 3.2	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP08-3.5-4.5	12/14/09	4.7 - 6	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
DP09-1-2	12/14/09	1 - 2	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP09-2.5-3	12/14/09	2.5 - 3	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
DP10-4-5.8	12/10/09	4 - 5.8	ND	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
DP10-5	12/10/09	5	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
DP11-4.2-4.85	12/10/09	4.2 - 4.85	ND	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
DP11-8-9	12/10/09	8 - 9	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
DP24-2-3	12/15/09	3.3 - 5	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP24-7-7.5	12/15/09	9 - 10	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
DP25-3-4	12/16/09	3.8 - 5	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
DP26-1-2	12/15/09	1 - 2	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
DP26-5-6	12/15/09	5 - 6.8	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP27-2.5-3.5	12/16/09	2.8 - 4	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
DP28-1.4-2	12/16/09	1.8 - 2.5	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
DP29-1-2	12/15/09	1.3 - 2.5	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
DP29-3-4	12/15/09	3.8 - 5	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP29-7	12/15/09	9	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP30-4	12/15/09	4.4	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
DP30-6-7	12/15/09	10 - 13	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Fruit Express (Generator Storage Area)																				
DP12-0.5-1.25	01/19/10	0.5 - 1.25	ND	**0.0819**	**0.53**	**0.299**	**0.182**	**0.117**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.14**	ND
DP12-4-5.8	01/19/10	4 - 5.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP32-1-2	01/04/10	1 - 2	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP33-1-2	01/04/10	1 - 2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

			BETX [2] (mg/kg)						VOC [3] (mg/kg)											
Sample ID	Sample Data	Sample Depth [4]	Benzene	Ethylbenzene	Toluene	Total Xylenes	Xylene, m-,p-	Xylene, o-	1,1,1,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichlorothene	1,1-Dichloropropene	1,2,3-Trichlorobenzene	1,2,3-Trichloropropane	1,2,4-Trichlorobenzene	1,2,4-Trimethylbenzene	1,2-Dibromo-3-Chloropropane
MTCA Method A Industrial Cleanup Criteria			0.03	6	7	9	NE	NE	NE	2	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
GTP33-3-4	01/04/10	3 - 4	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP34-1-2	01/04/10	1 - 2	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP34-4	01/04/10	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP35-1-2	01/04/10	1 - 2	**0.003 J**	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP35-3-4	01/04/10	3 - 4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP35B-1.5	01/04/10	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP35B-3	01/04/10	3	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dismantling Spur and East and West Debris and Soil Deposit Areas																				
Ralston Lead Track																				
DP41-0.5-1.5	12/17/09	0.5 - 1.5	ND	ND	**0.108**	**0.206**	**0.112**	**0.0946**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.102**	ND
DP41-4.5-5.5	12/17/09	4.5 - 6	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP42-4-5	12/17/09	4 - 5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP42-7-7.5	12/17/09	7.5 - 8.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP42-8	12/17/09	9	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP43-0-1	12/16/09	0 - 1	ND	ND	**0.164**	**0.143**	**0.0685**	**0.0744**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.123**	ND
DP43-2-3.5	12/16/09	2.5 - 4.3	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP44-0.5-1.5	12/16/09	0.5 - 1.5	ND	ND	ND	ND	ND	**0.0328**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP44-6-7	12/16/09	6 - 7.6	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP44A-2-3	12/16/09	3 - 3.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP44A-9	12/16/09	9	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP44B-3.8-4.6	12/17/09	4.1 - 5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP44B-5	12/17/09	5.5	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP44B-6-7	12/17/09	6 - 7.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Former Building Labeled "Paint"																				
DP54-0-1	12/16/09	0 - 1.2	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP54-1-2	12/16/09	1.2 - 2.4	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP55-1-2	01/04/10	1 - 2	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
Former Gasoline UST																				
DUPLICATE-5	01/04/10	1 - 2	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
GTP55-3-4	01/04/10	3 - 4	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
GTP55-8-9	01/04/10	8 - 9	ND	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
Fueling Area																				
MW23560-62	12/03/09	60 - 62	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

[1]Analyses completed by Pace Analytical, Minneapolis, Mn.

[2]BETX analyzed by method NWTPH-Gx/8021.

[3]VOCs analyzed by EPA 8260.

[4]As a consequence of the sonic drilling method, where appropriate, the soil sample depths have been normalized to 100 percent recovery. Therefore, the depth indicated in the sample name may vary from the normalized sample depth shown.

Refer to Appendix A of the attached report for rationale and discussion of the depth modifications.

ND = Compound was not detected at the Method Reporting Limit (MRL); mg/kg - milligrams per kilogram; J = estimated value greater than MRL; value is estimated typically because of sample dilution of QC recovery issues. See discussion in Appendix C; - = not tested; NE = screeing criteria not established;
Bold indicates a value was detected greater than reporting limit; shading indicates value was detected exceeding Method A Industrial Cleanup level.

VOC (mg/kg)																	
Sample ID	**Sample Data**	**Sample Depth [4]**	**1,2-Dichloro benzene**	**1,2-Dichloro ethane**	**1,2-Dichloro ethene**	**1,2-Dichloro propane**	**1,3,5-Trimethyl benzene**	**1,3-Dichloro benzene**	**1,3-Dichloro propane**	**1,4-Dichloro benzene**	**2,2-Dichloro propane**	**2-Butanone**	**2-Chlorotoluene**	**4-Chlorotoluene**	**4-Methyl-2-Pentanone (Methyl isobutyl ketone)**	**Acetone**	**Allyl Chloride**
MTCA Method A Industrial Cleanup Criteria			NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Former Koch Materials Lease Area																	
GTP46-1	12/21/09	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GTP46-11-12	12/21/09	11 - 12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GTP46-6-7	12/21/09	6 - 7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diesel Shop and Materials Storage Building																	
DP01-1-2	12/15/09	1.7 - 3.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP01-5-6	12/15/09	5 - 7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP01A-1-2	12/14/09	1.4 - 2.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP01A-11-12.5	12/14/09	14.2 - 15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP02-1-2	12/14/09	1.5 - 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP02-6-7	12/14/09	6 - 7.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP03-1.5-2	12/14/09	1.5 - 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP03-7.5-8.5	12/14/09	12.8 - 15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP04-0.5-1.5	12/14/09	0.8 - 2.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP04-12-13	12/14/09	12.7 - 15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP05-1.3-2.6	12/14/09	1.3 - 2.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP05-10.6	12/14/09	13.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP07-2-2.7	12/14/09	3 - 4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP07-6-7	12/14/09	6 - 9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP08-1.6-2.4	12/14/09	2.1 - 3.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP08-3.5-4.5	12/14/09	4.7 - 6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP09-1-2	12/14/09	1 - 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP09-2.5-3	12/14/09	2.5 - 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP10-4-5.8	12/10/09	4 - 5.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP10-5	12/10/09	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP11-4.2-4.85	12/10/09	4.2 - 4.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP11-8-9	12/10/09	8 - 9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP24-2-3	12/15/09	3.3 - 5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP24-7-7.5	12/15/09	9 - 10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP25-3-4	12/16/09	3.8 - 5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP26-1-2	12/15/09	1 - 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP26-5-6	12/15/09	5 - 6.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP27-2.5-3.5	12/16/09	2.8 - 4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP28-1.4-2	12/16/09	1.8 - 2.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP29-1-2	12/15/09	1.3 - 2.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP29-3-4	12/15/09	3.8 - 5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP29-7	12/15/09	9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP30-4	12/15/09	4.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP30-6-7	12/15/09	10 - 13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Fruit Express (Generator Storage Area)																	
DP12-0.5-1.25	01/19/10	0.5 - 1.25	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	--	ND	ND	ND	ND
DP12-4-5.8	01/19/10	4 - 5.8	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	--	ND	ND	ND	ND
GTP32-1-2	01/04/10	1 - 2	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP33-1-2	01/04/10	1 - 2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND	ND	ND	ND

VOC (mg/kg)																	
Sample ID	Sample Data	Sample Depth [4]	1,2-Dichloro benzene	1,2-Dichloro ethane	1,2-Dichloro ethene	1,2-Dichloro propane	1,3,5-Trimethyl benzene	1,3-Dichloro benzene	1,3-Dichloro propane	1,4-Dichloro benzene	2,2-Dichloro propane	2-Butanone	2-Chlorotoluene	4-Chlorotoluene	4-Methyl-2-Pentanone (Methyl isobutyl ketone)	Acetone	Allyl Chloride
MTCA Method A Industrial Cleanup Criteria			NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
GTP33-3-4	01/04/10	3 - 4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.0046 J**	ND
GTP34-1-2	01/04/10	1 - 2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP34-4	01/04/10	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND	ND	ND	ND
GTP35-1-2	01/04/10	1 - 2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP35-3-4	01/04/10	3 - 4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND	ND	ND	ND
GTP35B-1.5	01/04/10	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND	ND	ND	ND
GTP35B-3	01/04/10	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dismantling Spur and East and West Debris and Soil Deposit Areas																	
Ralston Lead Track																	
DP41-0.5-1.5	12/17/09	0.5 - 1.5	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	--	ND	0.0183 U	ND	ND
DP41-4.5-5.5	12/17/09	4.5 - 6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND	0.0013 U	**0.0255**	ND
DP42-4-5	12/17/09	4 - 5	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	--	ND	0.0165 U	ND	ND
DP42-7-7.5	12/17/09	7.5 - 8.3	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	--	ND	0.0162 U	ND	ND
DP42-8	12/17/09	9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND	0.0013 U	ND	ND
DP43-0-1	12/16/09	0 - 1	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	--	ND	0.0177 U	ND	ND
DP43-2-3.5	12/16/09	2.5 - 4.3	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0014 U	**0.0281**	ND
DP44-0.5-1.5	12/16/09	0.5 - 1.5	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	--	ND	0.0181 U	ND	ND
DP44-6-7	12/16/09	6 - 7.6	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0013 U	ND	ND
DP44A-2-3	12/16/09	3 - 3.5	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	--	ND	0.0171 U	ND	ND
DP44A-9	12/16/09	9	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0014 U	ND	ND
DP44B-3.8-4.6	12/17/09	4.1 - 5	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	--	ND	0.0161 U	ND	ND
DP44B-5	12/17/09	5.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND	0.0013 U	ND	ND
DP44B-6-7	12/17/09	6 - 7.3	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	--	ND	0.017 U	ND	ND
Former Building Labeled "Paint"																	
DP54-0-1	12/16/09	0 - 1.2	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP54-1-2	12/16/09	1.2 - 2.4	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP55-1-2	01/04/10	1 - 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DUPLICATE-5	01/04/10	1 - 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GTP55-3-4	01/04/10	3 - 4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GTP55-8-9	01/04/10	8 - 9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fueling Area																	
MW23560-62	12/03/09	60 - 62	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

VOC (mg/kg)																				
Sample ID	**Sample Data**	**Sample Depth [4]**	**Bromo benzene**	**Bromo chloro methane**	**Bromo form**	**Bromo methane**	**Carbon Tetrachloride**	**CFC-113**	**Chloro-benzene**	**Chloroethane**	**Chloroform**	**Chloro-methane**	**Cis-1,2-Dichloro-ethene**	**Cis-1,3-Dichloro-propene**	**Dibromo-chloro methane**	**Dibromo-methane**	**Dichloro-bromo methane**	**Dichloro-difluoro methane (CFC-12)**	**Dioxane, 1,4-**	**Ethyl Ether**
MTCA Method A Industrial Cleanup Criteria			NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Former Koch Materials Lease Area																				
GTP46-1	12/21/09	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GTP46-11-12	12/21/09	11 - 12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GTP46-6-7	12/21/09	6 - 7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diesel Shop and Materials Storage Building																				
DP01-1-2	12/15/09	1.7 - 3.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP01-5-6	12/15/09	5 - 7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP01A-1-2	12/14/09	1.4 - 2.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP01A-11-12.5	12/14/09	14.2 - 15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP02-1-2	12/14/09	1.5 - 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP02-6-7	12/14/09	6 - 7.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP03-1.5-2	12/14/09	1.5 - 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP03-7.5-8.5	12/14/09	12.8 - 15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP04-0.5-1.5	12/14/09	0.8 - 2.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP04-12-13	12/14/09	12.7 - 15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP05-1.3-2.6	12/14/09	1.3 - 2.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP05-10.6	12/14/09	13.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP07-2-2.7	12/14/09	3 - 4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP07-6-7	12/14/09	6 - 9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP08-1.6-2.4	12/14/09	2.1 - 3.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP08-3.5-4.5	12/14/09	4.7 - 6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP09-1-2	12/14/09	1 - 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP09-2.5-3	12/14/09	2.5 - 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP10-4-5.8	12/10/09	4 - 5.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP10-5	12/10/09	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP11-4.2-4.85	12/10/09	4.2 - 4.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP11-8-9	12/10/09	8 - 9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP24-2-3	12/15/09	3.3 - 5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP24-7-7.5	12/15/09	9 - 10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP25-3-4	12/16/09	3.8 - 5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP26-1-2	12/15/09	1 - 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP26-5-6	12/15/09	5 - 6.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP27-2.5-3.5	12/16/09	2.8 - 4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP28-1.4-2	12/16/09	1.8 - 2.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP29-1-2	12/15/09	1.3 - 2.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP29-3-4	12/15/09	3.8 - 5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP29-7	12/15/09	9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP30-4	12/15/09	4.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP30-6-7	12/15/09	10 - 13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Fruit Express (Generator Storage Area)																				
DP12-0.5-1.25	01/19/10	0.5 - 1.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
DP12-4-5.8	01/19/10	4 - 5.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
GTP32-1-2	01/04/10	1 - 2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
GTP33-1-2	01/04/10	1 - 2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND

VOC (mg/kg)																				
Sample ID	**Sample Data**	**Sample Depth [4]**	**Bromo benzene**	**Bromo chloro methane**	**Bromo form**	**Bromo methane**	**Carbon Tetrachloride**	**CFC-113**	**Chloro-benzene**	**Chloroethane**	**Chloroform**	**Chloro-methane**	**Cis-1,2-Dichloro-ethene**	**Cis-1,3-Dichloro-propene**	**Dibromo-chloro methane**	**Dibromo-methane**	**Dichloro-bromo methane**	**Dichloro-difluoro methane (CFC-12)**	**Dioxane, 1,4-**	**Ethyl Ether**
MTCA Method A Industrial Cleanup Criteria			NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
GTP33-3-4	01/04/10	3 - 4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
GTP34-1-2	01/04/10	1 - 2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
GTP34-4	01/04/10	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
GTP35-1-2	01/04/10	1 - 2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
GTP35-3-4	01/04/10	3 - 4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
GTP35B-1.5	01/04/10	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
GTP35B-3	01/04/10	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
Dismantling Spur and East and West Debris and Soil Deposit Areas																				
Ralston Lead Track																				
DP41-0.5-1.5	12/17/09	0.5 - 1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
DP41-4.5-5.5	12/17/09	4.5 - 6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP42-4-5	12/17/09	4 - 5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
DP42-7-7.5	12/17/09	7.5 - 8.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
DP42-8	12/17/09	9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP43-0-1	12/16/09	0 - 1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
DP43-2-3.5	12/16/09	2.5 - 4.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
DP44-0.5-1.5	12/16/09	0.5 - 1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
DP44-6-7	12/16/09	6 - 7.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
DP44A-2-3	12/16/09	3 - 3.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
DP44A-9	12/16/09	9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
DP44B-3.8-4.6	12/17/09	4.1 - 5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
DP44B-5	12/17/09	5.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP44B-6-7	12/17/09	6 - 7.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
Former Building Labeled "Paint"																				
DP54-0-1	12/16/09	0 - 1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
DP54-1-2	12/16/09	1.2 - 2.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
GTP55-1-2	01/04/10	1 - 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DUPLICATE-5	01/04/10	1 - 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GTP55-3-4	01/04/10	3 - 4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GTP55-8-9	01/04/10	8 - 9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fueling Area																				
MW23560-62	12/03/09	60 - 62	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND

VOC (mg/kg)																						
Sample ID	**Sample Data**	**Sample Depth [4]**	**Ethylene dibromide**	**HCFC-21**	**Hexachloro butadiene**	**Isopropyl benzene (Cumene)**	**Methyl t-butyl ether**	**Methylene Chloride**	**Naphthalene**	**n-Butyl benzene**	**n-Propyl benzene**	**p-Isopropyl toluene**	**Sec-Butyl benzene**	**Styrene**	**Tert-Butyl benzene**	**Tetra-chloro ethene**	**Tetra-hydrofuran**	**Trans-1,2-Dichloro ethene**	**Trans-1,3-Dichloro propene**	**Trichloro-ethene**	**Trichloro-fluoromethane (CFC-11)**	**Vinyl Chloride**
MTCA Method A Industrial Cleanup Criteria			0.005	NE	NE	NE	0.1	0.02	5	NE	NE	NE	NE	NE	NE	0.05	NE	NE	NE	0.03	NE	NE
Former Koch Materials Lease Area																						
GTP46-1	12/21/09	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GTP46-11-12	12/21/09	11 - 12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GTP46-6-7	12/21/09	6 - 7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diesel Shop and Materials Storage Building																						
DP01-1-2	12/15/09	1.7 - 3.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP01-5-6	12/15/09	5 - 7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP01A-1-2	12/14/09	1.4 - 2.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP01A-11-12.5	12/14/09	14.2 - 15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP02-1-2	12/14/09	1.5 - 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP02-6-7	12/14/09	6 - 7.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP03-1.5-2	12/14/09	1.5 - 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP03-7.5-8.5	12/14/09	12.8 - 15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP04-0.5-1.5	12/14/09	0.8 - 2.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP04-12-13	12/14/09	12.7 - 15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP05-1.3-2.6	12/14/09	1.3 - 2.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP05-10.6	12/14/09	13.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP07-2-2.7	12/14/09	3 - 4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP07-6-7	12/14/09	6 - 9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP08-1.6-2.4	12/14/09	2.1 - 3.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP08-3.5-4.5	12/14/09	4.7 - 6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP09-1-2	12/14/09	1 - 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP09-2.5-3	12/14/09	2.5 - 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP10-4-5.8	12/10/09	4 - 5.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP10-5	12/10/09	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP11-4.2-4.85	12/10/09	4.2 - 4.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP11-8-9	12/10/09	8 - 9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP24-2-3	12/15/09	3.3 - 5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP24-7-7.5	12/15/09	9 - 10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP25-3-4	12/16/09	3.8 - 5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP26-1-2	12/15/09	1 - 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP26-5-6	12/15/09	5 - 6.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP27-2.5-3.5	12/16/09	2.8 - 4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP28-1.4-2	12/16/09	1.8 - 2.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP29-1-2	12/15/09	1.3 - 2.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP29-3-4	12/15/09	3.8 - 5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP29-7	12/15/09	9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP30-4	12/15/09	4.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DP30-6-7	12/15/09	10 - 13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Fruit Express (Generator Storage Area)																						
DP12-0.5-1.25	01/19/10	0.5 - 1.25	ND	ND	ND	ND	ND	ND	ND	**0.0809**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP12-4-5.8	01/19/10	4 - 5.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP32-1-2	01/04/10	1 - 2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP33-1-2	01/04/10	1 - 2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

VOC (mg/kg)																						
Sample ID	**Sample Data**	**Sample Depth [4]**	**Ethylene dibromide**	**HCFC-21**	**Hexachloro butadiene**	**Isopropyl benzene (Cumene)**	**Methyl t-butyl ether**	**Methylene Chloride**	**Naphthalene**	**n-Butyl benzene**	**n-Propyl benzene**	**p-Isopropyl toluene**	**Sec-Butyl benzene**	**Styrene**	**Tert-Butyl benzene**	**Tetra-chloro ethene**	**Tetra-hydrofuran**	**Trans-1,2-Dichloro ethene**	**Trans-1,3-Dichloro propene**	**Trichloro-ethene**	**Trichloro-fluoromethane (CFC-11)**	**Vinyl Chloride**
MTCA Method A Industrial Cleanup Criteria			0.005	NE	NE	NE	0.1	0.02	5	NE	NE	NE	NE	NE	NE	0.05	NE	NE	NE	0.03	NE	NE
GTP33-3-4	01/04/10	3 - 4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP34-1-2	01/04/10	1 - 2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP34-4	01/04/10	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP35-1-2	01/04/10	1 - 2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP35-3-4	01/04/10	3 - 4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP35B-1.5	01/04/10	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.29**	ND
GTP35B-3	01/04/10	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dismantling Spur and East and West Debris and Soil Deposit Areas																						
Ralston Lead Track																						
DP41-0.5-1.5	12/17/09	0.5 - 1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP41-4.5-5.5	12/17/09	4.5 - 6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP42-4-5	12/17/09	4 - 5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP42-7-7.5	12/17/09	7.5 - 8.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP42-8	12/17/09	9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP43-0-1	12/16/09	0 - 1	ND	ND	ND	ND	ND	**0.18**	ND	ND	**0.0947**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP43-2-3.5	12/16/09	2.5 - 4.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP44-0.5-1.5	12/16/09	0.5 - 1.5	ND	ND	ND	ND	ND	**0.0738**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP44-6-7	12/16/09	6 - 7.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP44A-2-3	12/16/09	3 - 3.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP44A-9	12/16/09	9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP44B-3.8-4.6	12/17/09	4.1 - 5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP44B-5	12/17/09	5.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP44B-6-7	12/17/09	6 - 7.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Former Building Labeled "Paint"																						
DP54-0-1	12/16/09	0 - 1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP54-1-2	12/16/09	1.2 - 2.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP55-1-2	01/04/10	1 - 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DUPLICATE-5	01/04/10	1 - 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GTP55-3-4	01/04/10	3 - 4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GTP55-8-9	01/04/10	8 - 9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fueling Area																						
MW23560-62	12/03/09	60 - 62	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table B-3

Summary of Chemical Analytical Data in Soil [1]

Polycyclic Aromatic Hydrocarbons (PAHs)
BNSF Parkwater Facility Remedial Investigation
Spokane, Washington

				PAHs [2] (mg/kg)															
Sample ID	**Sample Data**	**Sample Depth [3]**	**TEQ [4] (Detects and Non-Detects = 1/2 Reporting Limit)**	**Acenaphthene**	**Acenaphthylene**	**Anthracene**	**Benzo(a) anthracene**	**Benzo(a) pyrene**	**Benzo(b) fluoranthene**	**Benzo(ghi) perylene**	**Benzo(k) fluoranthene**	**Chrysene**	**Dibenzo(a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**
MTCA Method A Industrial Cleanup Criteria			2	NE	NE	NE	NE	2	NE	NE	NE	NE	NE	NE	NE	NE	5	NE	NE
Former Koch Materials Lease Area																			
GTP46-1	12/21/09	1	4.88	8.51	ND	ND	ND	ND	9.07	ND	ND	10.9	ND	ND	8.53	ND	ND	31.6	9.47
GTP46-11-12	12/21/09	11 - 12	0.0090	0.0114	ND	ND	ND	ND	0.014	ND	ND	0.0137	ND	ND	0.0131	ND	ND	0.0426	0.0124
GTP46-6-7	12/21/09	6 - 7	0.034	0.0455	0.0111	0.0158	0.0296	0.0269	0.0242	0.0109	ND	0.058	ND	0.0139	0.0705	ND	0.0126	0.25	0.0534
GTP47-1	12/22/09	1	0.658	0.899	0.228	0.25	0.56	0.501	0.558	ND	ND	1.16	ND	0.335	1.1	ND	0.528	3.86	0.987
GTP47-11	12/22/09	11	0.0088	ND	ND	ND	ND	ND	0.0129	0.0138	ND	ND	ND	ND	ND	ND	ND	0.0125	ND
GTP47-4	12/22/09	4	0.0081	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DUPLICATE-2	12/22/09	4	0.0081	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP48-1	12/21/09	1	0.2058	ND	ND	ND	0.0912	ND	ND	ND	ND	0.211	ND	0.0815	ND	ND	ND	ND	0.185
GTP48-4-5	12/21/09	4 - 5	0.0083	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP49-1	12/21/09	1	1.030	0.279	ND	0.649	0.921	0.742	0.953	0.378	0.44	0.768	ND	1.96	ND	0.375	ND	2.25	2.03
GTP49-3-4	12/21/09	3 - 4	0.0268	ND	ND	ND	0.0252	0.0184	0.0273	0.013	0.0113	0.0196	ND	0.0343	ND	0.0126	ND	0.0217	0.0342
GTP50-1	12/18/09	1	0.2006	ND	ND	ND	0.0697	ND	ND	ND	ND	0.178	ND	0.0988	ND	ND	ND	0.0728	0.198
GTP50-5-6	12/18/09	5 - 6	0.008	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP51-1-2	12/18/09	1 - 2	0.967	ND	ND	ND	0.718	0.7	0.926	0.414	0.399	0.653	ND	1.28	ND	0.439	ND	0.545	1.36
GTP51-4	12/18/09	4	0.0082	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DUPLICATE-1	12/18/09	4	0.0302	ND	ND	0.0182	0.0286	0.0211	0.0282	0.016	0.0115	0.0225	ND	0.0611 J	ND	0.0147	ND	0.0729 J	0.0622 J
GTP52-1	12/18/09	1	0.4073	ND	ND	ND	ND	0.298	0.491	0.329	ND	0.376	ND	0.302	ND	ND	ND	0.114	0.445
GTP52-3-4	12/18/09	3 - 4	0.0082	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP53-1	12/18/09	1	1.26	0.217 J	ND	0.401 J	1.83	ND	2.44	ND	ND	1.6	ND	3.38	0.157 J	ND	ND	2.09 J	3.13
GTP53-3-5	12/18/09	3 - 5	0.0082	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diesel Shop and Materials Storage Building																			
DP01-1-2	12/15/09	1.7 - 3.3	0.0477	ND	ND	ND	ND	ND	0.0841	ND	ND	ND	ND	ND	ND	ND	0.101	0.15	0.0805
DP01-5-6	12/15/09	5 - 7	0.0418	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP01A-1-2	12/14/09	1.4 - 2.9	0.502	0.223	0.131	0.264	0.393	0.331	0.723	0.285	0.25	0.501	ND	1.1	ND	0.23	0.189	0.432	2.12
DP01A-2-3	12/14/09	2.9 - 5	0.0079	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP02-1-2	12/14/09	1.5 - 3	0.228	1.49	0.448	ND	0.252	0.128	0.46	ND	ND	0.322	ND	0.863	3.06	0.136	2.61	7.49	0.916
DP02-6-7	12/14/09	6 - 7.4	0.0082	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP03-1.5-2	12/14/09	1.5 - 2	0.542	5.94	1.14	ND	ND	ND	0.966	ND	ND	0.761	ND	3.34	12	ND	34.5	41.6	3.53
DP03-3-4	12/14/09	3 - 5.2	0.0800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP04-0.5-1.5	12/14/09	0.8 - 2.3	0.0908	ND	ND	0.115	ND	ND	0.147	0.237	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP04-3-4	12/14/09	4.5 - 6	0.0077	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP05-1.3-2.6	12/14/09	1.3 - 2.6	0.0085	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP05-8	12/14/09	9.6	0.0079	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP07-2-2.7	12/14/09	3 - 4	0.423	3.95	1.17	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.84	ND	5.4	6.86	ND
DP07-3.2-4	12/14/09	4.9 - 6	0.0079	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP08-1.6-2.4	12/14/09	2.1 - 3.2	0.459	1.34	ND	0.625	ND	ND	0.681	ND	ND	ND	ND	2.5	1.85	ND	0.714	4.37	2.59
DP08-3.5-4.5	12/14/09	4.7 - 6	0.0808	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP09-1-2	12/14/09	1 - 2	2.524	0.483	0.273	1.13	1.94	1.88	2.12	0.778	1.18	1.88	0.26	4.44	0.39	0.756	0.568	5.26	5.38
DP09-2.5-3	12/14/09	2.5 - 3	0.0079	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP10-4-5.8	12/10/09	4 - 5.8	0.0090	ND	ND	ND	ND	ND	0.0127	ND	ND	ND	ND	ND	ND	ND	ND	0.0142	ND

				PAHs [2] (mg/kg)															
Sample ID	**Sample Data**	**Sample Depth [3]**	**TEQ [4] (Detects and Non-Detects = 1/2 Reporting Limit)**	**Acenaphthene**	**Acenaphthylene**	**Anthracene**	**Benzo(a) anthracene**	**Benzo(a) pyrene**	**Benzo(b) fluoranthene**	**Benzo(ghi) perylene**	**Benzo(k) fluoranthene**	**Chrysene**	**Dibenzo(a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**
MTCA Method A Industrial Cleanup Criteria			2	NE	NE	NE	NE	2	NE	NE	NE	NE	NE	NE	NE	NE	5	NE	NE
DP10-8-9	12/10/09	8 - 9	**0.0079**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP11-4.2-4.85	12/10/09	4.2 - 4.85	**0.008**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP11-8-8.4	12/10/09	8 - 8.4	**0.0079**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP24-0.5-1.5	12/15/09	0.8 - 2.5	**0.0587**	ND	ND	ND	ND	ND	**0.143**	**0.0645**	ND	**0.0776**	ND	**0.0919**	ND	**0.0632**	**0.0617**	**0.0747**	**0.0855**
DP24-2-3	12/15/09	3.3 - 5	**0.0080**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP24-7-7.5	12/15/09	9 - 10	**0.0079**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP25-3-4	12/16/09	3.8 - 5	**0.0079**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP25-5-6	12/16/09	5 - 6.5	**0.0087**	ND	ND	ND	ND	ND	**0.0129**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP26-1-2	12/15/09	1 - 2	**0.0085**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP26-5-6	12/15/09	5 - 6.8	**0.0078**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP27-2.5-3.5	12/16/09	2.8 - 4	**0.0178**	ND	ND	ND	**0.0127**	**0.0122**	**0.0252**	ND	ND	**0.0133**	ND	**0.0211**	ND	ND	ND	**0.0152**	**0.0176**
DP27-5-6	12/16/09	5 - 8.6	**0.0089**	ND	ND	ND	ND	ND	**0.0168**	ND	ND	ND	ND	**0.0137**	ND	ND	ND	**0.0123**	**0.0129**
DP28-1.4-2	12/16/09	1.8 - 2.5	**0.0099**	ND	ND	ND	ND	ND	**0.0213**	ND	ND	ND	ND	**0.0133**	ND	ND	ND	**0.0128**	ND
DP28-5-6	12/16/09	5 - 8.5	**0.0094**	ND	ND	ND	ND	ND	**0.0206**	ND	ND	ND	ND	**0.0113**	ND	ND	ND	ND	ND
DP29-1-2	12/15/09	1.3 - 2.5	**0.008**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP29-3-4	12/15/09	3.8 - 5	**0.0081**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP29-7	12/15/09	9	**0.0079**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP30-1-2	12/15/09	1.1 - 2.2	**0.0078**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP30-4	12/15/09	4.4	**0.0078**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP30-6-7	12/15/09	10 - 13	**0.0078**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Western Fruit Express (Generator Storage Area)																			
DP12-0.5-1.25	01/19/10	0.5 - 1.25	**0.0269**	ND	ND	**0.0134**	**0.0176**	**0.0165**	**0.0615**	**0.0121**	ND	**0.026**	ND	**0.0361**	ND	**0.0113**	**0.012**	**0.0252**	**0.0277**
DP12-4-5.8	01/19/10	4 - 5.8	**0.0080**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP12-8-9.5	01/19/10	8 - 9.5	**0.0081**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP32-1-2	01/04/10	1 - 2	**0.1123**	ND	**0.0154**	**0.0251**	**0.0558**	**0.0761**	**0.169**	**0.0486**	**0.0701**	**0.0983**	**0.0172**	**0.113**	ND	**0.0403**	**0.0423**	**0.0851**	**0.109**
GTP32-3-4	01/04/10	3 - 4	**0.0086**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP33-1-2	01/04/10	1 - 2	**0.0434**	ND	ND	ND	**0.0267**	**0.0283**	**0.0694**	**0.0181**	**0.0276**	**0.0443**	ND	**0.0416**	ND	**0.0162**	**0.0215**	**0.04**	**0.0449**
GTP33-3-4	01/04/10	3 - 4	**0.008**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP34-1-2	01/04/10	1 - 2	**0.1106**	ND	ND	ND	**0.0569**	**0.081**	**0.125**	**0.0453**	**0.0499**	**0.0633**	**0.0209**	**0.0752**	ND	**0.0365**	**0.049**	**0.0615**	**0.0807**
GTP34-4	01/04/10	4	**0.0086**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DUPLICATE-6	01/04/10	4	**0.0085**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP35-1-2	01/04/10	1 - 2	**0.4842**	ND	ND	ND	**0.202**	**0.377**	**0.358**	**0.271**	**0.147**	**0.199**	**0.166**	**0.183**	ND	**0.179**	ND	**0.0842**	**0.202**
GTP35-3-4	01/04/10	3 - 4	**0.0087**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GTP35B-1.5	01/04/10	1.5	**0.0528**	ND	ND	ND	**0.0337**	**0.0358**	**0.0852**	**0.0183**	**0.0223**	**0.0482**	ND	**0.048**	ND	**0.0179**	**0.0356**	**0.0555**	**0.0573**
GTP35B-3	01/04/10	3	**0.008**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ralston Lead Track																			
DP41-0.5-1.5	12/17/09	0.5 - 1.5	**0.567**	ND	ND	ND	**0.376**	**0.41**	**0.584**	**0.212**	**0.279**	**0.353**	ND	**0.495**	ND	**0.239**	ND	**0.259**	**0.433**
DP41-4.5-5.5	12/17/09	4.5 - 6	**0.0077**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP42-4-5	12/17/09	4 - 5	**0.0084**	ND	ND	ND	ND	ND	**0.0105**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP42-7-7.5	12/17/09	7.5 - 8.3	**0.0078**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP43-0-1	12/16/09	0 - 1	**0.105**	ND	ND	ND	ND	ND	**0.249**	ND	ND	**0.144**	ND	**0.143**	ND	ND	ND	ND	**0.131**
DP43-2-3.5	12/16/09	2.5 - 4.3	**0.0081**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP44-0.5-1.5	12/16/09	0.5 - 1.5	**0.0383**	ND	ND	ND	**0.0271**	**0.0264**	**0.0499**	**0.0149**	**0.0175**	**0.0295**	ND	**0.0365**	ND	**0.0162**	ND	**0.0167**	**0.032**
DP44-6-7	12/16/09	6 - 7.6	**0.0077**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP44A-2-3	12/16/09	3 - 3.5	**0.0082**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP44A-9	12/16/09	9	**0.008**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP44B-3.8-4.6	12/17/09	4.1 - 5	**0.0085**	ND	ND	ND	ND	ND	**0.0135**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DP44B-6-7	12/17/09	6 - 7.3	**0.0082**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

				PAHs [2] (mg/kg)															
Sample ID	**Sample Data**	**Sample Depth [3]**	**TEQ [4] (Detects and Non-Detects = 1/2 Reporting Limit)**	**Acenaphthene**	**Acenaphthylene**	**Anthracene**	**Benzo(a) anthracene**	**Benzo(a) pyrene**	**Benzo(b) fluoranthene**	**Benzo(ghi) perylene**	**Benzo(k) fluoranthene**	**Chrysene**	**Dibenzo(a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**
MTCA Method A Industrial Cleanup Criteria			2	NE	NE	NE	NE	2	NE	NE	NE	NE	NE	NE	NE	NE	5	NE	NE
Fueling Area																			
MW23-60-62	12/03/09	60 - 62	**0.0080**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.0137**	ND	ND	ND	ND	**0.0147**

Notes:

[1]Analyses completed by Pace Analytical, Minneapolis, Mn.

[2]PAHs analyzed by method EPA 8270 by SIM.

[3]As a consequence of the sonic drilling method, where appropriate, the soil sample depths have been normalized to 100 percent recovery. Therefore, the depth indicated in the sample name may vary from the normalized sample depth shown. Refer to Appendix A of the attached report for rationale and discussion of the depth modifications.

[4]TEQ = Toxicity Equivalency Quotient. TEQs were calculated using the guidelines TEQs were calculated using the guidelines "Evaluating the Toxicity and Assessing the Carcinogenic Risk of Environmental Mixtures Using Toxicity Equivalency Factors" by Washington State Department of Ecology.

ND = Compound was not detected at the Method Reporting Limit (MRL); mg/kg - milligrams per kilogram; J = estimated value greater than MRL; value is estimated typically because of sample dilution of QC recovery issues. See discussion in Appendix C; - = not tested; NE = screeing criteria not established;
Bold indicates a value was detected greater than reporting limit.; shading indicates value was detected exceeding Method A Industrial Cleanup level.

https://projects.geoengineers.com/sites/0050611712/Final/BNSF RI Report Final Draft/[050611712_AppendixTables.xlsx]PAHs

1517
1518

APPENDIX C
Data Quality Assessment Summary

APPENDIX C
DATA QUALITY ASSESSMENT SUMMARY

Gasoline-Range Petroleum Hydrocarbons by Northwest Method NWTPH-Gx
Diesel- and Motor Oil-Range Petroleum Hydrocarbons by Northwest Method NWTPH-Dx
Metals (Including Mercury) by EPA Methods 6010/7471
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270C-SIM
Volatile Organic Compounds (VOCs) by EPA Method 8260B
Polychlorinated Biphenyls (PCBs) by EPA Method 8082

Laboratory Sample Delivery Groups (SDG):
10118932, 10118810, 10118631, 10119388, 10119104, 10119003, 10118946, 10119390, 10119500, 10119703, 10120799, 10119885, 10122203, and 10123202

Project: BNSF Parkwater (0506-117-12)

This report documents the results of an EPA defined level 2a data validation of analytical data from the analyses of soil samples and the associated laboratory and field quality control (QC) samples. The review included the following:

- Hold Times and Sample preservation
- Surrogates (for organics only)
- Blanks (method, trip, and equipment rinsate)
- Laboratory Control Samples
- Matrix Spikes/Matrix Spike Duplicates
- Field Duplicates
- Laboratory Duplicates
- Project Required Target Reporting Limits

DATA PACKAGE COMPLETENESS

The samples were analyzed by Pace Analytical, located in Minneapolis, Minnesota. The laboratory provided only Forms I, Forms II, and Forms III for a cursory level validation. The following sections discuss in detail the parameters and qualifier estimations to the data.

Objective

The objective of the data quality assessment was to review laboratory analytical procedures and quality control (QC) results to evaluate whether:

- The samples were analyzed using well-defined and acceptable methods that provide detection limits below applicable regulatory criteria;

- The precision and accuracy of the data are well defined and sufficient to provide defensible data; and
- The quality assurance/quality control (QA/QC) procedures utilized by the laboratory meet acceptable industry practices and standards.

Data Quality Assessment Summary

This data assessment was performed using guidance in the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (USEPA 2002) and USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (USEPA 2008).

Hold Times and Sample Preservation:

The holding time is defined as the time that elapses between sample collection and sample analysis. Maximum holding time criteria exist for each analysis to help ensure that the analyte concentrations found at the time of analysis reflect the concentration present at the time of sample collection. Established holding times were met for all analyses.

Chain-of-Custody (COC) Documentation:

COC forms were provided with the laboratory analytical reports. No transcription errors were found, the appropriate signatures were applied, and the cooler temperatures were within the appropriate control limits of 2 to 6°C.

Method, Trip, and Equipment Rinsate Blanks:

Method blanks are analyzed to ensure that laboratory procedures and reagents do not introduce measurable concentrations of the analytes of interest. Method blanks were analyzed with each batch of samples, at a frequency of one per twenty samples. For all sample batches, method blanks for all applicable methods were analyzed at the required frequency. None of the analytes of interest were detected above the reporting limits in any of the blanks.

No method blank detections were reported by the testing laboratory.

Trip blanks are analyzed to ensure that the field sampling procedures do not introduce measurable concentrations of the analytes of interest. Trip blanks were analyzed with each field sampling event, at a frequency of one per day.

No trip blank detections were reported by the testing laboratory.

SDGs 10119003 and 10119104: (Volatiles)

These sample delivery groups contained two trip blank samples (both named “TRIP BLANK”). In both cases, it was noted that one trip blank was a water sample, while the other was a soil sample. Both samples were ND for all target analytes.

SDGs 10120799: (Volatiles)

This sample delivery group contained one trip blank sample (named “TRIP BLANK”). There was no positive results for any target analytes in this sample.

SDGs 10119885: (Volatiles)

This sample delivery group contained one methanol blank sample (named "MEOH BLANK"). There was no positive results for any target analytes in this sample.

Surrogate Recoveries:

A surrogate compound is a compound that is chemically similar to the analytes of interest, but unlikely to be found in any environmental sample. Surrogates are used for organic analyses and are added to all samples, standards, and blanks to serve as an accuracy and specificity check of each analysis. The surrogates are added at a known concentration and percent recoveries are calculated following analysis. All surrogate recoveries for field samples were within the laboratory control limits.

SDG 10119003:

(VOLATILES)

The %R value for 4-bromofluorbenzene was less than the control limit in Sample DP54-0-1. The laboratory only used three surrogates, as opposed to four in the analysis. The reporting limits for all compounds were qualified as estimated (UJ).

(PAHS)

Sample GTP53-1 was analyzed at both a 20x dilution and at a standard 1x dilution. No duplicate results were reported. The surrogates were diluted out of the 20x dilution, whereas the 1x dilution only reported two surrogates. As the laboratory is held to three surrogates being used for the analysis, the positive results and reporting limits in the 1x dilution were estimated (J/UJ). The compounds affected were acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene.

SDG 10119388:

(NWTPH-DX)

The %R value for n-pentacosane was less than the control limit in sample GTP50-1. The positive results for Diesel Fuel and Motor Oil were estimated (J) in the sample.

(PAHS)

Sample GTP53-1 was analyzed at both a 20x dilution and at a standard 1x dilution. No duplicate results were reported. The surrogates were diluted out of the 20x dilution, whereas the 1x dilution only reported two surrogates. As the laboratory is held to three surrogates being used for the analysis, the positive results and reporting limits in the 1x dilution were estimated (J/UJ). The compounds affected were acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene.

SDG 10118946:

(NWTPH-DX)

The surrogate n-pentacosane was not recovered in five samples because the sample matrix required the analyst to dilute the samples ten times or more. No action was required.

(PAHS)

At least one surrogate %R value was outside the control limits in four samples because the sample matrix required the analyst to dilute each sample ten times or more. No action was required.

SDG 10119390:

(NWTPH-DX)

The %R value for n-pentacosane was less than the control limit in Sample GTP-48-1. The positive results for Diesel Fuel and Motor Oil were estimated (J) in the sample. The %R value for n-pentacosane was outside the control limits in Sample GTP-46-1 (20x) because the sample matrix required the analyst to dilute the sample ten times or more. No action was required

(PAHS)

The %R values for all surrogates were outside the control limits in Sample GTP-46-1 (100x) because the sample matrix required the analyst to dilute the sample ten times or more. No action was required.

SDG 10119500:

(NWTPH-DX)

The surrogate n-pentacosane was not recovered in Sample GTP47-1 (10x) because the sample matrix required the analyst to dilute the samples ten times or more. No action was required.

SDG 10119703:

(NWTPH-DX)

The %R value for n-pentacosane was less than the control limit in seventeen samples. The positive results and reporting limits for Diesel Fuel and Motor Oil were estimated (J/UJ) in each sample.

SDG 10120799:

(PAHS)

The surrogate terphenyl-d14 was less than the control limit in Sample DP12-0.5-1.25. The National Functional Guidelines state that one surrogate outlier is allowed per fraction if all surrogate recoveries are greater than 10 percent. No further action was required.

(VOCS)

The %R values for all surrogates were greater than the control limit in Sample DP12-4-5.8. There were no positive results for any target analytes in the sample. As these surrogate outliers were indicative of a high bias, no further action was required.

SDG 10119885:

(VOCS)

The %R values for toluene-d8 and 4-bromofluorobenzene were outside of the control limits in Samples GTP34-1-2 and GTP35-1-2. There were no positive results for any target analytes in these samples. The reporting limits for all target analytes were qualified as estimated (UJ) in these samples. The %R value for toluene-d8 was greater than the control limit in Sample GTP32-1-2. As there was only one surrogate outlier of the three surrogates required by the method, no action was required.

SDG 10122203:

(NWTPH-DX)

The %R value for n-pentacosane was greater than the control limit in Sample GTP36B-1. The sample concentrations of diesel fuel range and motor oil range petroleum hydrocarbons were both greater than 500 ppm. These concentrations represent a chromatographic interference that is masking the presence of the surrogate spike. No action was taken.

Matrix Spikes/Matrix Spike Duplicates (MS/MSD):

Because actual analyte concentration in environmental samples is not known, the accuracy of a particular analysis is usually inferred by performing a matrix spike (MS) analysis. One aliquot of sample is analyzed in the normal manner, than a second aliquot of the sample is spiked with a known amount of analyte concentration and analyzed. From these analyses, a percent recovery (%R) is calculated. Matrix spike duplicates (MSD) analyses are generally performed for organic analyses as a precision check. For some organic analytical methods, such as NWTPH-Dx, a laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) sample set is performed in lieu of a MS/MSD analysis.

For inorganic methods, the matrix spike (referred to as a "spiked sample" is typically followed by a post spike sample if any element recoveries were outside the control limits in the "spike sample". In this case, the laboratory did not analyze a post spike sample. No other action was taken other than to note it here.

Matrix spike analyses should be performed once per analytical batch or every twenty field samples, whichever is more frequent. The recovery criteria for matrix spikes and laboratory control samples are specified in the laboratory documents as are the relative percent difference values. The frequency requirements were met for all analyses, and the %R/RPD values were within the proper control limits.

SDG 10118932:

(METALS)

Two matrix spike (MS) sample sets were performed on Sample DP01-1-2 and DP30-4. The %R values for barium were outside of the control limits in both sample sets. No action was required, as the parent sample concentrations were greater than the amount spiked into the sample.

(PAHS)

A MS/MSD sample set was performed on Sample DP30-60-7. The %R values for all compounds were outside of the control limits in the sample set. No action was required, as 10 of the parent sample concentrations were greater than the amount spiked into the sample.

SDG 10118810:

No MS/MSD sample set was analyzed with this sample delivery group. There was insufficient sample mass to conduct a MS/MSD.

SDG 10118631:

(Metals) A MS/MSD sample set was performed on Sample DP45-1.7-2.7. The %R values for barium were outside of the control limits in the sample set. Professional judgment was used to determine that no samples should be qualified, as the parent sample concentrations were greater than the amount spiked into the sample. The %R values for silver were less than the control limits in the same sample set. As there were no positive results for silver in the associated samples, the reporting limits were qualified as estimated (UJ) in all of the associated samples. The %R values for mercury were greater than the control limits in the sample set. No action was required, as there were no positive results for mercury in any of the associated samples.

(PAHs) A MS/MSD sample set was performed on Sample DP11-4.2-4.85. The MS %R values for several compounds were outside of the control limits in the sample set. No action was required, as the corresponding MSD %R values were within the control limits. Also, several RPD values in the same sample set were greater than the control limits. No action was required because there were no positive results for these compounds in the parent sample.

SDG 10119003:

(NWTPH-DX)

A MS/MSD sample set was performed on Sample DP27-2.5-3.5. The RPD value for Diesel Fuel Range was greater than the control limit in the sample set. As there was no positive value for diesel fuel in the parent sample, no action was taken.

(METALS)

A MS sample set was performed on Sample DP44A-9. There was no barium recovery in the sample set. No action was taken, as the parent sample concentration was at least 4x the amount spiked into the sample.

SDG 10119388:

(NWTPH-DX)

A MS/MSD sample set was performed on Sample GTP52-1. The RPD value for Diesel Fuel Range was greater than the control limit in the sample set. The positive result for diesel fuel in the parent sample was qualified as estimated (J).

(METALS)

A MS/MSD sample set was performed on Sample GTP53-1. There was no barium recovery in the sample set. No action was taken, as the parent sample concentration was at least 4x the amount spiked into the sample.

(PAHS)

A MS/MSD sample set was performed on Sample GTP51-1-2. The MS/MSD %R and RPD values for several compounds were outside of the control limits in the sample set. No action was taken, as the parent sample was diluted 20x, the spiked compounds were diluted out of the sample.

SDG 10119104:

(METALS)

A MS/MSD sample set was performed on Sample DP44b-3.8-4.6. The %R values for silver were lower than the control limits, with the MS yielding no recovery at all. As there was no positive result for silver in the parent sample, the absence of a spiked percent recovery resulted in the rejection (R) of the silver reporting limits in the entire data set.

The %R values for lead were lower than the control limits in the same sample set. The positive results for lead were qualified as estimated (J) in the entire data set.

The %R values for barium were lower than the control limits in the same sample set. As the parent sample barium concentration was greater than the amount spiked into the sample, no action was taken.

SDG 10119500:

(NWTPH-DX)

A MS/MSD sample set was performed on Sample GTP38-4. The RPD value for Diesel Fuel was greater than the control limit. The positive result for Diesel Fuel was qualified as estimated (J) in the parent sample.

(METALS)

A MS sample set was performed on Sample GTP37-9. The %R value for silver was lower than the control limits. The positive results and reporting limits for silver were qualified as estimated (J/UJ) in the entire data set.

SDG 10119703:

(METALS)

One MS/MSD sample set was performed on Sample DP14-2.5-3. The %R values for silver and mercury were outside the control limits. The positive results and reporting limits for these compounds were qualified as estimated (J/UJ) in the entire data set.

Another MS/MSD sample set was performed on Sample DP17-3-4. The %R values for silver, barium, and mercury were outside the control limits. The positive results and reporting limits for these compounds were qualified as estimated (J/UJ) in the entire data set.

SDG 10120799:

(PCB AND PAHS)

One MS/MSD sample set was performed on a sample from a different SDG. Even though there were %R and RPD outliers for various target analytes in these quality control sample sets, no action was required as the parent sample was taken from a different laboratory sample delivery group.

(METALS)

One MS/MSD sample set was performed on Sample DP12-0.5-1.25. The %R values for silver were lower than the control limits. The reporting limits for silver were qualified as estimated (UJ) in the entire data set. The %R and RPD values for barium and lead were outside the control limits. As the

parent sample concentrations were both greater than the amount spiked into the sample, no action was taken.

SDG 10119885:

(METALS)

An MS sample set was performed on Sample DUPLICATE-6, while another MS/MSD sample set was performed on a sample from an unrelated analytical batch. The silver %R value was less than the control limit in the MS sample set. The silver results and reporting limits were qualified as estimated (J/UJ) in all of the samples in the analytical batch.

(PAHS)

A MS/MSD sample set was performed on Sample GTP32-1-2. The MS %R values for benzo(g,h,i)perlyene and indeno(1,2,3-cd)pyrene were outside of the control limits in the sample set. No action was taken, as the corresponding MSD %R values for these compounds were within the control limits.

SDG 10122203:

(METALS)

A MS/MSD sample set was performed on a sample from an unrelated analytical batch. The %R and RPD values for barium and lead were outside of the control limits in the sample set. No samples were qualified, as the parent sample concentrations were greater than four times the amount spiked into the sample. The %R value for chromium was less than the control limits in the MSD from the same sample set. No action was taken, as the corresponding MS %R value for this compound was within the control limits. The %R and RPD values for silver were outside of the control limits. No action was taken as there were no parent samples taken from this SDG.

Laboratory Control Samples/Laboratory Control Sample Duplicates (LSC/LCSD):

A laboratory control sample is essentially a blank sample that is spiked with a known amount of analyte concentration and analyzed. It is to be treated much like a matrix spike, without the possibility for matrix interference. As there is no actual sample matrix in the analysis, the analytical expectations for accuracy and precision are usually more rigorous and qualification would apply to all samples in the batch, instead of the parent sample only.

Laboratory control sample analyses should be performed once per analytical batch or every twenty field samples, whichever is more frequent. The recovery criteria for laboratory control samples are specified in the laboratory documents as are the relative percent difference values. The frequency requirements were met for all analyses, and the %R/RPD values were within the proper control limits, with the following exceptions:

The %R values and the RPD values for all target analytes were within the appropriate QC limits, with the exceptions below:

SDG 10119104:

(VOLATILES)

The LCS percent recovery (%R) value for acetone was greater than the control limit in the laboratory QC batch prepared on 12/23/09. No action was taken, as the corresponding LCSD %R value for acetone was within the control limits.

SDG 10119885:

(NWTPH-GX)

The LCS %R value for the gasoline range hydrocarbon compounds was greater than the control limit in the laboratory QC batch prepared on 1/7/10. No action was taken, as the corresponding LCSD %R value for gasoline range hydrocarbons was within the control limits.

(VOLATILES)

The LCS/LCSD %R values for bromoform were less than the control limits in the laboratory QC batch prepared on 1/7/10. The reporting limits for this compound were qualified as estimated (J) in all of the samples in this analytical batch. The LCS %R value for trans-1,3-dichloropropene was less than the control limit in the same laboratory QC batch. No action was taken, as the corresponding LCSD %R value for this compound was within the control limits.

Laboratory Duplicates:

Internal laboratory duplicate analyses are performed to monitor the precision of the analyses. Two separate aliquots of a sample are analyzed as distinct samples in the laboratory, and the RPD between the two results is calculated. Duplicate analyses should be performed once per analytical batch. If one or more of the samples used has a concentration greater than five times the reporting limit for that sample, the absolute difference is used instead of the RPD.

Laboratory duplicates were analyzed at the proper frequency and the specified acceptance criteria were met in all cases.

Field Duplicates

Field duplicate samples were collected and analyzed along with the reviewed sample batches. The duplicate samples were analyzed for the same parameters as the associated parent samples. As mentioned above for the laboratory duplicates the RPD is used as the criteria for assessing precision, unless one or more of the samples used has a concentration greater than five times the reporting limit for that sample, the absolute difference is used instead of the RPD. The RPD control limit for soils is 50 percent, while the RPD control limit for waters is 35 percent.

Field duplicates met the specified acceptance criteria, except where noted below.

SDG 10119388:

One field duplicate set, GTP51-4 and Duplicate1, was submitted with this analytical batch. The absolute difference values for fluoranthene, phenanthrene, and pyrene were greater than the control limit of twice the MRL. The positive results and reporting limits were estimated (J/UJ) in both samples.

SDG 10119500:

One field duplicate set, GTP47-4 and Duplicate-2, was submitted with this analytical batch. The absolute difference and RPD values for all target analytes were within the control limits described above.

SDG 10119703:

Two field duplicate sets, DP18-1-2 and Duplicate-3 and DP15-6-7 and Duplicate-4, were submitted with this analytical batch. The absolute difference and RPD values for all target analytes were within the control limits described above.

SDG 10119885:

Two field duplicate sets, GTP55-1-2 and Duplicate-5 and GTP34-4 and Duplicate-6, were submitted with this analytical batch. The RPD value for lead was greater than the control limit in the second duplicate set. The positive results for lead were estimated (J) in both samples.

Overall Assessment

As was determined by this EPA level 2a evaluation, the laboratory followed the specified analytical methods. Accuracy was acceptable, as demonstrated by the surrogate, MS/MSD, and LCS/LCSD %R values, with the exceptions mentioned above. Precision was acceptable, as demonstrated by the field duplicate, laboratory duplicate, MS/MSD, and LCS/LCSD RPD values, with the exceptions mentioned above.

Data were qualified as estimated because of surrogates, field duplicates, LCS/LCSD %R, MS/MSD %R outliers.

Data were rejected because of MS/MSD outliers.

All other data points are acceptable for the intended use.

Any estimated detection of compounds less than the MRL are listed in Tables B-1 through B-3 as ND.

Refer to Appendix D for laboratory reports.

BNSF – Parkwater Rail Yard Site

Project # 0506-117-12

Analyte Group (including methods): NWTPH-Dx, Metals (6010 & 7471),

GeoEngineers Sampling Event Date(s): 2/25/10

Laboratory SDG: 10123202

Validator Initials/Date: MJL 3/1/10

TECHNICAL EVALUATION CHECKLIST

A (Summaries of holding times, sample results; accuracy; precision; blanks)

☒

B (Summaries of calibration, instrument performance & compound ID)

☐ Regular ☐ HRMS (High Resolution Mass Spectrometry)

__No__ Qualifiers Issued to the database.

1.0 Technical Holding Times and Sample Handling (A)	**Y**	**N**	**N/A**
1.1 Is the chain-of-custody (COC) properly signed/dated? Correct analyses requested? All samples analyzed?	X		
1.2 Were the samples properly preserved in the appropriate containers?	X		
1.3 Are all holding times within the technical criteria? __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		
1.4 Are all cooler temperatures within the control limits? Cooler Temperature: 3.8 °C __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		

2.0 Surrogates/Labeled Compounds (A)	**Y**	**N**	**N/A**
2.1 Are all recovery values within the control limits? __X__ no outliers ____ see attached Surrogate Summary Form or data package page ____ see below	X		

•

Project # 0506-117-12

3.0 Method/Field Blank (A)

	Y	N	N/A
3.1 Are Method Blanks free from contamination? __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below	X		
3.2 Are there any trip/equipment blanks included in the data package (list below)?		X	
3.3 Are trip/equipment/field blanks free from contamination? __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below			X

Comments: ____ No positive results in associated samples; no action required for method / trip / equip. / other

____10X action level established for common lab cont.; 5X action level for others

4.0 Laboratory Control Sample (Blank Spike/OPR Sample) (A)

QC ID/Date:

	Y	N	N/A
4.1 Are all %R-values within the control limits? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		
4.2 Are all RPD values within control limits (if duplicate analyzed)? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		

Compound	%R values	Action

5.0 Matrix Spike/Matrix Spike Duplicate (A)

Parent Sample ID:

	Y	N	N/A
5.1 Are all %R-values within the control limits? _X__ no outliers ____ see attached MS/MSD Summary Form or data package page _X__ see below	X		
5.2 Are all RPD values within control limits? __X__ no outliers ____ see attached MS/MSD Summary Form or data package page _X__ see below	X		

Compound	%R or *RPD* values	Control Limits	Action

Project # 0506-117-12

6.0 Field Duplicate (A) Field Duplicate Sample ID(s):

	Y	N	N/A
6.1 Were field duplicates collected and analyzed?		X	
6.2 Are all RPD values within control limits? __X__ no outliers ____ see attached Field Dup. Summary Form or data package page ___ see below			X

Comments: ____ No qualifiers assigned based on field duplicate outliers

7.0 Sample Results (A)

	Y	N	N/A
7.1 Are there results for all analytes on the client required target compound list(s) **see QAPP for lists**?	X		
7.2a Were TIC requested for this project?		X	
7.2b If "yes", were TIC reported as required?			X
7.3 Are reporting limits and sample results adjusted for sample size, % moisture (solid samples), etc.?	X		
7.4 Is there any interference acting on any of the analyte concentrations?	X		

BNSF – Parkwater Rail Yard Site

Project # 0506-117-12

Analyte Group (including methods): NWTPH-Dx, Metals (6010 & 7471), PAHs (8270-SIM), BTEX compounds (8260)

GeoEngineers Sampling Event Date(s): 12/14/09

Laboratory SDG: 10118631

Validator Initials/Date: MJL 1/8/10

TECHNICAL EVALUATION CHECKLIST

A (Summaries of holding times, sample results; accuracy; precision; blanks)

☒

B (Summaries of calibration, instrument performance & compound ID)

☐ Regular ☐ HRMS (High Resolution Mass Spectrometry)

_ Yes _ Qualifiers Issued to the database.

1.0 Technical Holding Times and Sample Handling (A)	**Y**	**N**	**N/A**
1.1 Is the chain-of-custody (COC) properly signed/dated? Correct analyses requested? All samples analyzed?	X		
1.2 Were the samples properly preserved in the appropriate containers?	X		
1.3 Are all holding times within the technical criteria ? __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		
1.4 Are all cooler temperatures within the control limits? Cooler Temperature: 0.2. 1.0, 2.0 °C __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		

2.0 Surrogates/Labeled Compounds (A)	**Y**	**N**	**N/A**
2.1 Are all recovery values within the control limits? _X_ no outliers ____ see attached Surrogate Summary Form or data package page ____ see below	X		

Project # 0506-117-12

3.0 Method/Field Blank (A)

	Y	N	N/A
3.1 Are Method Blanks free from contamination? __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below	X		
3.2 Are there any trip/equipment blanks included in the data package (list below)?		X	
3.3 Are trip/equipment/field blanks free from contamination? TRIP BLANK (Water) __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below			X

Comments: ____ No positive results in associated samples; no action required for method / trip / equip. / other

____10X action level established for common lab cont.; 5X action level for others

4.0 Laboratory Control Sample (Blank Spike/OPR Sample) (A)

QC ID/Date:

	Y	N	N/A
4.1 Are all %R-values within the control limits? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		
4.2 Are all RPD values within control limits (if duplicate analyzed)? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		

Compound	%R values	Action

5.0 Matrix Spike/Matrix Spike Duplicate (A)

Parent Sample ID: See below for different analyses parent samples.

	Y	N	N/A
5.1 Are all %R-values within the control limits? ___ no outliers ____ see attached MS/MSD Summary Form or data package page __X__ see below		X	
5.2 Are all RPD values within control limits? ____ no outliers ____ see attached MS/MSD Summary Form or data package page __X__ see below		X	

Metals Parent Samples: DP45 1.7-2.7

- The barium %R values in the MS/MSD sample set was greater than the control limit.

  No action was taken because the parent sample concentration was > 3x the amount spiked.

  As the MS/MSD was the only outlier – professional judgement was used.
- The silver %R values in the MS/MSD sample set were less than the control limit.

  The silver reporting limits (no positive detects) were estimated UJ in all associated samples.
- The mercury %R values in the MS/MSD sample set were greater than the control limit. No action -

  No positive results in the parent sample.

Project # 0506-117-12

6.0 Field Duplicate (A) Field Duplicate Sample ID(s):

	Y	N	N/A
6.1 Were field duplicates collected and analyzed?		X	
6.2 Are all RPD values within control limits? __X__ no outliers ____ see attached Field Dup. Summary Form or data package page ____ see below			X

Comments: ____ No qualifiers assigned based on field duplicate outliers

6.3 Laboratory Duplicate (Fuels and Metals only)

7.0 Sample Results (A)

	Y	N	N/A
7.1 Are there results for all analytes on the client required target compound list(s) **see QAPP for lists**?	X		
7.2a Were TIC requested for this project?		X	
7.2b If "yes", were TIC reported as required?			X
7.3 Are reporting limits and sample results adjusted for sample size, % moisture (solid samples), etc.?	X		
7.4 Is there any interference acting on any of the analyte concentrations?	X		

PAHs Parent Sample: DP11-4.2-4.85

- Several of the MS %R values in the MS/MSD sample set were greater than the control limits.

  No action was taken because in each case, the corresponding MSD %R values were within the control limits.
- Several RPD values in the same MS/MSD sample set were greater than the control limits.

  No action – no positive results for these compounds in the parent sample.

BNSF – Parkwater Rail Yard Site

Project # 0506-117-12

Analyte Group (including methods): **NWTPH-Dx, Metals (6010 & 7471), PAHs (8270-SIM), BTEX compounds (8260)**

GeoEngineers Sampling Event Date(s): 12/15/09

Laboratory SDG: 10118923

Validator Initials/Date: MJL 1/8/10

TECHNICAL EVALUATION CHECKLIST

A (Summaries of holding times, sample results; accuracy; precision; blanks)

☒

B (Summaries of calibration, instrument performance & compound ID)

☐ Regular ☐ HRMS (High Resolution Mass Spectrometry)

_ No _ Qualifiers Issued to the database.

1.0 Technical Holding Times and Sample Handling (A)	**Y**	**N**	**N/A**
1.1 Is the chain-of-custody (COC) properly signed/dated? Correct analyses requested? All samples analyzed?	X		
1.2 Were the samples properly preserved in the appropriate containers?	X		
1.3 Are all holding times within the technical criteria ? __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		
1.4 Are all cooler temperatures within the control limits? Cooler Temperature: 6.0. 5.7, 6.0, 4.8 °C __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		

2.0 Surrogates/Labeled Compounds (A)	**Y**	**N**	**N/A**
2.1 Are all recovery values within the control limits? _X_ no outliers ____ see attached Surrogate Summary Form or data package page ____ see below	X		

Project # 0506-117-12

3.0 Method/Field Blank (A)

	Y	N	N/A
3.1 Are Method Blanks free from contamination? __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below	X		
3.2 Are there any trip/equipment blanks included in the data package (list below)?	X		
3.3 Are trip/equipment/field blanks free from contamination? TRIP BLANK (Water and Methanol) __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below	X		

Comments: ____ No positive results in associated samples; no action required for method / trip / equip. / other

____10X action level established for common lab cont.; 5X action level for others

4.0 Laboratory Control Sample (Blank Spike/OPR Sample) (A)

QC ID/Date:

	Y	N	N/A
4.1 Are all %R-values within the control limits? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		
4.2 Are all RPD values within control limits (if duplicate analyzed)? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		

Compound	%R values	Action

5.0 Matrix Spike/Matrix Spike Duplicate (A)

Parent Sample ID: See below for different analyses parent samples.

	Y	N	N/A
5.1 Are all %R-values within the control limits? ___ no outliers ____ see attached MS/MSD Summary Form or data package page __X__ see below		X	
5.2 Are all RPD values within control limits? ____ no outliers ____ see attached MS/MSD Summary Form or data package page __X__ see below		X	

Metals Parent Samples: DP01-1-2 and DP30-4

- The barium %R values in both MS/MSD sample sets were greater than the control limit.

No action was taken because the parent sample concentration was > 3x the amount spiked.

As the MS/MSD was the only outlier – professional judgement was used.

PAH Parent Sample: DP30-6-7

- All compound %R values were outside of the control limits because 10 out of the 16 target analyte concentrations were greater than 4 times the amount spiked into the sample. No action.

Project # 0506-117-12

6.0 Field Duplicate (A) Field Duplicate Sample ID(s):

	Y	N	N/A
6.1 Were field duplicates collected and analyzed?		X	
6.2 Are all RPD values within control limits? __X__ no outliers ____ see attached Field Dup. Summary Form or data package page ____ see below			X

Comments: ____ No qualifiers assigned based on field duplicate outliers

6.3 Laboratory Duplicate (Fuels and Metals only)

7.0 Sample Results (A)

	Y	N	N/A
7.1 Are there results for all analytes on the client required target compound list(s) **see QAPP for lists**?	X		
7.2a Were TIC requested for this project?		X	
7.2b If "yes", were TIC reported as required?			X
7.3 Are reporting limits and sample results adjusted for sample size, % moisture (solid samples), etc.?	X		
7.4 Is there any interference acting on any of the analyte concentrations?	X		

BNSF – Parkwater Rail Yard Site

Project # 0506-117-12

Analyte Group (including methods): BTEX compounds (8260)

GeoEngineers Sampling Event Date(s): 12/14/09

Laboratory SDG: 10118810

Validator Initials/Date: MJL 1/8/10

TECHNICAL EVALUATION CHECKLIST

A (Summaries of holding times, sample results; accuracy; precision; blanks)

☒

B (Summaries of calibration, instrument performance & compound ID)

☐ Regular ☐ HRMS (High Resolution Mass Spectrometry)

_ No _ Qualifiers Issued to the database.

1.0 Technical Holding Times and Sample Handling (A)	**Y**	**N**	**N/A**
1.1 Is the chain-of-custody (COC) properly signed/dated? Correct analyses requested? All samples analyzed?	X		
1.2 Were the samples properly preserved in the appropriate containers?	X		
1.3 Are all holding times within the technical criteria ? __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		
1.4 Are all cooler temperatures within the control limits? Cooler Temperature: 6.0 °C __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		

2.0 Surrogates/Labeled Compounds (A)	**Y**	**N**	**N/A**
2.1 Are all recovery values within the control limits? _X_ no outliers ____ see attached Surrogate Summary Form or data package page ____ see below	X		

Project # 0506-117-12

3.0 Method/Field Blank (A)

	Y	N	N/A
3.1 Are Method Blanks free from contamination? __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below	X		
3.2 Are there any trip/equipment blanks included in the data package (list below)?		X	
3.3 Are trip/equipment/field blanks free from contamination? TRIP BLANK (Water and Methanol) __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below			X

Comments: ____ No positive results in associated samples; no action required for method / trip / equip. / other

____10X action level established for common lab cont.; 5X action level for others

4.0 Laboratory Control Sample (Blank Spike/OPR Sample) (A)

QC ID/Date:

	Y	N	N/A
4.1 Are all %R-values within the control limits? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		
4.2 Are all RPD values within control limits (if duplicate analyzed)? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		

Compound	%R values	Action

5.0 Matrix Spike/Matrix Spike Duplicate (A)

Parent Sample ID: Insufficient sample volume for analysis.

	Y	N	N/A
5.1 Are all %R-values within the control limits? ___ no outliers ____ see attached MS/MSD Summary Form or data package page __X__ see below			X
5.2 Are all RPD values within control limits? ____ no outliers ____ see attached MS/MSD Summary Form or data package page __X__ see below			X

Project # 0506-117-12

6.0 Field Duplicate (A) Field Duplicate Sample ID(s):

	Y	N	N/A
6.1 Were field duplicates collected and analyzed?		X	
6.2 Are all RPD values within control limits? __X__ no outliers ____ see attached Field Dup. Summary Form or data package page ____ see below			X

Comments: ____ No qualifiers assigned based on field duplicate outliers

6.3 Laboratory Duplicate (Fuels and Metals only)

7.0 Sample Results (A)

	Y	N	N/A
7.1 Are there results for all analytes on the client required target compound list(s) **see QAPP for lists**?	X		
7.2a Were TIC requested for this project?		X	
7.2b If "yes", were TIC reported as required?			X
7.3 Are reporting limits and sample results adjusted for sample size, % moisture (solid samples), etc.?	X		
7.4 Is there any interference acting on any of the analyte concentrations?	X		

BNSF – Parkwater Rail Yard Site

Project # 0506-117-12

Analyte Group (including methods): NWTPH-Dx, Metals (6010 & 7471), PAHs (8270-SIM), Volatile compounds (8260)

GeoEngineers Sampling Event Date(s): 12/14/09

Laboratory SDG: 10118946

Validator Initials/Date: MJL 1/19/10

TECHNICAL EVALUATION CHECKLIST

A (Summaries of holding times, sample results; accuracy; precision; blanks)

☒

B (Summaries of calibration, instrument performance & compound ID)

☐ Regular ☐ HRMS (High Resolution Mass Spectrometry)

_NO_ Qualifiers Issued to the database.

1.0 Technical Holding Times and Sample Handling (A)	**Y**	**N**	**N/A**
1.1 Is the chain-of-custody (COC) properly signed/dated? Correct analyses requested? All samples analyzed?	X		
1.2 Were the samples properly preserved in the appropriate containers?	X		
1.3 Are all holding times within the technical criteria? __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		
1.4 Are all cooler temperatures within the control limits? Cooler Temperature: 6.0, 5.7, 6.0, 4.8°C __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		

2.0 Surrogates/Labeled Compounds (A)	**Y**	**N**	**N/A**
2.1 Are all recovery values within the control limits? _X_ no outliers ____ see attached Surrogate Summary Form or data package page __X__ see below		X	

NWTPH-Dx:

- Sample **DP02-1-2 (10x, 20x)** %R value for n-Pentacosane (0%) – (Control Limit= 50-150)
- Sample **DP03-1.5-2 (50x)** %R value for n-Pentacosane (0%) – (Control Limit= 50-150)
- Sample **DP07-2-2.7 (20x)** %R value for n-Pentacosane (0%) – (Control Limit= 50-150)
- Sample **DP08-1.6-2.4 (20x)** %R value for n-Pentacosane (0%) – (Control Limit= 50-150)
- Sample **DP09-1-2 (10x)** %R value for n-Pentacosane (0%) – (Control Limit= 50-150)

No action; the samples were diluted at least 10 times-surrogate diluted out in all cases.

PAHs:

- Sample **DP02-1-2 (10x)** %R value for nitrobenzene-d5 (168%) – (Control Limit= 45-126)
- Sample **DP03-1.5-2 (10x)** no recovery for any surrogates.
- Sample **DP07-2-2.7 (10x)** no recovery for any surrogates.
- Sample **DP08-1.6-2.4 (10x)** no recovery for any surrogates.
-

No action; the samples were diluted at least 10 times-surrogate diluted out in all cases.

Project # 0506-117-12

3.0 Method/Field Blank (A)

	Y	N	N/A
3.1 Are Method Blanks free from contamination? __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below	X		
3.2 Are there any trip/equipment blanks included in the data package (list below)?		X	
3.3 Are trip/equipment/field blanks free from contamination? ____ no outliers ____ see attached Blank Summary Form or data package page __X__ see below			X

Comments: ____ No positive results in associated samples; no action required for method / trip / equip. / other

____10X action level established for common lab cont.; 5X action level for others

4.0 Laboratory Control Sample (Blank Spike/OPR Sample) (A)

QC ID/Date:

	Y	N	N/A
4.1 Are all %R-values within the control limits? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		
4.2 Are all RPD values within control limits (if duplicate analyzed)? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		

Compound	%R values	Action

5.0 Matrix Spike/Matrix Spike Duplicate (A)

Parent Sample ID: All samples that were taken from this SDG were within CL.

	Y	N	N/A
5.1 Are all %R-values within the control limits? __X__ no outliers ____ see attached MS/MSD Summary Form or data package page ___ see below	X		
5.2 Are all RPD values within control limits? __X__ no outliers ____ see attached MS/MSD Summary Form or data package page ___ see below	X		

Compound	%R or *RPD* values	Control Limits	Action

Project # 0506-117-12

6.0 Field Duplicate (A) Field Duplicate Sample ID(s):

	Y	N	N/A
6.1 Were field duplicates collected and analyzed?	X		
6.2 Are all RPD values within control limits? ____ no outliers ____ see attached Field Dup. Summary Form or data package page ____ see below		X	

Comments: ____ No qualifiers assigned based on field duplicate outliers

7.0 Sample Results (A)

	Y	N	N/A
7.1 Are there results for all analytes on the client required target compound list(s) **see QAPP for lists**?	X		
7.2a Were TIC requested for this project?		X	
7.2b If "yes", were TIC reported as required?			X
7.3 Are reporting limits and sample results adjusted for sample size, % moisture (solid samples), etc.?	X		
7.4 Is there any interference acting on any of the analyte concentrations?	X		

BNSF – Parkwater Rail Yard Site

Project # 0506-117-12

Analyte Group (including methods): NWTPH-Dx, Metals (6010 & 7471), PAHs (8270-SIM), Volatile compounds (8260)

GeoEngineers Sampling Event Date(s): 12/16/09

Laboratory SDG: 10119003

Validator Initials/Date: MJL 1/17/10

TECHNICAL EVALUATION CHECKLIST

A (Summaries of holding times, sample results; accuracy; precision; blanks)
☒

B (Summaries of calibration, instrument performance & compound ID)

☐ Regular ☐ HRMS (High Resolution Mass Spectrometry)

_ Yes _ Qualifiers Issued to the database.

1.0 Technical Holding Times and Sample Handling (A)

	Y	N	N/A
1.1 Is the chain-of-custody (COC) properly signed/dated? Correct analyses requested? All samples analyzed?	X		
1.2 Were the samples properly preserved in the appropriate containers?	X		
1.3 Are all holding times within the technical criteria? __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		
1.4 Are all cooler temperatures within the control limits? Cooler Temperature: 1.2 °C __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		

2.0 Surrogates/Labeled Compounds (A)

	Y	N	N/A
2.1 Are all recovery values within the control limits? _X_ no outliers ____ see attached Surrogate Summary Form or data package page __X__ see below		X	

Volatiles:

- Sample **DP54-0-1** %R value for 4-Bromofluorobenzene (64%) – (Control Limit=70-130)

The lab only used three surrogates, as opposed to four. All reporting limits qualified as estimated (UJ).

Project # 0506-117-12

3.0 Method/Field Blank (A)

	Y	N	N/A
3.1 Are Method Blanks free from contamination? __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below	X		
3.2 Are there any trip/equipment blanks included in the data package (list below)?	X		
3.3 Are trip/equipment/field blanks free from contamination? TRIP BLANK __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below	X		

Comments: ____ No positive results in associated samples; no action required for method / trip / equip. / other

____10X action level established for common lab cont.; 5X action level for others

4.0 Laboratory Control Sample (Blank Spike/OPR Sample) (A)

QC ID/Date:

	Y	N	N/A
4.1 Are all %R-values within the control limits? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		
4.2 Are all RPD values within control limits (if duplicate analyzed)? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		

Compound	%R values	Action

5.0 Matrix Spike/Matrix Spike Duplicate (A)

Parent Sample ID: **Taken from different SDG(PCBs); DP12-0.5-1.25 (Metals)**

	Y	N	N/A
5.1 Are all %R-values within the control limits? __X__ no outliers ____ see attached MS/MSD Summary Form or data package page __ _ see below	X		
5.2 Are all RPD values within control limits? __X__ no outliers ____ see attached MS/MSD Summary Form or data package page ___ see below	X		

Compound	%R or *RPD* values	Control Limits	Action

Project # 0506-117-12

6.0 Field Duplicate (A) Field Duplicate Sample ID(s):

	Y	N	N/A
6.1 Were field duplicates collected and analyzed?	X		
6.2 Are all RPD values within control limits? ____ no outliers ____ see attached Field Dup. Summary Form or data package page ____ see below		X	

Comments: ____ No qualifiers assigned based on field duplicate outliers

6.3 Laboratory Duplicate (Fuels and Metals only)

7.0 Sample Results (A)

	Y	N	N/A
7.1 Are there results for all analytes on the client required target compound list(s) **see QAPP for lists**?	X		
7.2a Were TIC requested for this project?		X	
7.2b If "yes", were TIC reported as required?			X
7.3 Are reporting limits and sample results adjusted for sample size, % moisture (solid samples), etc.?	X		
7.4 Is there any interference acting on any of the analyte concentrations?	X		

BNSF – Parkwater Rail Yard Site

Project # 0506-117-12

Analyte Group (including methods): **NWTPH-Dx, Metals (6010 & 7471), PAHs (8270-SIM), BTEX compounds (8260)**

GeoEngineers Sampling Event Date(s): 12/17/09

Laboratory SDG: 10119104

Validator Initials/Date: MJL 1/17/10

TECHNICAL EVALUATION CHECKLIST

A (Summaries of holding times, sample results; accuracy; precision; blanks)

☒

B (Summaries of calibration, instrument performance & compound ID)

☐ Regular ☐ HRMS (High Resolution Mass Spectrometry)

_ Yes _ Qualifiers Issued to the database.

1.0 Technical Holding Times and Sample Handling (A)	Y	N	N/A
1.1 Is the chain-of-custody (COC) properly signed/dated? Correct analyses requested? All samples analyzed?	X		
1.2 Were the samples properly preserved in the appropriate containers?	X		
1.3 Are all holding times within the technical criteria? __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		
1.4 Are all cooler temperatures within the control limits? Cooler Temperature: 2.6 °C __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		

2.0 Surrogates/Labeled Compounds (A)	Y	N	N/A
2.1 Are all recovery values within the control limits? _X_ no outliers ____ see attached Surrogate Summary Form or data package page ____ see below	X		

3.0 Method/Field Blank (A)

	Y	N	N/A
3.1 Are Method Blanks free from contamination? __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below	X		
3.2 Are there any trip/equipment blanks included in the data package (list below)?	X		
3.3 Are trip/equipment/field blanks free from contamination? TRIP BLANK (Water); TRIP BLANK (Soil) __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below	X		

Comments: ____ No positive results in associated samples; no action required for method / trip / equip. / other

____10X action level established for common lab cont.; 5X action level for others

4.0 Laboratory Control Sample (Blank Spike/OPR Sample) (A)

QC ID/Date: *VOCs (water: Extracted 12/23/09)*

	Y	N	N/A
4.1 Are all %R-values within the control limits? __X__ no outliers ____ see attached Summary Form or data package page ____ see below		X	
4.2 Are all RPD values within control limits (if duplicate analyzed)? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		

Compound	%R values	Action
Acetone	202, 189 (C.L. = 10-200)	None; only one outlier

5.0 Matrix Spike/Matrix Spike Duplicate (A)

Parent Sample ID: See below for different analyses parent samples.

	Y	N	N/A
5.1 Are all %R-values within the control limits? ___ no outliers ____ see attached MS/MSD Summary Form or data package page __X__ see below		X	
5.2 Are all RPD values within control limits? __X__ no outliers ____ see attached MS/MSD Summary Form or data package page ___ see below	X		

Metals Parent Sample: **DP44b-3.8-4.6**

- The Barium %R values were less than the control limits. No action, the parent sample concentration >4x amount spiked.
- The Silver %R values were less than the control limits – the MS %R value "0". Qualified (J/R) in all samples.
- The Lead %R values were less than the control limits –. Qualified (J/UJ) in all samples.

Project # 0506-117-12

6.0 Field Duplicate (A) Field Duplicate Sample ID(s):

	Y	N	N/A
6.1 Were field duplicates collected and analyzed?	X		
6.2 Are all RPD values within control limits? ____ no outliers ____ see attached Field Dup. Summary Form or data package page ____ see below		X	

Comments: ____ No qualifiers assigned based on field duplicate outliers

6.3 Laboratory Duplicate (Fuels and Metals only)

7.0 Sample Results (A)

	Y	N	N/A
7.1 Are there results for all analytes on the client required target compound list(s) **see QAPP for lists**?	X		
7.2a Were TIC requested for this project?		X	
7.2b If "yes", were TIC reported as required?			X
7.3 Are reporting limits and sample results adjusted for sample size, % moisture (solid samples), etc.?	X		
7.4 Is there any interference acting on any of the analyte concentrations?	X		

BNSF – Parkwater Rail Yard Site

Project # 0506-117-12

Analyte Group (including methods): **NWTPH-Dx, Metals (6010 & 7471), PAHs (8270-SIM), BTEX compounds (8260)**

GeoEngineers Sampling Event Date(s): 12/18/09

Laboratory SDG: 10119388

Validator Initials/Date: MJL 1/15/10

TECHNICAL EVALUATION CHECKLIST

A (Summaries of holding times, sample results; accuracy; precision; blanks)

☒

B (Summaries of calibration, instrument performance & compound ID)

☐ Regular ☐ HRMS (High Resolution Mass Spectrometry)

_ Yes _ Qualifiers Issued to the database.

1.0 Technical Holding Times and Sample Handling (A)

	Y	N	N/A
1.1 Is the chain-of-custody (COC) properly signed/dated? Correct analyses requested? All samples analyzed?	X		
1.2 Were the samples properly preserved in the appropriate containers?	X		
1.3 Are all holding times within the technical criteria? __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		
1.4 Are all cooler temperatures within the control limits? Cooler Temperature: 0.0 °C __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		

2.0 Surrogates/Labeled Compounds (A)

	Y	N	N/A
2.1 Are all recovery values within the control limits? __ no outliers ____ see attached Surrogate Summary Form or data package page __X__ see below		X	

PAHs by 8270-SIM:

Sample GTP53-1 was analyzed twice; once at 1:1 and another time at a dilution of (20X). No duplicate results were reported.

1) For the analytes reported from the 20X Dilution – No action was taken, surrogates diluted out.

2) For the analytes reported from the regular analysis – Only two surrogates were reported. Results/Reporting limits from the regular analysis were estimated (J/UJ).

NWTPH-Dx:

Sample GTP50-1 %R value for n-pentacosane = 32% Control Limits (50-150) Postive results qualified (J).

Project # 0506-117-12

3.0 Method/Field Blank (A)

	Y	N	N/A
3.1 Are Method Blanks free from contamination? __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below	X		
3.2 Are there any trip/equipment blanks included in the data package (list below)?		X	
3.3 Are trip/equipment/field blanks free from contamination? TRIP BLANK (Water) __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below			X

Comments: ____ No positive results in associated samples; no action required for method / trip / equip. / other

____10X action level established for common lab cont.; 5X action level for others

4.0 Laboratory Control Sample (Blank Spike/OPR Sample) (A)

QC ID/Date:

	Y	N	N/A
4.1 Are all %R-values within the control limits? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		
4.2 Are all RPD values within control limits (if duplicate analyzed)? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		

Compound	%R values	Action

5.0 Matrix Spike/Matrix Spike Duplicate (A)

Parent Sample ID: See below for different analyses parent samples.

	Y	N	N/A
5.1 Are all %R-values within the control limits? ___ no outliers ____ see attached MS/MSD Summary Form or data package page __X__ see below		X	
5.2 Are all RPD values within control limits? ____ no outliers ____ see attached MS/MSD Summary Form or data package page __X__ see below		X	

NWTPH-Dx Parent Sample: GTP52-1

- The Diesel Fuel Range RPD value in the MS/MSD sample set was greater than the control limit.

The Diesel result in the parent sample was estimated (J).

Metals Parent Sample: GTP53-1

- There was no Barium recovery in the MS/MSD sample set. The parent sample concentration was > 4x the amount spiked into the sample. No Action.

PAHs Parent Sample: GTP51-1-2

- Several of the %R and RPD values were outside the control limit. The parent sample diluted 20X. The spiked compounds were diluted out of the sample. No Action.

Project # 0506-117-12

6.0 Field Duplicate (A) Field Duplicate Sample ID(s): **GTP51-4 & Duplicate-1**

	Y	N	N/A
6.1 Were field duplicates collected and analyzed?	X		
6.2 Are all RPD values within control limits? ____ no outliers ____ see attached Field Dup. Summary Form or data package page __X__ see below		X	

Comments: ____ No qualifiers assigned based on field duplicate outliers

- The following compounds were estimated because the Absolute Difference values were greater than the control limit of 2X the lowest MRL: **Fluoranthene, Phenanthrene, and Pyrene** Estimated (J/UJ) in both samples.

6.3 Laboratory Duplicate (Fuels and Metals only)

7.0 Sample Results (A)

	Y	N	N/A
7.1 Are there results for all analytes on the client required target compound list(s) **see QAPP for lists**?	X		
7.2a Were TIC requested for this project?		X	
7.2b If "yes", were TIC reported as required?			X
7.3 Are reporting limits and sample results adjusted for sample size, % moisture (solid samples), etc.?	X		
7.4 Is there any interference acting on any of the analyte concentrations?	X		

BNSF – Parkwater Rail Yard Site

Project # 0506-117-12

Analyte Group (including methods): NWTPH-Dx, Metals (6010 & 7471), PAHs (8270-SIM), PCB Aroclors (8082)

GeoEngineers Sampling Event Date(s): 12/22/09

Laboratory SDG: 10119500

Validator Initials/Date: MJL 1/22/10

TECHNICAL EVALUATION CHECKLIST

A (Summaries of holding times, sample results; accuracy; precision; blanks)

☒

B (Summaries of calibration, instrument performance & compound ID)

☐ Regular ☐ HRMS (High Resolution Mass Spectrometry)

Yes Qualifiers Issued to the database.

1.0 Technical Holding Times and Sample Handling (A)	**Y**	**N**	**N/A**
1.1 Is the chain-of-custody (COC) properly signed/dated? Correct analyses requested? All samples analyzed?	X		
1.2 Were the samples properly preserved in the appropriate containers?	X		
1.3 Are all holding times within the technical criteria? __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		
1.4 Are all cooler temperatures within the control limits? Cooler Temperature: 1.4 °C __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		

2.0 Surrogates/Labeled Compounds (A)	**Y**	**N**	**N/A**
2.1 Are all recovery values within the control limits? _X_ no outliers ____ see attached Surrogate Summary Form or data package page __X__ see below		X	

NWTPH-Dx:

- Sample **GTP47-1 (10x)** %R value for n-Pentacosane (0%) – (Control Limit= 50-150)

No action; the sample was diluted at least 10 times-surrogate diluted out in all cases.

Project # 0506-117-12

3.0 Method/Field Blank (A)

	Y	N	N/A
3.1 Are Method Blanks free from contamination? __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below	X		
3.2 Are there any trip/equipment blanks included in the data package (list below)?		X	
3.3 Are trip/equipment/field blanks free from contamination? ____ no outliers ____ see attached Blank Summary Form or data package page __X__ see below			X

Comments: ____ No positive results in associated samples; no action required for method / trip / equip. / other

____10X action level established for common lab cont.; 5X action level for others

4.0 Laboratory Control Sample (Blank Spike/OPR Sample) (A)

QC ID/Date:

	Y	N	N/A
4.1 Are all %R-values within the control limits? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		
4.2 Are all RPD values within control limits (if duplicate analyzed)? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		

Compound	%R values	Action

5.0 Matrix Spike/Matrix Spike Duplicate (A)

Parent Sample ID: **See below**

	Y	N	N/A
5.1 Are all %R-values within the control limits? __X__ no outliers ____ see attached MS/MSD Summary Form or data package page ___ see below	X		
5.2 Are all RPD values within control limits? ____ no outliers ____ see attached MS/MSD Summary Form or data package page __X__ see below		X	

Compound	%R or *RPD* values	Control Limits	Action
Diesel Fuel	*39*	*(30)*	*Qualified (J) in the parent sample.*
• Parent sample: **GTP38-4**			
Silver	66	(75-125)	Qualified (J/UJ) in all associated samples.

Project # 0506-117-12

6.0 Field Duplicate (A) Field Duplicate Sample ID(s): **GTP47-4** & **DUPLICATE-2**

	Y	N	N/A
6.1 Were field duplicates collected and analyzed?	X		
6.2 Are all RPD values within control limits? __X__ no outliers ____ see attached Field Dup. Summary Form or data package page ____ see below	X		

Comments: ____ No qualifiers assigned based on field duplicate outliers

7.0 Sample Results (A)

	Y	N	N/A
7.1 Are there results for all analytes on the client required target compound list(s) **see QAPP for lists**?	X		
7.2a Were TIC requested for this project?		X	
7.2b If "yes", were TIC reported as required?			X
7.3 Are reporting limits and sample results adjusted for sample size, % moisture (solid samples), etc.?	X		
7.4 Is there any interference acting on any of the analyte concentrations?	X		

BNSF – Parkwater Rail Yard Site

Project # 0506-117-12

Analyte Group (including methods): NWTPH-Dx, Metals (6010 & 7471)

GeoEngineers Sampling Event Date(s): 12/28/09

Laboratory SDG: 10119703

Validator Initials/Date: MJL 1/24/10

TECHNICAL EVALUATION CHECKLIST

A (Summaries of holding times, sample results; accuracy; precision; blanks)

☒

B (Summaries of calibration, instrument performance & compound ID)

☐ Regular ☐ HRMS (High Resolution Mass Spectrometry)

Yes Qualifiers Issued to the database.

1.0 Technical Holding Times and Sample Handling (A)	**Y**	**N**	**N/A**
1.1 Is the chain-of-custody (COC) properly signed/dated? Correct analyses requested? All samples analyzed?	X		
1.2 Were the samples properly preserved in the appropriate containers?	X		
1.3 Are all holding times within the technical criteria? __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		
1.4 Are all cooler temperatures within the control limits? Cooler Temperature: 4.8, 1.8 °C __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		

2.0 Surrogates/Labeled Compounds (A)	**Y**	**N**	**N/A**
2.1 Are all recovery values within the control limits? ___ no outliers ____ see attached Surrogate Summary Form or data package page __X__ see below		X	

NWTPH-Dx: (Continued on last page)

- Sample **DP18-1-2** %R value for n-Pentacosane (47%) – (Control Limit= 50-150)
- Sample **DP18-4** %R value for n-Pentacosane (44%) – (Control Limit= 50-150)
- Sample **DP18-2** %R value for n-Pentacosane (46%) – (Control Limit= 50-150)
- Sample **DUPLICATE-3** %R value for n-Pentacosane (44%) – (Control Limit= 50-150)
- Sample **DUPLICATE-4** %R value for n-Pentacosane (42%) – (Control Limit= 50-150)
- Sample **DP19-5** %R value for n-Pentacosane (42 %) – (Control Limit= 50-150)
- Sample **DP19-7-8** %R value for n-Pentacosane (48 %) – (Control Limit= 50-150)
- Sample **DP20-2** %R value for n-Pentacosane (48 %) – (Control Limit= 50-150)
- Sample **DP20-5-6** %R value for n-Pentacosane (48 %) – (Control Limit= 50-150)
- Sample **DP22-1-2** %R value for n-Pentacosane (48 %) – (Control Limit= 50-150)
- Sample **DP13-6-7** %R value for n-Pentacosane (48 %) – (Control Limit= 50-150)
- Sample **DP15-6-7** %R value for n-Pentacosane (45 %) – (Control Limit= 50-150)
- Sample **DP17-1.5-2.5** %R value for n-Pentacosane (48 %) – (Control Limit= 50-150)
- Sample **DP17-3-4** %R value for n-Pentacosane (37 %) – (Control Limit= 50-150)

Project # 0506-117-12

3.0 Method/Field Blank (A)

	Y	N	N/A
3.1 Are Method Blanks free from contamination? __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below	X		
3.2 Are there any trip/equipment blanks included in the data package (list below)?		X	
3.3 Are trip/equipment/field blanks free from contamination? ____ no outliers ____ see attached Blank Summary Form or data package page __X__ see below			X

Comments: ____ No positive results in associated samples; no action required for method / trip / equip. / other

____10X action level established for common lab cont.; 5X action level for others

4.0 Laboratory Control Sample (Blank Spike/OPR Sample) (A)

QC ID/Date:

	Y	N	N/A
4.1 Are all %R-values within the control limits? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		
4.2 Are all RPD values within control limits (if duplicate analyzed)? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		

Compound	%R values	Action

5.0 Matrix Spike/Matrix Spike Duplicate (A)

Parent Sample ID: **See below for parent samples.**

	Y	N	N/A
5.1 Are all %R-values within the control limits? __X__ no outliers ____ see attached MS/MSD Summary Form or data package page ___ see below		X	
5.2 Are all RPD values within control limits? ____ no outliers ____ see attached MS/MSD Summary Form or data package page __X__ see below		X	

Compound	%R or *RPD* values	Control Limits	Action
Silver	50, 50	(75-125)	Qualified (J/UJ) in all associated samples.
Mercury	65, 127 - *60*	(75-125) (30)	Qualified (J/UJ) in all associated samples.
• **DP14-2.5-3**			
Silver	67	(75-125)	Qualified (J/UJ) in all associated samples.
Barium	64	(75-125)	Qualified (J/UJ) in all associated samples.
Mercury	128	(75-125)	Qualified (J/UJ) in all associated samples.
• **DP17-3-4**			

6.0 Field Duplicate (A) Field Duplicate Sample ID(s):

	Y	N	N/A
6.1 Were field duplicates collected and analyzed?	X		
6.2 Are all RPD values within control limits? ____ no outliers ____ see attached Field Dup. Summary Form or data package page __X__ see below	X		

Comments: ____ No qualifiers assigned based on field duplicate outliers

DP18-1-2 & **DUPLICATE-3:** All RPD/Absolute difference values less than the control limits.

DP15-6-7 & **DUPLICATE-4:** All RPD/Absolute difference values less than the control limits.

7.0 Sample Results (A)

	Y	N	N/A
7.1 Are there results for all analytes on the client required target compound list(s) **see QAPP for lists**?	X		
7.2a Were TIC requested for this project?		X	
7.2b If "yes", were TIC reported as required?			X
7.3 Are reporting limits and sample results adjusted for sample size, % moisture (solid samples), etc.?	X		
7.4 Is there any interference acting on any of the analyte concentrations?	X		

- Sample **DP21-1.5-2.5** %R value for n-Pentacosane (41 %) – (Control Limit= 50-150)
- Sample **DP21-7** %R value for n-Pentacosane (41 %) – (Control Limit= 50-150)
- Sample **DP23-3-4** %R value for n-Pentacosane (44 %) – (Control Limit= 50-150)

All of the above Diesel Fuel / Motor Oil results and reporting limits were qualified as estimated (J/UJ).

BNSF – Parkwater Rail Yard Site

Project # 0506-117-12

Analyte Group (including methods): NWTPH-Dx, Metals (6010 & 7471), PAHs (8270-SIM), Volatile compounds (8260)

GeoEngineers Sampling Event Date(s): 12/21/09

Laboratory SDG: 10119390

Validator Initials/Date: MJL 1/20/10

TECHNICAL EVALUATION CHECKLIST

A (Summaries of holding times, sample results; accuracy; precision; blanks)
☒

B (Summaries of calibration, instrument performance & compound ID)

☐ Regular ☐ HRMS (High Resolution Mass Spectrometry)

Yes Qualifiers Issued to the database.

1.0 Technical Holding Times and Sample Handling (A)	**Y**	**N**	**N/A**
1.1 Is the chain-of-custody (COC) properly signed/dated? Correct analyses requested? All samples analyzed?	X		
1.2 Were the samples properly preserved in the appropriate containers?	X		
1.3 Are all holding times within the technical criteria? __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		
1.4 Are all cooler temperatures within the control limits? Cooler Temperature: 0.0 °C __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		

2.0 Surrogates/Labeled Compounds (A)	**Y**	**N**	**N/A**
2.1 Are all recovery values within the control limits? _X_ no outliers ____ see attached Surrogate Summary Form or data package page __X__ see below		X	

NWTPH-Dx:

- Sample **GTP48-1** %R value for n-Pentacosane (31%) – (Control Limit= 50-150) – BOTH results qualified (J/UJ).
- Sample **GTP46-1 (20x)** %R value for n-Pentacosane (0%) – (Control Limit= 50-150)

No action; the sample was diluted at least 10 times-surrogate diluted out in all cases.

PAHs:

- Sample **GTP46-1 (100x)** no recovery for any surrogates.

No action; the samples were diluted at least 10 times-surrogate diluted out in all cases.

Project # 0506-117-12

3.0 Method/Field Blank (A)

	Y	N	N/A
3.1 Are Method Blanks free from contamination? __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below	X		
3.2 Are there any trip/equipment blanks included in the data package (list below)?		X	
3.3 Are trip/equipment/field blanks free from contamination? ____ no outliers ____ see attached Blank Summary Form or data package page __X__ see below			X

Comments: ____ No positive results in associated samples; no action required for method / trip / equip. / other

____10X action level established for common lab cont.; 5X action level for others

4.0 Laboratory Control Sample (Blank Spike/OPR Sample) (A)

QC ID/Date:

	Y	N	N/A
4.1 Are all %R-values within the control limits? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		
4.2 Are all RPD values within control limits (if duplicate analyzed)? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		

Compound %R values Action

5.0 Matrix Spike/Matrix Spike Duplicate (A)

Parent Sample ID: **See Below – All parent MS/MSD taken from this delivery group were OK.**

	Y	N	N/A
5.1 Are all %R-values within the control limits? __X__ no outliers ____ see attached MS/MSD Summary Form or data package page ___ see below	X		
5.2 Are all RPD values within control limits? __X__ no outliers ____ see attached MS/MSD Summary Form or data package page ___ see below	X		

Compound %R or *RPD* values Control Limits Action

Project # 0506-117-12

6.0 Field Duplicate (A) Field Duplicate Sample ID(s):

	Y	N	N/A
6.1 Were field duplicates collected and analyzed?	X		
6.2 Are all RPD values within control limits? ____ no outliers ____ see attached Field Dup. Summary Form or data package page ____ see below		X	

Comments: ____ No qualifiers assigned based on field duplicate outliers

7.0 Sample Results (A)

	Y	N	N/A
7.1 Are there results for all analytes on the client required target compound list(s) **see QAPP for lists**?	X		
7.2a Were TIC requested for this project?		X	
7.2b If "yes", were TIC reported as required?			X
7.3 Are reporting limits and sample results adjusted for sample size, % moisture (solid samples), etc.?	X		
7.4 Is there any interference acting on any of the analyte concentrations?	X		

BNSF – Parkwater Rail Yard Site

Project # 0506-117-12

Analyte Group (including methods): NWTPH-Dx, PCBs (EPA 8082), Metals (6010 & 7471), PAHs (EPA 8270C/SIM), Volatile Organic Compounds (EPA 8260B)

GeoEngineers Sampling Event Date(s): 1/19/10

Laboratory SDG: 10120799

Validator Initials/Date: MJL 2/5/10

TECHNICAL EVALUATION CHECKLIST

A (Summaries of holding times, sample results; accuracy; precision; blanks)

☒

B (Summaries of calibration, instrument performance & compound ID)

☐ Regular ☐ HRMS (High Resolution Mass Spectrometry)

Yes Qualifiers Issued to the database.

1.0 Technical Holding Times and Sample Handling (A)	**Y**	**N**	**N/A**
1.1 Is the chain-of-custody (COC) properly signed/dated? Correct analyses requested? All samples analyzed?	X		
1.2 Were the samples properly preserved in the appropriate containers?	X		
1.3 Are all holding times within the technical criteria? __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		
1.4 Are all cooler temperatures within the control limits? Cooler Temperature: 3.2°C __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		

2.0 Surrogates/Labeled Compounds (A)	**Y**	**N**	**N/A**
2.1 Are all recovery values within the control limits? ___ no outliers ____ see attached Surrogate Summary Form or data package page __X__ see below		X	

PAHs:

- Sample **DP12-0.5-1.25** %R value for **Terphenyl-d14** (61%) – (Control Limit = 67-125)

No action - only one base-neutral outlier.

VOCs:

- Sample **DP12-4-5.8** %R value for **ALL SURROGATES** were greater than the control limits.

No action - no positive results in the sample.

Project # 0506-117-12

3.0 Method/Field Blank (A)

	Y	N	N/A
3.1 Are Method Blanks free from contamination? __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below	X		
3.2 Are there any trip/equipment blanks included in the data package (list below)?	X		
3.3 Are trip/equipment/field blanks free from contamination? **TRIP BLANK** __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below	X		

Comments: ____ No positive results in associated samples; no action required for method / trip / equip. / other

____10X action level established for common lab cont.; 5X action level for others

4.0 Laboratory Control Sample (Blank Spike/OPR Sample) (A)

QC ID/Date:

	Y	N	N/A
4.1 Are all %R-values within the control limits? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		
4.2 Are all RPD values within control limits (if duplicate analyzed)? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		

Compound	%R values	Action

5.0 Matrix Spike/Matrix Spike Duplicate (A)

Parent Sample ID: **Taken from different SDG(PCBs and PAHs); DP12-0.5-1.25 (Metals)**

	Y	N	N/A
5.1 Are all %R-values within the control limits? _X__ no outliers ____ see attached MS/MSD Summary Form or data package page ___ see below		X	
5.2 Are all RPD values within control limits? ____ no outliers ____ see attached MS/MSD Summary Form or data package page _X_ see below		X	

Compound	%R or *RPD* values	Control Limits	Action
PCB-1016 & PCB-1260	**Outliers**; No action – parent sample not included in this SDG.		
Barium	0, 325; *75*	(75-125);(30)	None, parent > the amount spiked
Lead	45, 331; *50*	(75-125);(30)	None, parent > 4x the amount spiked
Silver	53, 61	(75-125)	All silver reporting limits qualified (UJ)
Fluoranthene & Pyrene	**Outliers**; No action – parent sample not included in this SDG.		

Project # 0506-117-12

6.0 Field Duplicate (A) Field Duplicate Sample ID(s):

	Y	N	N/A
6.1 Were field duplicates collected and analyzed?		X	
6.2 Are all RPD values within control limits? __X__ no outliers ____ see attached Field Dup. Summary Form or data package page ___ see below			X

Comments: ____ No qualifiers assigned based on field duplicate outliers

7.0 Sample Results (A)

	Y	N	N/A
7.1 Are there results for all analytes on the client required target compound list(s) **see QAPP for lists**?	X		
7.2a Were TIC requested for this project?		X	
7.2b If "yes", were TIC reported as required?			X
7.3 Are reporting limits and sample results adjusted for sample size, % moisture (solid samples), etc.?	X		
7.4 Is there any interference acting on any of the analyte concentrations?	X		

BNSF – Parkwater Rail Yard Site

Project # 0506-117-12

Analyte Group (including methods): NWTPH-Dx, PCBs (EPA 8082), Metals (6010 & 7471),

GeoEngineers Sampling Event Date(s): 2/9/10

Laboratory SDG: 10122203

Validator Initials/Date: MJL 2/25/10

TECHNICAL EVALUATION CHECKLIST

A (Summaries of holding times, sample results; accuracy; precision; blanks)

☒

B (Summaries of calibration, instrument performance & compound ID)

☐ Regular ☐ HRMS (High Resolution Mass Spectrometry)

__No__ Qualifiers Issued to the database.

1.0 Technical Holding Times and Sample Handling (A)	**Y**	**N**	**N/A**
1.1 Is the chain-of-custody (COC) properly signed/dated? Correct analyses requested? All samples analyzed?	X		
1.2 Were the samples properly preserved in the appropriate containers?	X		
1.3 Are all holding times within the technical criteria? __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		
1.4 Are all cooler temperatures within the control limits? Cooler Temperature: 0.1 °C __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		

2.0 Surrogates/Labeled Compounds (A)	**Y**	**N**	**N/A**
2.1 Are all recovery values within the control limits? ___ no outliers ____ see attached Surrogate Summary Form or data package page __X__ see below		X	

NWTPH-Dx:

- Sample **GTP36B-1** %R value for **n-pentacosane** was greater than the control limits.

  No action - the high concentrations of taget analytes are masking the surrogate spike.

Project # 0506-117-12

3.0 Method/Field Blank (A)

	Y	N	N/A
3.1 Are Method Blanks free from contamination? __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below	X		
3.2 Are there any trip/equipment blanks included in the data package (list below)?		X	
3.3 Are trip/equipment/field blanks free from contamination? __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below			X

Comments: ____ No positive results in associated samples; no action required for method / trip / equip. / other

____10X action level established for common lab cont.; 5X action level for others

4.0 Laboratory Control Sample (Blank Spike/OPR Sample) (A)

QC ID/Date:

	Y	N	N/A
4.1 Are all %R-values within the control limits? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		
4.2 Are all RPD values within control limits (if duplicate analyzed)? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		

Compound	%R values	Action

5.0 Matrix Spike/Matrix Spike Duplicate (A)

Parent Sample ID: ***Taken from a different SDG*** **(Metals)**

	Y	N	N/A
5.1 Are all %R-values within the control limits? ___ no outliers ____ see attached MS/MSD Summary Form or data package page __X__ see below		X	
5.2 Are all RPD values within control limits? ____ no outliers ____ see attached MS/MSD Summary Form or data package page __X__ see below		X	

Compound	%R or *RPD* values	Control Limits	Action
Barium	199, 229	(75-125)	None; parent concentration > 4x the amount spiked
Lead	1624, 0 (*56)*	(75-125) (30)	" "
Chromium	87, 33	(75-125)	None, only one outlier.
Silver	49, 31 (36)	(75-125) (30)	None, parent sample taken from Different SDG

Project # 0506-117-12

6.0 Field Duplicate (A) Field Duplicate Sample ID(s):

	Y	N	N/A
6.1 Were field duplicates collected and analyzed?		X	
6.2 Are all RPD values within control limits? __X__ no outliers ____ see attached Field Dup. Summary Form or data package page ___ see below			X

Comments: ____ No qualifiers assigned based on field duplicate outliers

7.0 Sample Results (A)

	Y	N	N/A
7.1 Are there results for all analytes on the client required target compound list(s) **see QAPP for lists**?	X		
7.2a Were TIC requested for this project?		X	
7.2b If "yes", were TIC reported as required?			X
7.3 Are reporting limits and sample results adjusted for sample size, % moisture (solid samples), etc.?	X		
7.4 Is there any interference acting on any of the analyte concentrations?	X		

BNSF – Parkwater Rail Yard Site

Project # 0506-117-12

Analyte Group (including methods): NWTPH-Gx-BTEX (8021), NWTPH-Dx, PCBs (EPA 8082), Metals (6010 & 7471), PAHs (EPA 8270C/SIM), Volatile Organic Compounds (EPA 8260B)

GeoEngineers Sampling Event Date(s): 1/4/10

Laboratory SDG: 10119885

Validator Initials/Date: MJL 2/7/10

TECHNICAL EVALUATION CHECKLIST

A (Summaries of holding times, sample results; accuracy; precision; blanks)
☒

B (Summaries of calibration, instrument performance & compound ID)

☐ Regular ☐ HRMS (High Resolution Mass Spectrometry)

Yes Qualifiers Issued to the database.

1.0 Technical Holding Times and Sample Handling (A)	**Y**	**N**	**N/A**
1.1 Is the chain-of-custody (COC) properly signed/dated? Correct analyses requested? All samples analyzed?	X		
1.2 Were the samples properly preserved in the appropriate containers?	X		
1.3 Are all holding times within the technical criteria? __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		
1.4 Are all cooler temperatures within the control limits? Cooler Temperature: 1.6, 0.6, 0.4 °C __X__ no outliers ____ see attached Holding Time worksheet or data package page ____ see below	X		

2.0 Surrogates/Labeled Compounds (A)	**Y**	**N**	**N/A**
2.1 Are all recovery values within the control limits? ___ no outliers ____ see attached Surrogate Summary Form or data package page __X__ see below		X	

VOCs:

- Sample **GTP32-1-2** %R value for **TOLUENE-D8** was greater than the control limits.

  No action - only one surrogate outlier.

- Sample **GTP34-1-2** %R values for **TOLUENE-D8 and 4-BROMOFLUOROBENZENE** were outside the control limits.

  All reporting limits were qualified as estimated (UJ). Benzene already qualified (J).

- Sample **GTP35-1-2** %R values for **TOLUENE-D8 and 4-BROMOFLUOROBENZENE** were outside the control limits.

  All reporting limits were qualified as estimated (UJ).

Project # 0506-117-12

3.0 Method/Field Blank (A)

	Y	N	N/A
3.1 Are Method Blanks free from contamination? __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below	X		
3.2 Are there any trip/equipment blanks included in the data package (list below)?	X		
3.3 Are trip/equipment/field blanks free from contamination? **MEOH BLANK** __X__ no outliers ____ see attached Blank Summary Form or data package page ____ see below	X		

Comments: ____ No positive results in associated samples; no action required for method / trip / equip. / other

____10X action level established for common lab cont.; 5X action level for others

4.0 Laboratory Control Sample (Blank Spike/OPR Sample) (A)

QC ID/Date:

	Y	N	N/A
4.1 Are all %R-values within the control limits? ____ no outliers ____ see attached Summary Form or data package page __X__ see below		X	
4.2 Are all RPD values within control limits (if duplicate analyzed)? __X__ no outliers ____ see attached Summary Form or data package page ____ see below	X		

Compound	%R values		Action
Gasoline Range	128, 114	(75-125)	None; only one outlier
Bromoform	68, 65	(70-130)	Reporting Limits qualified (UJ) in associated samples
trans-1,3-Dichloropropene	72,69	(70-130)	None, only one outlier.

5.0 Matrix Spike/Matrix Spike Duplicate (A)

Parent Sample ID: **DUPLICATE-6 (Metals); GTP32-1-2 (PAHs)**

	Y	N	N/A
5.1 Are all %R-values within the control limits? __X__ no outliers ____ see attached MS/MSD Summary Form or data package page ___ see below		X	
5.2 Are all RPD values within control limits? __X__ no outliers ____ see attached MS/MSD Summary Form or data package page __ see below	X		

Compound	%R or *RPD* values	Control Limits	Action
Silver	46	(75-125)	All silver results/reporting limits qualified (UJ)
Benzo(g,h,i)perlyene	24,40	(30-150)	None, only one outlier.
Indeno(1,2,3-cd)pyrene	28, 38	(30-150)	None, only one outlier.

6.0 Field Duplicate (A) Field Duplicate Sample ID(s): 1) GTP55-1-2 & DUPLICATE-5 2) GTP34-4 & DUPLICATE-6

	Y	N	N/A
6.1 Were field duplicates collected and analyzed?	X		
6.2 Are all RPD values within control limits? ____ no outliers ____ see attached Field Dup. Summary Form or data package page __x_ see below		X	

Comments: ____ No qualifiers assigned based on field duplicate outliers

2) (Metals) Lead RPD value =72%

- Lead results qualified as estimated in both samples.

7.0 Sample Results (A)

	Y	N	N/A
7.1 Are there results for all analytes on the client required target compound list(s) **see QAPP for lists**?	X		
7.2a Were TIC requested for this project?		X	
7.2b If "yes", were TIC reported as required?			X
7.3 Are reporting limits and sample results adjusted for sample size, % moisture (solid samples), etc.?	X		
7.4 Is there any interference acting on any of the analyte concentrations?	X		

1869
1870

APPENDIX D
Laboratory Analytical Reports (CD)

APPENDIX D
LABORATORY ANALYTICAL REPORTS (CD)

TABLE D-1. CHAIN OF CUSTODY INFORMATION

Chain of Custody Number	PDF Document Name.
1335094	10118631
1335075	10118810
1335077	10118932
1335099	10118946
1335086	10119003
1335100	10119104
1335101	10119388
1335102	10119390
1335123	10119500
1232731	10119703
1232733	10119885
1232735	10120799
1232737	10122203
1232738	10123202
J17541	Test America

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CHAIN-OF-CUSTODY / Analytical Request Document

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10114703

Page: 3 of 3

1232732

Section A Required Client Information:

Company: GeoEngineers
Address: 523 E 2nd
Spokane, WA 99202
Email To:
Phone: Fax:
Requested Due Date/TAT: Std

Section B Required Project Information:

Report To: John Haney
Copy To: Bruce Williams
Purchase Order No.:
Project Name: Parkwater
Project Number: 0506-117-12

Section C Invoice Information:

Attention: Bruce Sheppard
Company Name: BNSF
Address:
Pace Quote Reference:
Pace Project Manager: Carol Davy
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☒ OTHER

Site Location STATE: WA

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes — MATRIX / CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N: NWTPH-Dx	PCBs & Metals 6010	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	DP17-1.5-2.5	SL	G			12/28/09	1235		2	/									/		D25
2	DP17-3-4						1240		2	/									/		D26
3	DP17-6-7						1245		2	/									/		Hold D27
4	DP21-1.5-2.5						1255		2	/									/		D28
5	DP21-5						1300		2	/									/		Hold D29
6	DP21-7						1305		2	/									/		D30
7	DP23-1-2						1315		2	/									/		D31
8	DP23-3-4						1325		2	/									/		D32
9	DP23-6-7						1330		2	/									/		Hold D33
10	DP21-10						1310		2	/									/		Hold D34
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	[signature] / GeoEngineers	12/29/09	1730	[signature] / Pace	12/30/09	0957	4.8	Y	Y	Y
							1.8			

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Katherine Cassidy

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 12/28/09

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

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10118631

Page: 1 of 2

1335094

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: GeoEngineers	Report To: John Haney	Attention: Bruce Sheppard
Address: 532E 27th Ave	Copy To: Jodi Lamb	Company Name: BNSF
Spokane WA 99202		Address:
Email To:	Purchase Order No.:	Pace Quote Reference:
Phone: Fax:	Project Name: BNSF Parkwater Ri	Pace Project Manager: Carol Davy
Requested Due Date/TAT: Standard	Project Number: 0506-117-12	Pace Profile #:

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☒ OTHER

Site Location STATE: WA

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	RCRA 8 Metals EPA 6000	NWTPH-Dx DRO	PAHs EPA 8270C-SIM	BTEX - low level 8260	BTEX 8260	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	DP45 1.7-2.7	SL	G		~~1050~~	~~12/1/09~~	1050		2	2									Y	Y					001
2	DP45 4-5				~~1055~~		1055		2	2															hold 002
3	DP45 8-9				~~1110~~		1110		2	2															hold 003
4	DP45 12-13.5				~~1115~~		1115		2	2															hold 004
5	DP11-0.6-1.8						1230		3	3															hold 005
6	DP11-4.2-4.85						1235		3	3									Y	Y	Y		Y		006
7	DP11-8-8.4						1245		3	3									Y	Y	Y				007
8	DP11-12-14						1255		3	3															hold 008
9	DP11-8-9						1220		4	3							1		Y			Y			009
10	DP10-5						1335		4	3							1		Y			Y			010
11	DP100.2-1						1310		3	3															hold 011
12	DP10-4-5.8	↓	↓			↓	1335		3	3									Y	Y	Y		Y		012

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	GeoEngineers	12-1-09	1730	Pace MN	12/11/09	0947	0.2	Y	N	Y

46 of 48

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Katherine Cassidy

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 12-11-09 1655

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1 0118631

Page: 2 of 2

1335093

Section A Required Client Information:

Company:	Cus Engineers
Address:	532 E 2nd Ave
	Spokane, WA 99202
Email To:	
Phone:	Fax:
Requested Due Date/TAT:	Standard

Section B Required Project Information:

Report To:	John Haney
Copy To:	Jodi Lamb
Purchase Order No.:	
Project Name:	BNSF Parkwater RI
Project Number:	0500-117-12

Section C Invoice Information:

Attention:	Bruce Sheppard
Company Name:	BNSF
Address:	
Pace Quote Reference:	
Pace Project Manager:	Carol Davy
Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☒ OTHER

Site Location STATE: WA

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N: NWTPH-Dx and SGC	PCBs EPA 8082	PAHs EPA 8270 SIM	VOCs EPA 8260B	LCAAs Kubek EPA 6020	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	DP10-8-9	SL	G			12/1/09	1355		3	3								/		/		/		013
2	DP10-12-12.4					12/1/09	1405		3	3								/		/				hold 014
3	MW23560-602					12-3-09	1245		2	2								/		/		/		015
4	Trip Blank					12/1/0															1	/		
5																						12/10/09		
6																								
7																								
8																								
9																								
10																								
11																								
12																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	[signature] / Cus Engineers	12-11-09	1730	[signature] PACE MN	12/11/09	0947	0.2	Y	N	Y
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

47 of 48

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Katherine Cassidy

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 12-11-09

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10118810

Page: 1 of 1

1335075

Section A Required Client Information:

Company: GeoEngineers
Address: 523 E 2nd Ave
Spokane WA 99202
Email To:
Phone: Fax:
Requested Due Date/TAT: Standard

Section B Required Project Information:

Report To: John Haney
Copy To: Bruce Williams
Purchase Order No.:
Project Name: Parkwater RI
Project Number: 0506-117-12

Section C Invoice Information:

Attention: Bruce Sheppard
Company Name: BNSF
Address: Seattle WA
Pace Quote Reference:
Pace Project Manager: Carol Davy
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☒ OTHER

Site Location STATE: WA

17 of 18

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE)

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test ↓ Y/N	RCRA 8 Metals 6010	NWTPH-Dx	PCBs EPA 8082	PAHs 8270C w/ LOC/LMS	VOC Low Level 8260 BTEX	VOC 8260B BTEX	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	DP09-2.5-3	SL	G			12-14-09	1325		4	3						1										001
2	DP09-3.5-4.5	"	"			"	1230		"	3						1										002
3	DP07-6-7	"	"			"	1145		"	3						1										003
4	DP05-10.6	"	"			"	1100		"	3						1										004
5	DP01A-11-12.5	"	"			"	1645		"	3						1										005
6	DP02-6-7	"	"			"	1610		"	3						1										006
7	DP03-7.5-8.5	"	"			"	1535		"	3						1										007
8	DP04-12-13	"	"			"	1445		"	3						1										008
9	DP																									
10	DP																									
11	DP																									
12	DP																									

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	KW CB / GeoEngineers	12-14-09	1730	[signature] Pace	12/15	1000	6.0	y	y	y

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Katherine Cassidy

SIGNATURE of SAMPLER: KW CB

DATE Signed (MM/DD/YY): 12/14/09

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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ID18932

Page: 1 of 2

1335077

Section A Required Client Information:

Company: Geo Engineers
Address: 523 E 2nd Ave
Spokane, WA 99202
Email To:
Phone: Fax:
Requested Due Date/TAT: Std

Section B Required Project Information:

Report To: John Haney
Copy To: Bruce Williams
Purchase Order No.:
Project Name: Parkwater R1
Project Number: 0506-117-12

Section C Invoice Information:

Attention: Bruce Sheppard
Company Name: BNSF
Address:
Pace Quote Reference:
Pace Project Manager: Carol Davy
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☒ OTHER 650 67

Site Location STATE: WA

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	RCRA 8 Metals 6010D	NWTPH-Dx	PCBs EPA 8082	PAHs 8270C w/GC/MS	VOCs Low Level 8260 BTEX	VOCs 8260B BTEX	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	DP01-1-2	SL	G			12-15-09	1020		3																		001
2	DP01-5-6						1030		7																		002
3	DP01-12.5-13						1045		3																		Hold 003
4	DP24-0.5-1.5						1105		3																		004
5	DP24-2-3						1115		3																		Hold 005
6	DP24-7-7.5						1130		7																		006
7	DP24-11.5-12						1145		3																		Hold 007
8	DP26-1-2						1150		7																		008
9	DP26-5-6						1210		3																		Hold 009
10	DP26-10						1215		3																		Hold 010
11	DP29-1-2						1235		7																		011
12	DP29-3-4	↓	↓			↓	1240		3																		012

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	[signature] / GeoEngineers	12-15-09	1730	[signature]	12/16	1000	6.0 5.7	Y	Y	Y
							6.0			
							4.8			

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Katherine Cassidy
SIGNATURE of SAMPLER: [signature]
DATE Signed (MM/DD/YY): 12/15/09

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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Page: 2 of 2

1335085

Section A Required Client Information:

Company: GeoEngineers
Address: Spokane, WA
Email To:
Phone: Fax:
Requested Due Date/TAT: Std

Section B Required Project Information:

Report To: John Haney
Copy To: Bruce Williams
Purchase Order No.:
Project Name: Padewater RI
Project Number: 0506-117-12

Section C Invoice Information:

Attention: Bruce Sheppard
Company Name: BNSF
Address:
Pace Quote Reference:
Pace Project Manager: Carol Davy
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☒ OTHER

Site Location STATE: WA

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Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE)

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test ↓ Y/N	RCRA8 Metals 6010	NWTPH-Dx	PAHs 8270C w/ GC/MS	BTEX low level 8260	BTEX EPA 8260	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	DP29-7	SL	G			12-15-09	1340		3	/									/	/	/					D13
2	DP30-1-2	SL	G			"	1515		3	/									/	/	/					D14
3	DP30-	SL	G			"	1530		7	/																D15
4	DP30-6-7	SL	G			↓	1535		3	/									/	/	/					Hold D16
5																										D17
6																										D18
7																										
8																										
9																										
10																										
11																										
12																										

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	GeoEngineers	12/15/09	1730	Pace	12/16	1000	6.0	Y	Y	Y
							5.7			
							6.0			
							4.8			

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Katherine Cassidy
SIGNATURE of SAMPLER:
DATE Signed (MM/DD/YY): 12/15/09

Temp in °C | Received on ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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CHAIN-OF-CUSTODY / Analytical Request Document

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ID/8946

Page: 1 of 2

1335099

Section A Required Client Information:

Company:	GeoEngineers
Address:	523 E 2nd Ave
	Spokane, WA 99202
Email To:	
Phone:	Fax:
Requested Due Date/TAT:	Std

Section B Required Project Information:

Report To:	John Haney
Copy To:	Bruce Williams
Purchase Order No.:	
Project Name:	Parks Water RI
Project Number:	0506-117-12

Section C Invoice Information:

Attention:	Bruce Sheppard
Company Name:	BNSF
Address:	
Pace Quote Reference:	
Pace Project Manager:	Carol Davy
Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☒ OTHER 54 of 56

Site Location STATE: WA

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	RCRA 8 Metals (6010)	NWTPH-Dx	PCBs EPA 8082	PAHs 8270C w/ 6C/MB	VOCs Low Level 8260 BTEX	VOCs 8260 BTEX	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	DP01A-1-2	SL	G			12-14-09	1630		3	/									/	/	/	/	/			1
2	DP01A-2-3						1640		3	/									/	/	/	/	/			2
3	DP01A-11.-12.5						1645		3	/									/	/	/	/	/		Hold	3
4	DP02-1-2						1550		3	/									/	/	/	/	/			4
5	DP02-6-7						1610		3	/									/	/	/	/	/			5
6	DP02-11.5-12.5						1625		3	/									/	/	/	/	/		Hold	6
7	DP03-1.5-2						1510		3	/									/	/	/	/	/			7
8	DP03-3-4						1525		3	/									/	/	/	/	/			8
9	DP03-7.5-8.5						1535		3	/									/	/	/	/	/		Hold	9
10	DP04-0.5-1.5						1415		3	/									/	/	/	/	/			10
11	DP04-3-4						1425		3	/									/	/	/	/	/			11
12	DP04-12-13	↓	↓			↓	1445		3	/									/	/	/	/	/		Hold	12

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	[signature] / GeoEngineers	12-15-09	1730	[signature]	12/16	1000	6.0	Y	Y	Y
							5.7			
							6.0			
							4.9			

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Katherine Cassidy

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 12/14/09

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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CHAIN-OF-CUSTODY / Analytical Request Document

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1335076

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Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: GeoEngineers	Report To: John Haney	Attention: Bruce Sheppard
Address: 523 E 2nd Ave Spokane, WA 99202	Copy To: Bruce Williams	Company Name: BNSF
		Address:
Email To:	Purchase Order No.:	Pace Quote Reference:
Phone: Fax:	Project Name: Parkwater RI	Pace Project Manager: Coral Davy
Requested Due Date/TAT: Std	Project Number: 0506-117-012	Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☒ OTHER

Site Location STATE: WA

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE)

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Requested Analysis Filtered (Y/N): RCRA 8 Metals 6010	MTPH-Dx	PCBs EPA 8082	PAHs 8270 Selected Ions	BTEX 8260 Low Level	BTEX EPA 8260B	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	DP05-1.3-2.6	SL	G			12-14-09	1030		3	/									/	/	/	/		/			013
2	DP05-8					12-14-09	1045		3	/									/	/	/	/					014
3	DP05-10						1055		3	/																Hold	015
4	DP07-2-2.7						1130		3	/									/	/	/	/		/			016
5	DP07-3.2-4						1120		3	/									/	/	/	/					017
6	DP07-6-7						1145		3	/																Hold	018
7	DP08-1.6-2.4						1220		3	/									/	/	/	/		/			019
8	DP08-3.5-4.5						1230		3	/										/	/	/					020
9	DP08-8-9						1245		3	/																Hold	021
10	DP09-1-2						1315		3	/									/	/	/	/		/			022
11	DP09-2.5-3						1325		3	/										/	/	/					023
12	DP09-5.5-6.5						1335		3	/																Hold	024

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	[signature] / GeoEngineers	12-15-09	1730	[signature] Pace	12/16	1000	6x0	Y	Y	Y
							5x7			
							6x0			
							4x8			

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Katherine Cassidy

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 12/14/09

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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CHAIN-OF-CUSTODY / Analytical Request Document

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10119003

Page: 1 of 2

1335086

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: GeoEngineers	Report To: John Haney	Attention: Bruce Sheppard
Address: Spokane, WA	Copy To: Bruce Williams	Company Name: BNSF
	Purchase Order No.:	Address:
Email To:	Project Name: Parkwater RI	Pace Quote Reference:
Phone: Fax:	Project Number: 0506-117-12	Pace Project Manager: Carol Davy
Requested Due Date/TAT: Std		Pace Profile #:

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☒ OTHER

Site Location STATE: WA

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information: SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	Matrix Codes MATRIX / CODE: Drinking Water DW, Water WT, Waste Water WW, Product P, Soil/Solid SL, Oil OL, Wipe WP, Air AR, Tissue TS, Other OT	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Y/N	Analysis Test: RCRA 8 Metals 6010	NWTPH-Dx	PAHs 8270SIM w/ GC/MS	BTEX low level 8260	BTEX EPA 8260	Lead	VOCs low level 8260							Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	DP25-3-4	SL	SL	G			12-6-09	920		7																							001
2	DP25-5-6							930		3																							002
3	DP25-8-9							945		3																							003
4	DP27-2.5-3.5							1005		7																							004
5	DP27-5-6							1015		3																							005
6	DP27-7-7.8							1020		3																							006
7	DP28-1.4-2							1035		7																							007
8	DP28-5-6							1040		3																							008
9	DP28-9-10							1045		3																							009
10	DP54-0-1							1145		7																							010
11	DP54-1-2							1150		3																							011
12	DP54-4.5-5.5		↓	↓			↓	1200		3																							012

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
⊗ Added 12-18-09 pw Allen Haney COD		12/16/09	1730		12/17/09	1000	1.2 3.6	Y	Y	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Katherine Cassidy

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 12/16/09

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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10/19003

Page: 2 of 2

1304582

Section A Required Client Information:

Company:	GeoEngineers
Address:	523 E 2nd Ave
	Spokane, WA 99202
Email To:	
Phone:	Fax:
Requested Due Date/TAT:	Std

Section B Required Project Information:

Report To:	John Haney
Copy To:	Bruce Sheppard Williams
Purchase Order No.:	
Project Name:	Parkwater R1
Project Number:	0506a-117-12

Section C Invoice Information:

Attention:	Bruce Sheppard
Company Name:	BNSF
Address:	
Pace Quote Reference:	
Pace Project Manager:	Carol Davy
Pace Profile #:	

REGULATORY AGENCY

NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐
UST ☐ RCRA ☐ OTHER ☒

Site Location STATE: WA

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Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	RCRA 8 Metals 6010	NWTPH-Dx	PAHs 8270 SIM w/ GC/MS	BTEX Low Level 8260	BTEX EPA 8260	Lead	VOC Low Level 8260		Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	DP44a-0-1	SL	G			12-16-09	1355		3	/									/	/	/				HOLD			013
2	DP44a-2-3						1400		3	/									/	/	/			⊗				014
3	DP44a-7-8						1350		3	/									/	/	/						Hold	015
4	DP44a-9						1357		3	/							/		/	/	/			/				016
5	DP44a 9.2						1430		4	/							/										Hold	017
6	DP44a-10-11						1430		3																		Hold	018
7	DP44-0.5-1.5						1450		3										/	/	/			⊗				019
8	DP44-6-7						1510		7										/	/	/			/				020
9	DP44-10-11						1520		3																		Hold	021
10	DP43-0-1						1535		3										/	/	/			⊗				022
11	DP43-2-3.5						1545		7										/	/	/			/				023
12	DP43-13-14	↓	↓			↓	1600		3										/	/	/						Hold	024

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
⊗ Added 12-18-09 per John Haney	GeoEngineers	12-16-09	1730	Pete MW	12/17/09	1000	1.2	4	4	4
HOLD per John Haney 12-18-09							3.6			

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Katherine Cassidy

SIGNATURE of SAMPLER:

DATE Signed (MM/DD/YY): 12/16/09

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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1120 | 1121 | 1122

CHAIN-OF-CUSTODY / Analytical Request Document

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10119104

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1335100

Section A Required Client Information:

Company: GeoEngineers
Address: 523 E 2nd Ave
Spokane, WA 99202
Email To:
Phone: Fax:
Requested Due Date/TAT: Std

Section B Required Project Information:

Report To: John Haney
Copy To: Bruce Williams
Purchase Order No.:
Project Name: Parkwater Rd
Project Number: 0506-117-12

Section C Invoice Information:

Attention: Bruce Sheppard
Company Name: BNSF
Address:
Pace Quote Reference:
Pace Project Manager: Carol Davy
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☒ OTHER

Site Location STATE: WA

Section D Required Client Information

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	RCRA 8 Metals 6010	NWTPH-Dx	PCBs EPA 8082	PAHs 8270C w/ 6C/MS	VOCs Low Level 8260	VOCs EPA 8260B Mid Level	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	DP44b-0.5-1.5	SL	G			12-17-09	1220		3										X	X		X				Hold 001
2	DP44b-3.8-4.6						1335		5																	002
3	DP44b-5						1340		4																	003
4	DP44b-6-7						1300		3																	004
5	DP44b-12-13						1310		3																	Hold 005
6	DP42-0.5-1						1350		3										X	X		X				Hold 006
7	DP42-4-5						1400		3																	007
8	DP42-7-7.5						1415		5																	008
9	DP42-8						1420		4																	009
10	DP42-11-12						1425		3																	Hold 010
11	DP41-0.5-1.5						1455		5																	011
12	~~DP41-4.5-5.5~~ DP41-9-10						1500 1510		3																	012 013

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
② Added 12-21-09 AMD	GeoEngineers	12-17-09		Pace	12/18/09	0952	2.6°	Y	Y	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Katherine Cassidy

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY): 12/17/09

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

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1335101

Section A
Required Client Information:

Company: GeoEngineers
Address: 523 E 2nd Ave
Spokane, WA 99202
Email To:
Phone: Fax:
Requested Due Date/TAT: Std

Section B
Required Project Information:

Report To: John Haney
Copy To: Bruce Williams
Purchase Order No.:
Project Name: Parkwater R1
Project Number: 0506-117-12

Section C
Invoice Information:

Attention: Bruce Sheppard
Company Name: BNSF
Address:
Pace Quote Reference:
Pace Project Manager: Carol Davy
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☒ OTHER

Site Location STATE: WA

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Section D
Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Matrix Codes MATRIX / CODE
Drinking Water DW
Water WT
Waste Water WW
Product P
Soil/Solid SL
Oil OL
Wipe WP
Air AR
Tissue TS
Other OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Y/N	Analysis Test: NWTPH-Dx	RCRA8 Metals (6010	PAHs EPA 8270C	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	GTP53-1	SL	G			12-18-09	0905		3															001
2	GTP53-3-5						0915		3															002
3	GTP53-13-15						0930		3															Hold 003
4	GTP52-1						1030		3															004
5	GTP52-3-4						1045		3															005
6	GTP52-11-12						1055		3															Hold 006
7	GTP51-1-2						1145		3															007
8	GTP51-4						1155		3															008
9	GTP51-12						1210		3															Hold 009
10	GTP50-1						1400		3															010
11	GTP50-5-6						1420		3															011
12	GTP50-10-11 Duplicate-1						~~1430~~ 1234		~~3~~ 3															Hold 012 013

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	GeoEngineers	12-21-09	1730		12/22/09	1045	010	Y	Y	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Katherine Cassidy
SIGNATURE of SAMPLER:
DATE Signed (MM/DD/YY): 12-18-09

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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1019390

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1335102

Section A Required Client Information:

Company: GeoEngineers
Address: 523 E 2nd Ave
Spokane WA 99202
Email To:
Phone: Fax:
Requested Due Date/TAT: Std

Section B Required Project Information:

Report To: John Harvey
Copy To: Bruce Williams
Purchase Order No.:
Project Name: Parkwater R1
Project Number: 0500e-117-12

Section C Invoice Information:

Attention: Bruce Sheppard
Company Name: BNSF
Address:
Pace Quote Reference:
Pace Project Manager: Carol Davy
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☒ OTHER

Site Location STATE: WA

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Requested Analysis Filtered (Y/N): Y/N	Analysis Test: Nutrients-Dx	Resp & Metals 6010	PAHs EPA 8270C	VOCs 8260	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	GTP48-1	SL	G			12-21-09	1000		3																001
2	GTP48-9-5						1015		3																002
3	GTP48-10-11						1025		3																Hold 003
4	GTP49-1						1125		3																004
5	GTP49-3-4						1135		3																005
6	GTP49-11-12						1200		3																Hold 006
7	GTP46-1						1415		3															X	007
8	GTP46-6-7						1440		3															X	008
9	GTP46-11-12						1455		3															X	009
10																									
11																									
12																									

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
@ added 12/22/09 Lic email from J. Harvey CMD	CB/GeoEngineers	12/21/09	1730	Pace	1222	1045	6.0	Y	Y	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Katherine Cassidy

SIGNATURE of SAMPLER: CB

DATE Signed (MM/DD/YY): 12/21/09

Temp In °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

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CHAIN-OF-CUSTODY / Analytical Request Document

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Page: 1 of 1

1335123

38 of 39

Section A Required Client Information:

Company:	GeoEngineers
Address:	523 E 2nd Ave
	Spokane, WA 99202
Email To:	
Phone:	Fax:
Requested Due Date/TAT:	Std

Section B Required Project Information:

Report To:	John Haney
Copy To:	Bruce Williams
Purchase Order No.:	
Project Name:	Parkwater RI
Project Number:	0506-117-12

Section C Invoice Information:

Attention:	Bruce Sheppard
Company Name:	BNSF
Address:	
Pace Quote Reference:	
Pace Project Manager:	Carol Davy
Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☒ OTHER

Site Location STATE: WA

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes — MATRIX / CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	NWTPH-Dx	RCRA 8 Metals (with Hg)	PCBs 8082	PAHs EPA 8270C	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	Duplicate-2					12.22.09	1234		3	/									/	/	/	/		001
2	GTP47-1						835		3	/									/	/	/	/		002
3	GTP47-4						855		3	/									/	/	/	/		003
4	GTP47-11						910		3	/									/	/	/	/		004
5	GTP40-2						1015		3	/									/	/	/	/		005
6	GTP40-9						1040		3	/									/	/	/	/		006
7	GTP39-5						1200		3	/									/	/	/	/		007
8	GTP39-10-11						1230		3	/									/	/	/	/		008
9	GTP38-4						1315		3	/									/	/	/	/		009
10	GTP38-9						1325		3	/									/	/	/	/		010
11	GTP37-5						1400		3	/									/	/	/	/		011
12	GTP37-9						1420		3	/									/	/	/	/		012

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
		12/22/09	1730	Pacel	12/23/09	1050	1.4	Y	Y	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Katherine Cassidy

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 12/22/09

Temp In °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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Page: 1 of 3

1232731

Section A Required Client Information:

Company: GeoEngineers
Address: Spokane, WA 99202
Email To:
Phone: Fax:
Requested Due Date/TAT: Std

Section B Required Project Information:

Report To: John Haney
Copy To: Bruce Williams
Purchase Order No.:
Project Name: Parkwater RI
Project Number: 0506-117-12

Section C Invoice Information:

Attention: Bruce Shypard
Company Name: BNSF
Address:
Pace Quote Reference:
Pace Project Manager: Carol Dowy
Pace Profile #:

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☒ OTHER 47 O 50

Site Location STATE: WA

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	NWTPH-Dx	RCRA 8 Metals (6010)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	DP14-2.5-3	SL	G			12-28-09	1000		2	/									/	/		001
2	DP14-4						1010		2	/									/	/		002
3	DP14-7						1015		2	/									/	/		Hold 003
4	DP16-1.5-2.5						1020		2	/									/	/		004
5	DP16-4-5						1025		2	/									/	/		005
6	DP16-7						1030		2	/									/	/		Hold 006
7	DP18-1-2						1035		2	/									/	/		007
8	DP18-4						1040		2	/									/	/		008
9	DP18-6-7						1045		2	/									/	/		Hold 009
10	DP19-2						1050		2	/									/	/		010
11	Duplicate-3						1234		2	/									/	/		011
12	Duplicate-4	↓	↓			↓	1234		2	/									/	/		012

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	[signature] / GeoEngineers	12/29/09	1730	[signature] Pace	12/30/09	0957	4C 1B	Y	Y	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Katherine Cassidy

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 12/28/09

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

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1232730

Section A Required Client Information:

Company: GeoEngineers
Address: 523 E 2nd Ave
Spokane, WA 99202
Email To:
Phone: Fax:
Requested Due Date/TAT: Std

Section B Required Project Information:

Report To: John Haney
Copy To: Bruce Williams
Purchase Order No.:
Project Name: Parkwater
Project Number: 0506-117-12

Section C Invoice Information:

Attention: Bruce Sheppard
Company Name: BNSF
Address:
Pace Quote Reference:
Pace Project Manager: Carol Davy
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☒ OTHER

Site Location STATE: WA

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	NWTPH-Dx	PAHs EPA 8270C	BTEX 8 Metals 6010	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	DP19-5	SL	G			12-28-09	1055		2	1														013
2	DP19-7-8						1100		2	1														014
3	DP20-2						1105		2	1														015
4	DP20-5-6						1110		2	1														016
5	DP20-7-8						1120		2	1														Hold 017
6	DP22-1-2						1130		2	1														018
7	DP13-1-2						1200		2	1														019
8	DP13-6-7						1210		2	1														020
9	DP13-8.5						1215		2	1														Hold 021
10	DP15-1-2						1220		2	1														022
11	DP15-6-7						1225		2	1														023
12	DP15-8						1230		2	1														Hold 024

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	GeoEngineers	12-29-09	1730		12/30/09	0957	4.8	Y	Y	Y
							1.8			

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Katherine Cassidy

SIGNATURE of SAMPLER:

DATE Signed (MM/DD/YY): 12/28/09

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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10119885

Page: 1 of 2

1232733

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: GeoEngineers	Report To: John Haney	Attention: Bruce Sheppard
Address: 523 E 2nd Spokane, WA	Copy To: Bruce Williams	Company Name: BNSF
		Address:
Email To:	Purchase Order No.:	Pace Quote Reference:
Phone: Fax:	Project Name: Parkwater	Pace Project Manager: Carol Davy
Requested Due Date/TAT: Std	Project Number: 0506-117-12	Pace Profile #:

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☒ OTHER

Site Location STATE: WA

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	NWTPH-Dx	BTEX 8260 Low Level	PAHs 8270C	PCBs 8082	VOC 8260 Low Level	BTEX 8260 Low Level	NWTPH-Gx	Lead	VOC 8260 Mid Level	BTEX 8260 Mid Level	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	GTP55-1-2	SL	G			1-4-10	1505		5	/						1												1
2	GTP55-5						1515		5	/						1												2
3	GTP55-8-9						1530		5	/						1												3
4	GTP55-3-4						1535		5	/						1												4
5	GTP36-1-2						1410		3	/																		5
6	GTP36-5						1420		3	/																		6
7	GTP36-9-10						1435		3	/																		7
8	[redacted] Duplicate-5						1234		5	/																		8
9	GTP32-1-2						1300		8	/																		9
10	GTP32-3-4						1310		4	/																		10
11	GTP32-8						1320		4	/																		11
12	GTP33-1-2						1200		6	/																		12

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	GeoEngineers	01/4/10	1730	Pace	1/5/10	1045	1.6	Y	Y	Y
							0.6			
							0.4			

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Katherine Cassidy

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 01/4/10

ORIGINAL

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10116985

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1232734

Section A Required Client Information:

Company:	Geo Engineers
Address:	Spokane, WA 99202
Email To:	
Phone:	Fax:
Requested Due Date/TAT:	Std

Section B Required Project Information:

Report To:	John Haney
Copy To:	Bruce Williams
Purchase Order No.:	
Project Name:	Parkwater
Project Number:	0506-117-12

Section C Invoice Information:

Attention:	Bruce Sheppard
Company Name:	BNSF
Address:	
Pace Quote Reference:	
Pace Project Manager:	Carol Davy
Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☒ OTHER _____

Site Location STATE: WA

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes — MATRIX / CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	NWTPH-Dx	RCRA 8 Metals 6010	PAHs 8270C	PCBs 8082	VOC 8260 low level	VOC 8260 Mid level	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	GTP33-3-4	SL	G			1-4-10	1205		8	\									/	/	/	/	/	/			013
2	GTP34-1-2						1105		8	\									/	/	/	/	/	/			014
3	GTP34-4						1115		4	\									/	/	/	/	/	(V)			015
4	GTP34-8						1125		4	\														(V)		Hold	016
5	GTP35-1-2						955		8	\									/	/	/	/	/	/			017
6	GTP35-3-4						1005		4	\									/	/	/	/	/	(V)			018
7	GTP35-8						1020		4	\																Hold	019
8	GTP35B-1.5						840		6	\							\		/	/	/	/	/	/			020
9	GTP35B-3						900		8	\							\		/	/	/	/	/			← Yes to PCBs	021
10	GTP35B-8						925		4	\																Hold	022
11	GTP33-8		↓			↓	1220		4	\																Hold	023
12	Duplicate-1a		↓			↓	1234		4										/	/	/						024

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	[signature] / GeoEngineers	1-4-10	1730	[signature]	1/5/10	1045	1.6 / 0.6 / 0.4 · Y · Y · Y

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Katherine Cassidy

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 01/4/10

ORIGINAL

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1012079

Page: 1 of 1

1232735

Section A Required Client Information:

Company: GeoEngineers
Address: 523 E 2nd Ave
Spokane, WA 99202
Email To:
Phone: 509 363-3125 Fax:
Requested Due Date/TAT: Standard

Section B Required Project Information:

Report To: John Haney
Copy To: Bruce Williams
Purchase Order No.: DS
Project Name: Parkwater RR
Project Number: 0506-117-12

Section C Invoice Information:

Attention: Bruce Sheppard
Company Name: BNSF
Address:
Pace Quote Reference:
Pace Project Manager: Coral Davy
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☒ OTHER

Site Location STATE: WA

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	RCRA 8 Metals 6010	NWTPH-Dx	PCBs EPA 8082	PAHs 8270	VOC Low Level 8260B	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	DP12-0.5-1.25	SL	G			1-19-10	925		5	/						1			/	/	/	/	/		
2	DP12-4-5.8	↓	↓				945		5	/						1			/	/	/	/	/		
3	DP12-8-9.5	↓	↓			↓	955		2	/									/	/	/	/	/		
4	~~DP12~~																									
5																										
6																										
7																										
8																										
9																										
10																										
11																										
12																										

Requested Analysis Filtered (Y/N)

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
I collected as much sample as possible, Please call John H if there isn't enough volume to run all requested analyses.	CJC/GeoEngineers	1/19/10	1730	S Hummer / Pace	1/20/10	1004	32	Y	N	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Katherine Cassidy

SIGNATURE of SAMPLER: CJC

DATE Signed (MM/DD/YY): 1/19/10

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

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10122203

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1232737

Section A Required Client Information:

Company: GeoEngineers
Address: 523 E 2nd Ave
Spokane, WA 99202
Email To:
Phone: Fax:
Requested Due Date/TAT: Std

Section B Required Project Information:

Report To: John Haney
Copy To:
Purchase Order No.:
Project Name: BNSF Parkwater
Project Number: 0506-117-12

Section C Invoice Information:

Attention: Bruce Sheppard
Company Name: BNSF
Address:
Pace Quote Reference:
Pace Project Manager: Carol Davy
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☒ OTHER

Site Location STATE: WA

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Requested Analysis Filtered (Y/N): RCRA 8 Metals 6010	PCBs 8082	NWTPH-Dx	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	GTP36A - 2.5	SL	G	~~2/9/10~~		2/9/10	1330		3										X	X	X		10122203001
2	GTP36A - 8	"	"			2/9/10	1350		3										X	X	X		002
3	GTP36B - 1					2/9/10	1420		3										X	X	X		003
4	GTP36B - 7					2/9/10	1440		3										X	X	X		004
5	GTP38A - 1					2/9/10	1515		3										X	X	X		005
6	GTP38A - 5	↓	↓			2/9/10	1525		3										X	X	X		006
7																							
8																							
9																							
10																							
11																							
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	Kevin Rodwell GeoEngineers	2/10/10	1600	[signature] Pace	2/11/10	1007	0.1	Y	Y	Y

24 of 25

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Kevin Rodwell

SIGNATURE of SAMPLER: Kevin Rodwell

DATE Signed (MM/DD/YY): 2/10/10

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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CHAIN-OF-CUSTODY / Analytical Request Document

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10123202

Page: 1 of 1

1232738

Section A Required Client Information:

Company:	GeoEngineers
Address:	523 E 7th Ave
	Spokane, WA 99202
Email To:	
Phone:	Fax:
Requested Due Date/TAT:	Standard

Section B Required Project Information:

Report To:	John Haney
Copy To:	Jodi Lamb
Purchase Order No.:	
Project Name:	BNSF Parkwater RI
Project Number:	0506-117-12

Section C Invoice Information:

Attention:	Bruce Sheppard
Company Name:	BNSF
Address:	
Pace Quote Reference:	
Pace Project Manager:	Carol Davy
Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☒ OTHER _____

Site Location STATE: WA

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes — MATRIX / CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Requested Analysis Filtered (Y/N)	Analysis Test Y/N	RCRA 8 Metals (6010	NWTPH-Dx	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	GTP56-1.3-1.5	SL	G			2-25-10	1305		2	/										/	/		001
2	GTP57-1.3-1.5	SL	G			2-25-10	1335		2	/										/	/		002
3	GTP58-1.3-1.5	SL	G			2-25-10	1405		2	/										/	/		003
4																							
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	[signature] / GeoEngineers	2-25-10	1600	[signature] / Pace	2-26-10	0950	3.8°C	Y	Y	Y

18 of 19

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Katherine Cassidy

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 2-25-10

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

11720 North Creek Pkwy N Suite 400, Bothell, WA 98011-8244 425-420-9200 FAX 420-9210
11922 E. First Ave, Spokane, WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave,Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #: 17541

CLIENT: GeoEngineers

REPORT TO: John Haney
ADDRESS: 523 E 2nd Ave
Spokane WA 99202
PHONE: (509)(363) 3125 FAX:

INVOICE TO: Bruce Shepard
BNSF
Seattle, WA

P.O. NUMBER:

PROJECT NAME: Parkwater (BNSF)
PROJECT NUMBER: 0506-117-11
SAMPLED BY: K. Randall; K. Cassidy

TURNAROUND REQUEST
in Business Days *
Organic & Inorganic Analyses: [X] STD. | 7 | 5 | 4 | 3 | 2 | 1 | <1
Petroleum Hydrocarbon Analyses: [X] STD. | 4 | 3 | 2 | 1 | <1
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE: HCl	REQUESTED ANALYSES: NWTPH-Dx	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	MW04-012110	1-21-10 1215			W	2		
2	MW06-012110	1-21-10 1360			W	2		
3	MW07-012110	1-21-10 1085			W	2		
4	MW08-012210	1-22-10 1012			W	2		
5	MW09-012110	1-21-10 1458			W	2		
6	MW10-012010	1-20-10 1312			W	2		
7	MW11-012010	1-20-10 1357			W	2		
8	MW12-012210	1-22-10 1100			W	2		
9	MW14-012110	1-21-10 1405			W	2		
10	MW20-012110	1-21-10 1640			W	2		

RELEASED BY: PRINT NAME: Kevin Randall FIRM: GeoEngineers DATE: 1-25-10 TIME: 1200
RECEIVED BY: Cathy Crumble PRINT NAME: Cathy Crumble FIRM: TA Tac DATE: 1/26/10 TIME: 8:45

RELEASED BY: PRINT NAME: FIRM: DATE: TIME:
RECEIVED BY: PRINT NAME: FIRM: DATE: TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 1 OF 2

TAL-1000(0408)

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

11720 North Creek Pkwy N Suite 400, Bothell, WA 98011-8244 425-420-9200 FAX 420-9210
11922 E. First Ave, Spokane, WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave, Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #: 17541

CLIENT: GeoEngineers

REPORT TO: John Haney
ADDRESS: 523 E 2nd Ave
Spokane, WA 99202

PHONE: FAX:

INVOICE TO: Bruce Shepard
BNSF

P.O. NUMBER:

PROJECT NAME: BNSF Parkwater

PROJECT NUMBER: 0506-117-11

SAMPLED BY: K. Cassidy, K. Randall

TURNAROUND REQUEST
in Business Days *

Organic & Inorganic Analyses: [10] STD. [7] [5] [4] [3] [2] [1] [<1]

Petroleum Hydrocarbon Analyses: [X] (STD.) [4] [3] [2] [1] [<1]

[OTHER] Specify:

* Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE: HCl	REQUESTED ANALYSES: DRPH+ORPH	REQUESTED ANALYSES: NWTPH-Dx	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	MW22-012110	1-21-10 0947		/		W	2		
2	MW23-012210	1-22-10 1142		/		W	2		
3	Duplicate-1	1-22-10 1234		/		W	2		
4									
5									
6									
7									
8									
9									
10									

RELEASED BY: Kevin Randall FIRM: GeoEngineers DATE: 1-25-10 TIME: 1200

RECEIVED BY: Cathy Gamble FIRM: TA Tac DATE: 1/26/10 TIME: 9:15

RELEASED BY: PRINT NAME: FIRM: DATE: TIME:

RECEIVED BY: PRINT NAME: FIRM: DATE: TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 2 OF 2

TAL-1000(0408)