UNITED STATES AIR FORCE
JOINT BASE ELMENDORF-RICHARDSON
ALASKA

ENVIRONMENTAL RESTORATION PROGRAM

SITE CHARACTERIZATION REPORT ADDENDUM
DP009 – BUILDING 986 DRY WELL

FINAL

FEBRUARY 2015

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FINAL

SITE CHARACTERIZATION REPORT ADDENDUM
DP009 – BUILDING 986 DRY WELL

JOINT BASE ELMENDORF-RICHARDSON, ALASKA

Prepared for
Air Force Civil Engineer Center

Contract No. FA8903-09-D-8589 / Task Order 0016

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Appendixes

LIST OF ACRONYMS AND ABBREVIATIONS

µg/m^3	microgram(s) per cubic meter
1,1-DCE	1,1-dichloroethene
AAC	*Alaska Administrative Code*
ABS	acrylonitrile butadiene styrene
ADEC	Alaska Department of Environmental Conservation
AFCEC	Air Force Civil Engineer Center
Army	United States Army
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cis-1,2-DCE	cis-1,2-dichloroethene
COPC	contaminant of potential concern
DQE	data quality evaluation
DRO	diesel-range organics
EPA	United States Environmental Protection Agency
FFA	Federal Facility Agreement
GC	gas chromatograph
GRO	gasoline-range organics
HVAC	heating, ventilating, and air conditioning
IC	institutional control
ITRC	Interstate Technology and Regulatory Council
JBER	Joint Base Elmendorf-Richardson
JBER-R	JBER-Richardson
JP-4	jet propulsion fuel, grade 4
mg/kg	milligram(s) per kilogram
NFA	no further action
OUA	Operable Unit A
PBR	Performance-Based Remediation
PCE	tetrachloroethene
PID	photoionization detector
POL	petroleum, oil, and lubricant

QC	quality control
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
SOP	standard operating procedure
SVE	soil vapor extraction
SWMU	Solid Waste Management Unit
TCE	trichloroethene
TO	task order
trans-1,2-DCE	trans-1,2-dichloroethene
UFP-QAPP	Uniform Federal Policy-Quality Assurance Project Plan
USAF	United States Air Force
VOC	volatile organic compound
WESTON	Weston Solutions, Inc.

TITLE AND APPROVAL PAGE

Document Name:	Site Characterization Report Addendum for DP009 – Building 986 Dry Well
Site Name/Project Name:	Performance-Based Remediation (PBR) for Alaska Group PBR – Joint Base Elmendorf-Richardson, Alaska
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Report Prepared By (Contractor's Qualified Person):	Corey Schwabenlander, CH2M HILL
Preparation Date:	February 2015

This *DP009 Site Characterization Report Addendum* was prepared by qualified persons, as required by 18 *Alaska Administrative Code* (AAC) 75.355(c)(1) and 18 AAC 75.380(a) and defined in 18 AAC 75.990(100).

Reporting Organization's Project Manager: Signature: _____

Leah Waller, CH2M HILL

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1.0 INTRODUCTION

This document is an addendum to the *Joint Base Elmendorf-Richardson, Alaska, Site Characterization Report, DP009 – Building 986 Dry Well* (Site Characterization Report) (United States Air Force [USAF], 2014a) and presents the results of the soil gas screening and sampling that was recommended in that report. DP009 is located within Joint Base Elmendorf-Richardson (JBER)-Richardson (JBER-R) (the former Fort Richardson Army Post) in Anchorage, Alaska.

Soil gas screening and sampling conducted between June 2 and August 13, 2014, was performed in accordance with the *Joint Base Elmendorf-Richardson, Basewide Uniform Federal Policy-Quality Assurance Project Plan Addendum – Additional Site Characterization Work Plan, DP009 – Building 986 Dry Well* (Site Characterization Work Plan Addendum) (USAF, 2014b), and in accordance with the standard operating procedures (SOPs) provided in the *Soil Gas Sampling Work Plan Addendum* (USAF, 2013a) to the *Joint Base Elmendorf-Richardson, Basewide Uniform Federal Policy-Quality Assurance Project Plan* (Basewide UFP-QAPP) (USAF, 2013b), which were approved by the Alaska Department of Environmental Conservation (ADEC) in May 2014, October 2013, and August 2013, respectively. The activities were conducted as a follow-on investigation to the 2013 fieldwork. The objective was to further characterize the volatile organic compounds (VOCs) detected in soil during the 2013 investigation, evaluate whether it is widespread and/or indicative of a separate source area, and to collect soil gas samples to further assess the vapor intrusion pathway.

Work was conducted by CH2M HILL under subcontract to Weston Solutions, Inc. (WESTON) for the JBER and Clear Air Force Station Performance-Based Remediation (PBR) project. This work has been authorized by the Air Force Civil Engineer Center (AFCEC) under Contract Number FA8903-09-D-8589, Task Order (TO) No. 0016.

2.0 SITE LOCATION AND DESCRIPTION

DP009 is located on the southeast corner of Otter Lake Road and Warehouse Street at JBER-R (Figure 1). DP009 consists of a former dry well located near Building 986 (petroleum, oil, and lubricant [POL] laboratory). The 15-foot-deep dry well was approximately 4 feet in diameter, and was located south of Building 986. The dry well was used from the 1950s to the 1990s for the disposal of drain and sink water from the adjacent POL laboratory. Numerous chemicals were used in the POL laboratory during quality testing of fuels used at Fort Richardson, including motor gas; aviation fuel; jet propulsion fuel, grade 4 (JP-4); arctic-grade diesel; spent reagents; solvents; heavy metals, including mercury, lead, silver, and barium; and waste solutions. The dry well was connected to a pipe that led from the laboratory sink. The dry well was removed in 1998, along with piping and sludge waste found at the bottom of the well. In addition, the laboratory sink was removed along with its associated subsurface piping, fixtures, and plumbing (United States Army [Army], 2000).

Building 986 is currently in use as a POL laboratory. Three full-time (40-hour-per-week) workers, both male and female, occupy Building 986 from Monday to Friday. Additional information regarding Building 986 can be found in Section 5.3, Building Survey Results.

The nearest surface water body to DP009 is Ship Creek, which is approximately 1.3 miles south of the site. Additional information on location, regional hydrology, hydrogeology, climate, and site history is presented in the Site Characterization Report (USAF, 2014a).

Regulatory oversight for DP009 is currently conducted by ADEC, and DP009 is listed under State of Alaska Contaminated Sites Database Hazard Identification number 943 as Cleanup Complete with Institutional Controls (ICs). Because petroleum hydrocarbons have historically been the primary contaminants of potential concern (COPCs) at DP009, the USAF has been managing investigation and remediation of contamination at the site under the State-Fort Richardson Environmental Restoration Agreement (Two-Party Agreement) in accordance with the ADEC Contaminated Sites Program (18 AAC 75).

3.0 INVESTIGATION AND REMEDIAL ACTION HISTORY

Prior to regulation under the Two-Party Agreement, DP009 was investigated under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) with Operable Unit A (OUA). DP009 was also referred to as Solid Waste Management Unit (SWMU) 60. Under the Three-Party Agreement (regulated by both the United States Environmental Protection Agency [EPA] and ADEC), the Army was also required to support closure of the site under the Resource Conservation and Recovery Act (RCRA) (Army, 2006).

Investigations and cleanup actions were conducted at DP009 from 1992 through 2003. In 1992, prior to regulation under the Two-Party Agreement, DP009 was investigated under CERCLA with OUA. The Army sampled the dry well in 1992 to determine the presence and extent of contaminants in the well. Eighteen inches of water and 6 to 8 inches of sludge were observed in the well at 15 feet below ground surface (bgs). Samples taken from the sludge and water revealed that petroleum hydrocarbons and heavy metals (including arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) and VOCs (1,2-dichlorobenzene, 1,4-dichlorobenzene, and 1,3,5-trimethylbenzene) were present (Army, 1997).

In 1995, as part of the OUA remedial investigation (RI), eight soil borings were advanced and five monitoring wells were installed (Ecology and Environment, 1996). Groundwater samples were collected from five monitoring wells (AP-3650/AP-3651 – upgradient wells; AP-3648 – source area well; AP-3649/AP-3652 – downgradient wells). Diesel-range organics (DRO) and gasoline-range organics (GRO) were detected in soil samples from boring locations within a 40-foot radius of the former dry well with the highest concentrations detected at a depth of 15 feet bgs. Site-related contaminants were not detected in groundwater samples collected from the monitoring wells at DP009 (Ecology and Environment, 1996). The baseline risk assessment for the site indicated that contamination did not pose unacceptable risk to human health or the environment under CERCLA (Army, 1997).

Following completion of the RI for DP009 in 1995, no further action (NFA) was selected in the *Record of Decision for Operable Units A and B* (Army, 1997), and the site was closed under CERCLA and transferred to the Two-Party Agreement to address remaining petroleum hydrocarbon contaminated soil. In 1998, the dry well, associated piping, and sludge waste found at the bottom of the well were removed, along with the laboratory sink and its associated subsurface piping, fixtures, and plumbing. Under the Two-Party Agreement, a soil vapor extraction (SVE) system was installed in 1998 consisting of three vapor extraction wells

(EMCON, 1999). The SVE system operated until reduced removal rates were reported in July 1999, and the system was converted to a bioventing system consisting of 14 bioventing wells. The bioventing system operated from October 1999 to December 2003. The SVE/bioventing system significantly reduced DRO, GRO, and benzene, toluene, ethylbenzene, and total xylenes (BTEX) concentrations in soil at the site (AGVIQ, 2004).

From 1999 through 2003, a total of 15 soil borings were advanced to support remediation monitoring of the SVE/bioventing system and the ultimate shutdown and decommissioning of the system in May 2004 (AGVIQ, 2004). Soil samples were analyzed for GRO, DRO, and BTEX. The historical data at DP009 show that releases from the dry well resulted in DRO, GRO, benzene, and ethylbenzene soil contamination in the vadose zone within a 40-foot radius of the former dry well, ranging in depth from 10 to 35 feet bgs. In 2003, DRO and benzene were detected above the ADEC Table B1 cleanup levels of 250 and 0.025 milligrams per kilogram (mg/kg), respectively. The maximum concentration of DRO in soil was 746 mg/kg at CB-13 (15 feet bgs), and the maximum concentration of benzene was 0.0862 mg/kg at CB-15 (15 feet bgs) (Figure 2). All other analytes were detected below ADEC Table B1 and B2 cleanup levels. No impacts to groundwater were observed.

The Army implemented ICs to restrict site access to petroleum-contaminated soils. As a result, ADEC approved closure of the site with ICs in 2004, and the site is assigned a "Cleanup Complete with Institutional Controls" status.

In 2006, SWMU 60 was recommended for closure under RCRA because all tanks and containers had been removed, the dry well was closed, and site cleanup was conducted in accordance with the Federal Facility Agreement (FFA) and the Two-Party Agreement (Army, 2006).

In 2013, additional site characterization activities were conducted to further characterize the nature of residual COPCs in soil at DP009 and to evaluate potential risks to human health and the environment. Two soil borings were installed and sampled to depths of 40 feet bgs. DRO and GRO concentrations, although above project screening levels, were sufficiently delineated laterally and vertically within the source area for the purposes of evaluating current and future site risk related to petroleum. The highest concentration of DRO detected in 2013 (413 mg/kg) was in the source area at boring DP009-SB02 from 15 to 20 feet bgs, adjacent to the former dry well. This concentration is significantly less than the 746 mg/kg of DRO detected in this area in 2003. GRO was also detected at DP009-SB01 above the project screening level (300 mg/kg) at a concentration of 339 mg/kg from 15 to 20 feet bgs (USAF, 2014a).

During the 2013 field investigation, benzene, trichloroethene (TCE), and tetrachloroethene (PCE) were detected in soil at concentrations an order of magnitude higher than historical data. The highest historical concentration of benzene was 0.0862 mg/kg (at 15 feet bgs in 2003). In 2013, benzene was detected at concentrations up to 0.46 mg/kg (20 to 25 feet bgs), and with concentrations of 0.0561 mg/kg in surface soil (0 to 5 feet bgs). TCE and PCE had not been historically detected. In 2013, TCE was detected at concentrations up to 0.028 mg/kg (20 to 25 feet bgs), and PCE was detected at concentrations up to 0.0397 mg/kg (15 to 20 feet bgs). The lateral extent of TCE and PCE in soil has not been defined (USAF, 2014a).

A human health risk evaluation was completed for DP009 using the hydrocarbon risk calculator and the 2003 and 2013 data (USAF, 2014a). Two exposure areas were considered at the site, the DRO/GRO source area (including co-located VOCs) and the VOC-only source area.

Cumulative cancer risks for the DRO/GRO source area current industrial and hypothetical residential exposure scenarios are above the regulatory risk standard of 1E-05 for the DRO/GRO source area. The primary contributors to carcinogenic risk for the industrial scenario are benzene and PCE in indoor air; the primary contributor to carcinogenic risk for the residential scenario is benzene in indoor air (USAF, 2014a).

Cumulative cancer risks for the VOC-only source area current industrial and hypothetical residential exposure scenarios for the direct contact, outdoor inhalation, and groundwater ingestion pathways are below the regulatory risk standard of 1E-05 for the benzene and TCE contamination in the VOC-only source area. For the vapor intrusion pathway, benzene and TCE concentrations exceed 18 AAC 75.345 Table B1 cleanup levels, indicating that further evaluation is necessary to assess possible vapor intrusion risk (USAF, 2014a).

4.0 2014 FIELD ACTIVITIES

Field activities at DP009 consisted of the installation of six soil gas probes (DP009-SV01 through DP009-SV06), soil gas screening at five locations, soil gas sampling for laboratory analysis at two locations, and a building survey. Fieldwork was conducted between June 2 and August 13, 2014. Surveying of the soil gas probes locations was completed by The Boutet Company, an Alaska-licensed surveyor, on June 24, 2014.

Installation, screening and sampling of soil gas probes was supervised by Annika Seay and Jennifer Ulrich (Frame) of CH2M HILL who are "qualified persons" as defined in 18 AAC 75.990 (100) and whose resumes are provided in Appendix F of the Basewide UFP-QAPP (USAF, 2013a) and the Site Characterization Report (USAF, 2014a), respectively.

The following documents are provided in Appendix A: Field documentation (Appendix A-1), soil gas probe completion diagrams (Appendix A-2), soil gas sampling logs (Appendix A-3), building survey (Appendix A-4), chain-of-custody forms (Appendix A-5), a photo log (Appendix A-6), and survey elevation measurements and coordinates (Appendix A-7).

4.1 Soil Gas Screening and Sampling

Five soil gas probes, DP009-SV01 through DP009-SV05, were installed on June 2, 2014, and one soil gas probe, DP009-SV06, was installed on July 31, 2014 (Figure 3). All soil gas probes were installed to a depth of 8 feet bgs by GeoTek Alaska, Inc., in accordance with SOP-5b, using a Geoprobe 8040DT drill rig. A six-inch stainless steel 0.0057-inch mesh screen with a 7/16-inch outer diameter was connected to one-eighth inch inner diameter Teflon tubing and installed from 7.5 to 8.0 feet bgs. The screen was surrounded by a 10/20 Colorado silica sand filter pack starting approximately 3 inches below the screen, and extending to approximately 6 inches above the screen. Hydrated 3/8-inch bentonite chips were used to seal the annular space above the sand pack. A temporary flush mount completion including a quick-connect stainless steel cap for the tubing and a 4-inch acrylonitrile butadiene styrene (ABS) cleanout adaptor fitting with a screw cap was constructed. The soil gas probes were left in place at the conclusion of the sampling effort to allow

for additional future sampling, if necessary. Probe construction details can be found on the soil gas probe completion diagrams in Appendix A-2.

On June 4, 2014, soil gas screening samples were collected from five soil gas probes (DP009-SV01 through DP009-SV05) and screened with a portable gas chromatograph (GC) with a photoionization detector (PID) (FROG-4000 by Defiant Technologies, Inc.) for PCE and TCE and with a GEM2000 landfill gas meter for oxygen, carbon dioxide, and methane concentrations. Soil gas screening for PCE and TCE and measurement of oxygen, carbon dioxide, and methane were conducted in accordance with methods outlined in SOP-5f.

A physical leak check of the sampling manifold and a helium leak check of the soil gas probe (using helium with a 99.999 percent purity rating) were performed prior to sampling, in accordance with SOP-5f of the Soil Gas Work Plan Addendum. For the helium-leak check, the helium concentration beneath the enclosure was verified to be greater than 10 percent prior to and while purging the probe. During the last 5 minutes of the purge, a gas sampling bag (i.e., a Tedlar bag) was attached to the sample exhaust port; this bag/sample was used for analysis of helium with a helium detector. The helium concentration measured in the leak-check sample at each location was 0.0 percent helium (Appendix A-3). Soil gas was then collected from each location in a gas sampling bag for field screening with a GEM2000 gas meter and a photoionization detector (both calibrated on a daily basis). Soil gas screening and sampling logs are presented in Appendix A-3.

On August 13, 2014, soil gas samples for laboratory analysis were collected from DP009-SV03 and DP009-SV06 (Figure 3) using the procedures outlined in SOP-05c. One primary soil gas sample was collected from soil gas probe DP009-SV06, and one primary soil gas sample and one duplicate soil gas sample were collected from soil gas probe DP009-SV03. Prior to sampling, leak check procedures were performed at both probes as described above. All soil gas samples were assigned a unique identification number in the field and were submitted to Applied Sciences Laboratory (CH2M HILL Corvallis Laboratory, UST-079) for analysis of BTEX, PCE, TCE, 1,1-dichloroethene (1,1-DCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichlorothene (trans-1,2-DCE), and vinyl chloride by EPA Method TO-15 (Table 1).

4.2 Building Survey

A survey of Building 986 was completed on June 10, 2014; the completed ADEC Building Inventory and Indoor Air Sampling Questionnaire is included in Appendix A-4.

Differential pressure of the Building 986 indoor air relative to the outdoor air was measured from June 16 to 25, 2014, using an Omniguard 4 differential pressure transducer/data logger. The differential pressure transducer was placed in the office located in the southwestern corner of the building. Tubing was extended from the differential pressure transducer through the office window to the outside of the building. The pressure differential between the indoor and outdoor atmospheres was recorded by the electronic data logger at 5-minute intervals for 9 days.

5.0 RESULTS

This section describes the results of soil gas screening, analytical soil gas samples, and the differential pressure monitoring. Soil gas screening results are not compared to screening levels. The results were used to determine presence or absence and a rough order of magnitude to assess

the distribution of PCE and TCE in the subsurface. Soil gas analytical results were compared to ADEC's residential shallow soil gas target levels (ADEC, 2012). ADEC's target levels for shallow soil gas "are conservative, risk-based screening levels" that are one line of evidence in a phased approach for evaluating vapor intrusion, and "exceeding a target level does not automatically imply that receptors are at risk or the pathway is complete" (ADEC, 2012).

5.1 Soil Gas Screening Results

A summary of the soil gas screening results is presented in Table 2. TCE and PCE were detected in soil gas at concentrations above the calibrated detection limit (137 and 172 micrograms per cubic meter [$\mu g/m^3$], respectively) in both the primary and field duplicate sample from location DP009-SV03. TCE was detected at concentration of 14,265 $\mu g/m^3$ in the primary sample and 18,457 $\mu g/m^3$ in the duplicate sample, and PCE was detected at a concentration of 1,787 $\mu g/m^3$ in the primary sample and 2,566 $\mu g/m^3$ in the duplicate sample at location DP009-SV03. Location DP009-SV03 is near the former dry well (Figure 3). PCE was observed at concentrations below the calibrated detection limits at two other locations: DP009-SV01 and DP009-SV05. TCE and PCE were not detected at locations DP009-SV02 and DP009-SV04. These soil gas screening results indicate that the former dry well is the source of TCE and PCE in soil and that the contamination is likely confined to the area around the former dry well.

Field screening of oxygen, carbon dioxide, and methane in soil gas from each location indicated that the soil is well oxygenated (18.4 to 21.3 percent) with relatively low concentrations of carbon dioxide (0.1 to 2.4 percent) and no methane detections. Concentrations of oxygen, carbon dioxide, and methane detected using the GEM2000 landfill gas meter are provided in Table 2. Soil gas sampling logs are presented in Appendix A-3. FROG-4000 output log files are presented in Appendix B-1.

5.2 Soil Gas Analytical Results

Results of the TO-15 analysis of the two primary and one field duplicate soil gas samples collected from 7.5 to 8 feet bgs are presented in Table 3, and shown on Figure 3. PCE, TCE, ethylbenzene, toluene, and xylenes were detected in soil gas at DP009-SV03 and DP009-SV06. However, none of the analyte concentrations exceeded ADEC's residential or commercial/industrial target levels for shallow soil gas. No PCE or TCE degradation compounds (1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, or vinyl chloride) were detected in soil gas samples from DP009-SV03 or DP009-SV06, indicating that degradation of PCE and TCE is not likely occurring.

PCE was detected at concentrations ranging from 5.93 J $\mu g/m^3$ to 45.3 $\mu g/m^3$, and TCE was detected at concentrations ranging from 2.84 J $\mu g/m^3$ to 4.21 J $\mu g/m^3$. The analytical soil gas concentrations at DP009-SV03 are several orders of magnitude lower than the soil gas screening results from the same location (see Section 5.1). Benzene was not detected in soil gas at location DP009-SV06 even though soil samples collected in 2013 at the same location contained benzene concentrations of 0.039 and 0.145 mg/kg at 0 to 5 feet bgs and 10 to 15 feet bgs, respectively, and 0.46 mg/kg at 20 to 25 feet bgs. Examination of the field documentation (field notes, soil gas probe completion logs, and soil gas sampling logs) for locations DP009-SV03 and DP009-SV06 and discussions with the field team provide no indication of soil gas sample collection error. The discrepancy between the soil gas screening results and the soil gas analytical results could be

due to the inherent temporal variability related to shallow soil gas sampling (Interstate Technology and Regulatory Council [ITRC], 2007).

5.3 Building Survey Results

Building 986 is one level slab-on-grade with a sealed concrete floor and painted concrete block foundation. Building 986 consists of the main laboratory surrounded by surrounded by two offices, a break room, and three storage rooms. There are two floor drains and one cleanout located in the building. A commercial heating, ventilating, and air conditioning (HVAC) system was installed in 2012, which provides multiple air exchanges per hour to meet code for a POL laboratory. The commercial HVAC consists of multiple roof air intakes and multiple air exhausts. Windows nearest the suspected source area are only opened occasionally in the summer. Onsite workers include three full-time (40-hour) workers from Monday to Friday. Two exterior doors are present on the northern side of the building, and one exterior door is located on the eastern side of the building.

The results of the differential pressure monitoring indicate that there is a constant positive pressure between the office space in the building and the outdoor air. These results are consistent with the use of a commercial HVAC system to maintain compliance with the POL laboratory code requirements. The large positive spike shown on the plot of pressure monitoring data (Appendix A-4) is likely the result of personnel at Building 986 attempting to close the window in the office through which the differential pressure transducer tubing was run. The constant positive pressure in this area of the building and the multiple air exchanges per hour suggest that there is little potential for vapor intrusion and that current exposure to 40-hour-per-week workers via the vapor intrusion pathway is insignificant.

5.4 Data Quality Evaluation

Sample receipt forms, laboratory data review checklists, and a comprehensive data quality evaluation (DQE) report are included in Appendix B-2. The goal of the DQE is to demonstrate that a sufficient number of representative samples were collected, and that the resulting analytical data can be used to support the decision making process. The following summary highlights the DQE findings:

1. No data were rejected, and completeness was 100 percent for all method/matrix/analyte combinations.
2. No data were qualified because of low-level blank detections.
3. Although data were qualified as estimated because of quality control (QC) exceedances as noted, overall precision and accuracy of the data, as measured by field and laboratory QC indicators, suggest that data are usable for project objectives.

The complete laboratory data package is included in Appendix B-3.

6.0 CONCLUSIONS AND RECOMMENDATIONS

This section presents the conclusions for additional sampling activities conducted from June to August 2014 and provides recommendations for further actions at the site.

6.1 Conclusions

The following conclusions were made regarding DP009:

- TCE and PCE were detected in soil gas screening samples at concentrations up to 18,457 and 2,566 µg/m^3, respectively (DP009-SV03 located near the former dry well). Soil gas screening results indicate that the former dry well at DP009 is the source of PCE and TCE contamination at the site. PCE and TCE contamination, while not laterally defined with definitive soil data, appears to be limited to the area surrounding the former dry well. The vertical extent of PCE and TCE contamination was delineated during the 2013 Site Characterization to a maximum depth of 25 feet bgs.

- The risk evaluation completed in 2013 indicated that the vapor intrusion pathway was complete for current industrial and potential future residents at DP009, and, based on modeling of soil concentrations, there was potential risk from exposure to benzene, PCE, and TCE concentrations within indoor air. Soil gas samples were collected in 2014, and PCE and TCE were detected at concentrations up to 45.3 µg/m^3 and 4.21 J µg/m^3, below ADEC's residential or commercial/industrial target levels for shallow soil gas. No PCE or TCE degradation compounds (1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, or vinyl chloride) were detected in soil gas samples.

- Comparison of soil gas screening concentrations to soil gas analytical concentrations indicated a discrepancy of up to several orders of magnitude between the results. A reason for the discrepancy was not determined. Given the difference, the results of these soil gas analytical samples should not be used for decision making.

- Soil gas sample results provide no evidence that PCE and TCE are being degraded within the vadose zone at DP009.

- The results of the differential pressure monitoring indicate that there is a constant positive pressure between the office space in the building and the outdoor air. The constant positive pressure in this area of the building and the multiple air exchanges per hour suggest that there is little potential for vapor intrusion and that current exposure to 40-hour-per-week workers via the vapor intrusion pathway is insignificant.

6.2 Recommendations

The following are recommended for DP009:

- Based on concentrations of VOCs detected in soil in 2013 and soil gas screening results in 2014, further investigation of the lateral extent of TCE and PCE in soil is necessary.

- The results of the 2014 analytical soil gas samples should not be used for decision making purposes. Further investigation of soil gas may be necessary to support evaluation of potential future site risk and risk management decisions.

7.0 REFERENCES

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Tables

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Table 1: DP009 Analytical Sample Summary

Location	Sample ID	Matrix	Sample Type	Depth (ft)	Collection Date	TO-15
DP009-SV03	14Q3DP009-SV0301-SG-0	Soil Gas	N	7-8	13-Aug-14	X
DP009-SV03	14Q3DP009-SV0301-SG-1	Soil Gas	FD	7-8	13-Aug-14	X
DP009-SV06	14Q3DP009-SV0601-SG-0	Soil Gas	N	7-8	13-Aug-14	X

Notes:

N = primary sample

FD = field duplicate

TO-15 = Volatile organic compounds (benzene, toluene, ethylbenzene, xylenes, tetrachloroethene, trichloroethene, 1,1-dichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, and vinyl chloride)

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Table 2: DP009 Soil Gas Screening Results

Sample Location	Field Sample ID	Sample Interval (feet bgs)	FROG Log File	TCE				PCE				Oxygen	Carbon Dioxide	Methane
				(ppbv)		($\mu g/m^3$)		(ppbv)		($\mu g/m^3$)		(%)	(%)	(%)
DP009-SV01	14Q2DP009-SV0101-SG-0	8	155	25	U	137	U	5	J	34	J	19.5	0.1	0.0
DP009-SV02	14Q2DP009-SV0201-SG-0	8	156	25	U	137	U	25	U	172	U	20.8	0.4	0.0
DP009-SV03	14Q2DP009-SV0301-SG-0	8	157	**2610**	E	**14265**	E	**259**		**1787**		19.0	0.9	0.0
DP009-SV03	14Q2DP009-SV0301-SG-1	8	158	**3377**	E	**18457**	E	**372**		**2566**		18.4	0.8	0.0
DP009-SV04	14Q2DP009-SV0401-SG-0	8	159	25	U	137	U	25	U	172	U	20.5	0.2	0.0
DP009-SV05	14Q2DP009-SV0501-SG-0	8	160	25	U	137	U	2.35	J	16	J	19.7	0.9	0.0
DP009-SV03*	14Q3DP009-SV0301-SG-0	8	NA	NA		NA		NA		NA		18.8	2.4	0.0
DP009-SV06*	14Q3DP009-SV0601-SG-0	8	NA	NA		NA		NA		NA		21.3	0.3	0.0

Field Sample ID key: YYFREQSS019-LOC(or QC)##-MEDIA-0/1, where

- YY = year
- FREQ = Frequency if sampling (Q2 for second quarter, etc.)
- DP009 = DP009 ID
- LOC(or QC)## = The sample number based on its location or whether it is a QC blank (SV01 for soil vapor probe, SB01 for soil boring, TB for trip blank, EB for equipment blank, etc.)
- MEDIA = GW for groundwater, SO for soil, SG for soil gas, SD for sediment, etc.
- -0/-1 = 0 for primary samples and 1 for field duplicates

Notes:

% = percent

$\mu g/m^3$ = microgram(s) per cubic meter

bgs = below ground surface

E = concentration exceeded the calibration range

ID = identification

J = concentrations were detected by the FROG but are below the calibrated detection limit of 25 ppbv.

NA = not applicable

PCE = tetrachloroethene

ppbv = part(s) per billion by volume

TCE = trichloroethene

U = not detected above the reporting limit

Bold indicates that the analyte was detected above the calibrated detection limit.

* = samples collected for TO-15 laboratory analysis; screening for oxygen, carbon dioxide, and methane only

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Table 3: TO-15 Soil Gas Sample Results at DP009

Analyte	Location	DP009-SV03		DP009-SV06
	Sample ID	*14Q3DP009-SV0301-SG-0*	*14Q3DP009-SV0301-SG-1*	*14Q3DP009-SV0601-SG-0*
	Sample Depth (ft)	*7 - 8*	*7 - 8*	*7 - 8*
	Sample Date	*8/13/2014*	*8/13/2014*	*8/13/2014*
	Screening Level			
VOCs (µg/m^3)				
1,1-Dichloroethene	2100	2.89 U	3.19 U	2.9 U
Benzene	31	2.33 U	2.57 U	2.34 U
~~cis-1,2-Dichloroethene~~	~~73~~	2.89 U	3.19 U	2.9 U
Ethylbenzene	97	**4.59**	**4.2 J**	**6.58**
m- & p-Xylene	1000	**3.49 J**	**3.67 J**	**5.34 J**
o-Xylene	1000	**1.41 J**	**1.41 J**	**2.12 J**
Tetrachloroethene (PCE)	4~~2~~0	**44**	**45.3**	**5.93 J**
Toluene	52~~1~~00	**2.61 J**	**3.11 J**	**3.6**
~~trans-1,2-Dichloroethene~~	~~630~~	2.89 U	3.19 U	2.9 U
Trichloroethene (TCE)	2~~1~~	**4.21 J**	**3 J**	**2.84 J**
Vinyl Chloride	16	1.86 U	2.06 U	1.87 U

Notes:

µg/m^3 = microgram(s) per cubic meter

J = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

NA = not analyzed

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

Bold indicates the analyte was detected.

No results exceeded screening criteria.

Screening Criteria:

2012 ADEC Vapor Intrusion Guidance Target Levels for Residential Shallow Soil Gas

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Figures

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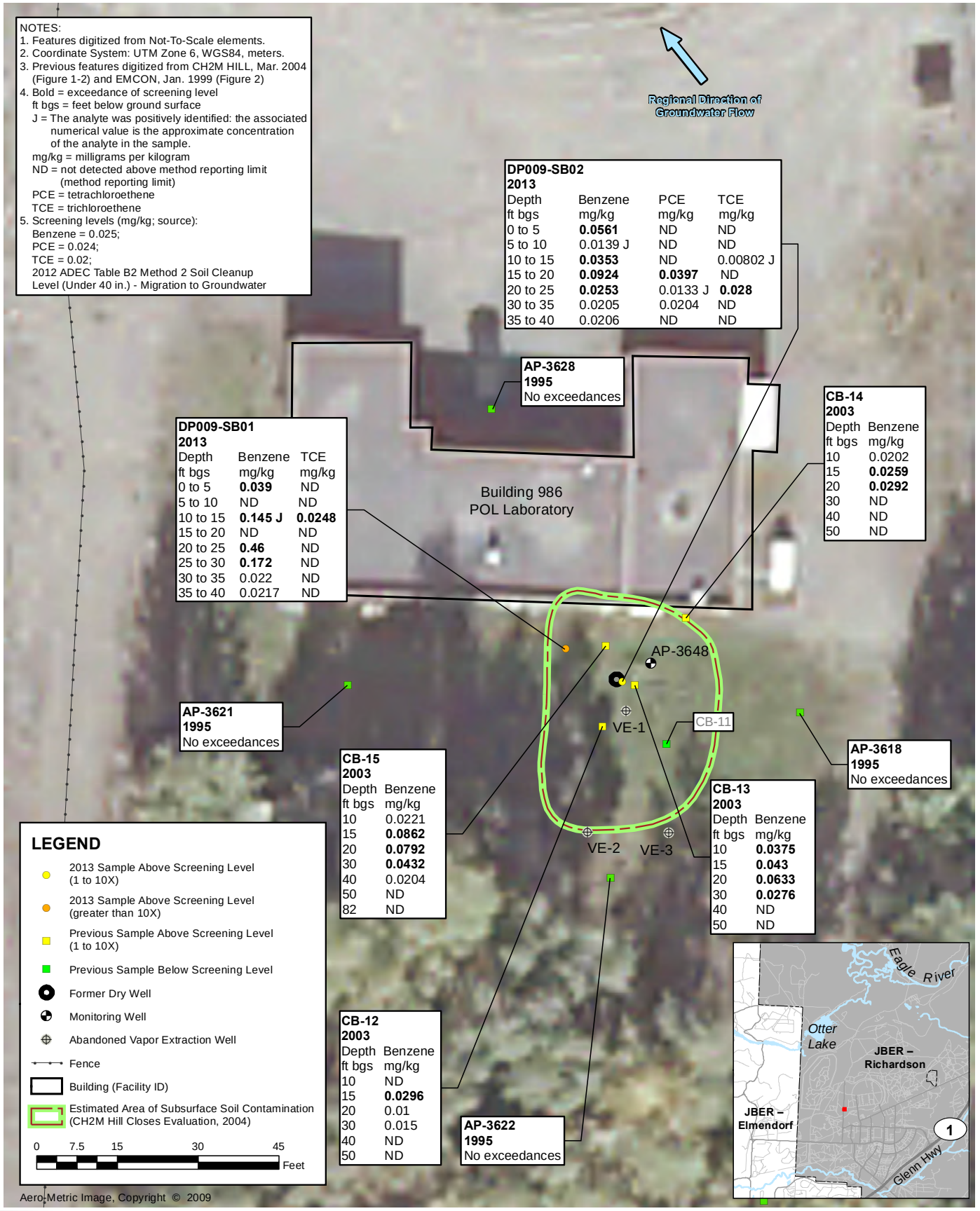
Date: 27 Oct 2014 Drawn by: lclark R:\AFCEE_JBER_20001102\MapFiles\SCR\DP009\Figure_1_DP009_Bldg986_SiteLocation.mxd

SITE DP009 LOCATION

Figure **1**

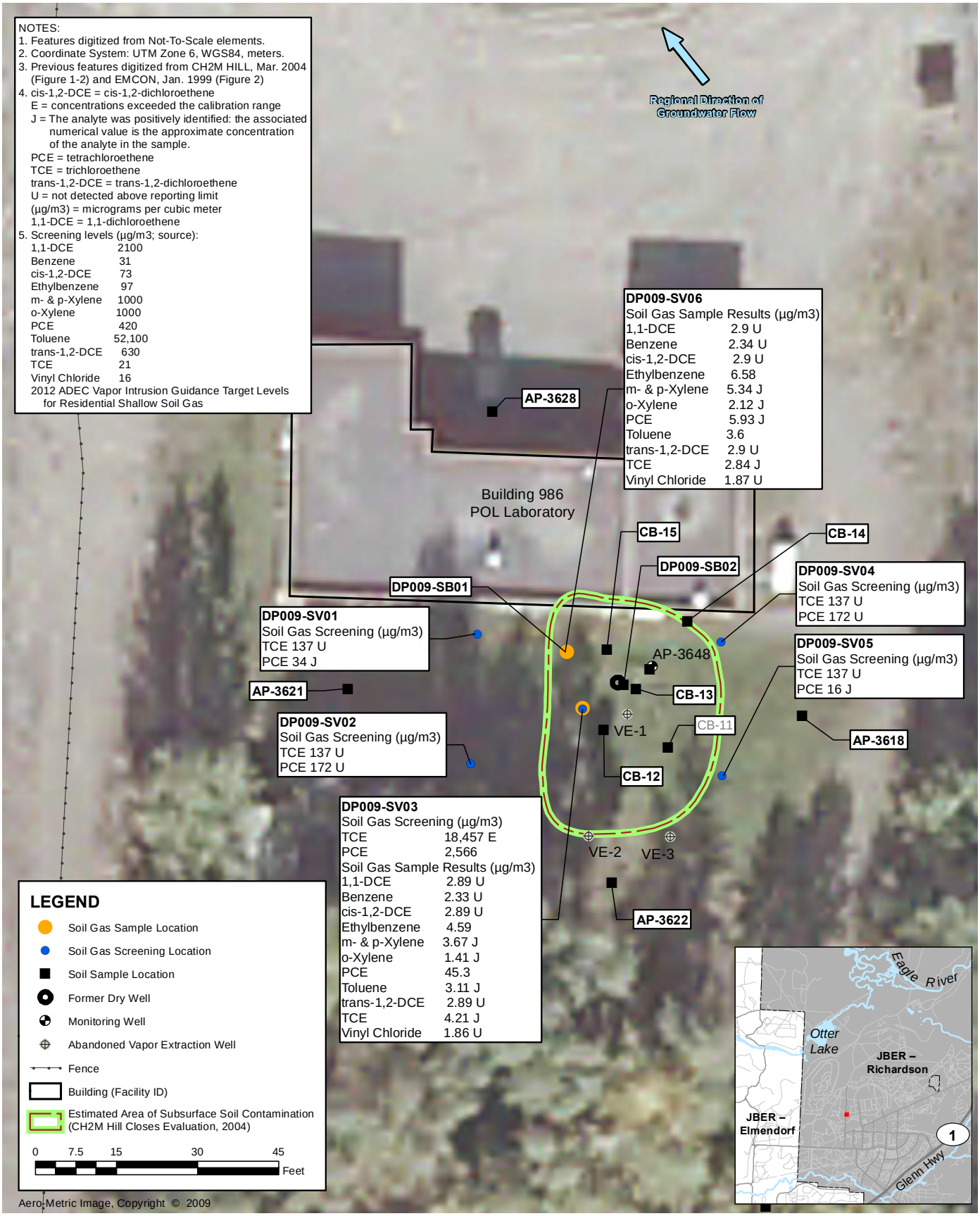
Site Characterization Report Addendum
DP009, Building 986 Dry Well
Joint Base Elmendorf-Richardson, Alaska



PREVIOUS SOIL SAMPLE RESULTS

Figure **2**

Site Characterization Report Addendum
DP009, Building 986 Dry Well
Joint Base Elmendorf-Richardson, Alaska



Date: 29 Oct 2014 Drawn by: lclark R:\AFCEE_JBER_20001102\MapFiles\SCR\DP009Addendum\Figure_3_DP009_Bldg986_SoilResults.mxd

N
W E
S

SOIL GAS RESULTS

Figure 3

Site Characterization Report Addendum
DP009, Building 986 Dry Well
Joint Base Elmendorf-Richardson, Alaska

Appendix A
Field Logs and Data Collection Forms

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Appendix A-1
Field Documentation

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SOP-04 Attachment 1: Organic Vapor and Air Monitoring

Field Calibration Sheet

CH2MHILL Project Number: 457958.09.HE.02 Page of

Calibration Event	1	2	3	4
Date and Time:	6.2.14	6.4.14	6.11.14	6.12.14
Instrument				
Instrument Type:	Mini Rae 2000 PID	~~Mini R~~ PID	PID	PID
Instrument Name:		Mini Rae 3000	Mini Rae 3000	Mini Rae 3000
Serial Number:	C1Ø2431	C1Ø2560	C1Ø 2560	C1Ø 2560
Owner of Instrument:	CH2MHILL	CH2MHILL	CH2MHILL	CH2MHILL
Lamp Type (PID only):	1Ø.6eV	1Ø.6eV	1Ø.6eV	1Ø.6eV
Type of Regulator:	Model 713 0.5 LPM OM	Model 713 0.5 LPM OM	Model 713 0.5 LPM OM	Model 713 0.5 LPM OM
Type of Tubing:	T-connection	T-connection	T-connection	T-connection
Calibration Gas				
Gas Type:	Isobutylene	Isobutylene	Isobutylene	Isobutylene
Canister Lot Number:	14-4896	14-4896	14-4896	14-4896
Canister Expiration Date:	11/7/2015	11/7/2015	11/7/2015	11/7/2015
Observations				
Zero Gas Reading:	0.1	0.0	0.0	0.0
Calibration Reading:	103	100.0	100	100.0
Ambient Weather Conditions:	high 40s, light rain cloudy	high 60s, clear, light breeze	high 50s, clear light breeze	high 50s, cloudy, light breeze
Operators Initials:	AHS	AHS	AHS	AHS
Notes/Comments:				

PDX/100570002.PDF

FQM ✓
Jennifer Frame 6/6/14

SOP-04 Attachment 1: Organic Vapor and Air Monitoring

Field Calibration Sheet

CH2MHILL Project Number: Page of

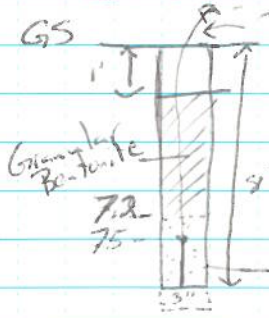
Calibration Event	1	2	3	4
Date and Time:	7/28/14 0745	7/29/14 0730	7/30/14 0740	7/31/14 0745
Instrument				
Instrument Type:	PID	PID	PID	PID
Instrument Name:	MiniRae 3000	MiniRae 3000	MiniRae 3000	MiniRae 3000
Serial Number:	010 2548	010 2548	010 2548	010 2548
Owner of Instrument:	CH2M HILL	CH2M HILL	CH2M HILL	CH2M HILL
Lamp Type (PID only):	10.6eV	10.6eV	10.6eV	10.6eV
Type of Regulator:	Model 713 0.5LPM OM	Model 713 0.5LPM OM	Model 713 0.5LPM OM	Model 713 0.5LPM OM
Type of Tubing:	T-connection	T-connection	T-connection	T-connection
Calibration Gas				
Gas Type:	Isobutylene	Isobutylene	Isobutylene	Isobutylene
Canister Lot Number:	13-4712	13-4712	13-4712	13-4712
Canister Expiration Date:	02.13.15	02.13.15	02.13.15	02.13.15
Observations				
Zero Gas Reading:	0.0	0.1	0	0.0
Calibration Reading:	100.0	100.0	100	100.0
Ambient Weather Conditions:	50s, clear	50's, overcast, fog	50s, overcast	50s, clear
Operators Initials:	AS	KS	AS	AS
Notes/Comments:				

PDX/100570002.PDF

FQM ✓ Jennifer Ulrich 4/31/14

JBER - Soil Vapor Team 6/2/2014

1000 - Arrive @ site DP009, behind Bldg. 986. Plan is to install SV probes in 5 locations @ a depth of 8 ft. bgs.
Driller preps rig with rod + decon water, probes + tubing.
1015 - Set-up on DP009-SV1 (NW corner of grid)
1030 - Begin drilling DP009-SV1, move ~12-18" away from building to allow for clearance - PID = 0.0 BZ. Push to 8' using 2.25" OD rod.



- Sand from 8'3" to 7'2", probe set @ 8'-7.5' bgs
- Granular bentonite from 7'2" to 1' bgs. Hydrated bottom 1' then hydrate top 5'. Completed boring ~1125

1130 - Move to DP009-SV2 (SW corner) location of grid. Begin drilling PID = 0.0 BZ. Sand from 8'3" to 7'. Placed 1' of granular + hydrated
1200 - Finish installing DP009-SV2, take lunch
1235 - Back onsite.
1240 - Set-up @ DP009-SV3 (middle of grid). PID = 0.0 BZ.
Sand 8'3" to 7'2", screen from 8' to 7'6". Granular Bentonite 7'2" to 1' bgs.
1325 - Setup @ DP009-SV05 (South East corner of grid). PID = 0.0 BZ
Sand 8'3" to 7'1", screen 8'-7'6". Granular Bentonite from 7'1" to 1' bgs
1400 - Move to DP009-SV04 (Northeast corner of grid) next to bldg 986
Moving SV location ~18 to 24" south to allow access. PID = 0.0 BZ
Sand from 8'3" to 7'. Screen from 8'-7.5'. Bentonite from 7' to 1' bgs.
1450 - Finish installs @ DP009, start building monuments. Set top of cap @ grade.
1515 - Finish setting monument caps Clean-up area, pack-up to demob.
1530 - Go back to office trailer + complete paperwork and inspect test SV monitoring equipment.
- Finish paperwork + site prep for tomorrow. Plan to calibrate FROA + begin screening DP009.

6/2/2014

Rite in the Rain

Scale: 1 square = _____

DP009

Elvin GC Software

1 2 OPEN SAVE EXPORT PORT Select Po

Elvin version (2.0.20.9)

Defiant Technologies

Live Data | Analyze | Calibration | Settings

Calibration

Analyte Name Tetrachloroethene **Analyte Alias** PCE ADD

Analytes

Trichloroethene

Tetrachloroethene

Data

Peak	Time	Height	Area	Width	Concentration	FileName
7	190.25	47439	455033	0	25	C:\Users\bjonesst\AppData\Roaming\Defiant\20140603\1617_LOG_...
2	190.08	87248	913111	0	50	C:\Users\bjonesst\AppData\Roaming\Defiant\20140603\1608_LOG_...
3	189.5	268676	2978193	0	100	C:\Users\bjonesst\AppData\Roaming\Defiant\20140603\1558_LOG_...
4	189.08	759607	9772110	0	250	C:\Users\bjonesst\AppData\Roaming\Defiant\20140603\1546_LOG_...
5	188.75	1556915	21314202	0	500	C:\Users\bjonesst\AppData\Roaming\Defiant\20140603\1531_LOG_...
6	188.92	2752900	36363004	0	1000	C:\Users\bjonesst\AppData\Roaming\Defiant\20140603\1514_LOG_...

Analyte Window 10.00 SET seconds **Retention Time** Use Average Manually set 188 SET seconds

Solve Using: Area Quadratic

✓ Force Through Zero

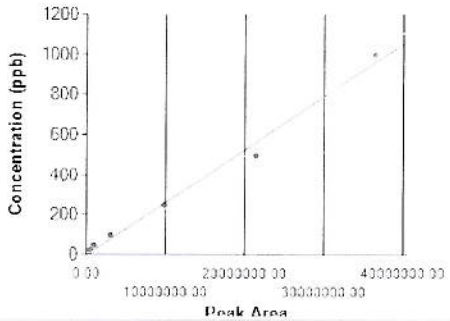
Area

EQ Y=1.4979E-013X² + 2.1797E-005X + 0.0000E+000

QUAD R² 0.99445

EQ Y=2.6471E-005X + 0.0000E+000

LINE R² 0.99028



DISCONNECTED NO PARAMS ... X: 37.00 Y: 12843586.60 ANALYZE: 37.00 0.0

FQM ✓ Jennifer Frame 6/4/14

DP009

Ellvin GC Software

1 2 OPEN SAVE EXPORT PORT Select Po Ellvin version (2.0.20.9) Defiant Technologies

Live Data | Analyze | Calibration | Settings

Calibration

Analyte Name Trichloroethene **Analyte Alias** TCE ADD

Analytes

- Trichloroethene
- Tetrachloroethene

Data

	Peak	Time	Height	Area	Width	Concentration	FileName
	7	80.58	31070	223723	0	25	C:\Users\bionesst\AppData\Roaming\Defiant\20140603\1617_LOG ...
▶	2	80.83	65521	520650	0	50	C:\Users\bionesst\AppData\Roaming\Defiant\20140603\1608_LOG ...
	3	80.75	201903	1754367	0	100	C:\Users\bionesst\AppData\Roaming\Defiant\20140603\1558_LOG ...
	4	80.58	528885	4819372	0	250	C:\Users\bionesst\AppData\Roaming\Defiant\20140603\1546_LOG ...
	5	80.67	1134136	11553518	0	500	C:\Users\bionesst\AppData\Roaming\Defiant\20140603\1531_LOG ...
	6	80.67	2074940	22306223	0	1000	C:\Users\bionesst\AppData\Roaming\Defiant\20140603\1514_LOG ...

Analyte Window 10.00 SET seconds **Retention Time** Use Average Manually set 80 SET seconds

Solve Using: Area Linear

✓ Force Through Zero

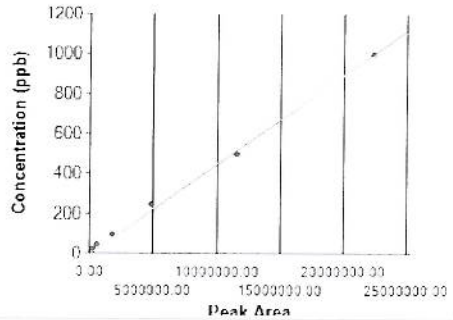
Area

EQ Y=-9.4685E-014X² + 4.6684E-005X + 0.0000E+000

QUAD R² 0.99619

EQ Y=4.4847E-005X + 0.0000E+000

LINE R² 0.99595



DISCONNECTED NO PARAMS X: 37.00 Y: 12843586.60 ANALYZE: 37.00 0.0

FQM ✓ Jennifer Rame 9/4/14

JBER-R DP0009 6.4.14

0800 Brandon Jones-Stanley (BJS) meets Annika Seay (ATS) and Field Team Lead (FTL) Morgan Bruno (MB) at CH Field office. BJS begins checking Frog calibration for screening today. ATS calibrates PID meter. Fresh air calibration = 0.0 ppm, Isobutylene calibration = 102.0 ppm

0835 Frog calibration check complete.

0935 Leave field office for DP0009 (BJS and ATS)

0940 ATS checks in with building. No one answers door and it is locked. A vehicle is parked out front and lights are on in the building. Begin set up for SV Probe screening.

Project Site: DP0009

Task / Activity for the day: Soil vapor screening at 5 SV probe locations

Personnel: Brandon Jones-Stanley, Annika Seay (field logbook)

Project Number: 457958.09.HR.04

Hold Health and Safety ~~briefing~~ tailgate meeting. Topics include:

- Pinch points when working with hand tools
- awkward positioning / ergonomics
- biological hazards (mosquitos, potential for wildlife on base)
- muster area / evacuation plan
- hydration, work/rest ~~regimene~~ regimen

1000 Begin ~~set SV01~~ DP0009-SV01 leak check (manifold leak check) passed

1005 Begin purge for helium check.

1010 Helium check passed.

1015 Prepare to collect sample ~~14Q2DP0009-SV01-SG-0~~. Will run for 5 min. to collect sample

1020 Pull sample bag. Small sample pulled - will use Frog first to see if additional sample is needed. Hook up to Frog for sample.

1030 Pull another 5 minute sample; did not recover PCE or TCE during first try. The bag was not as full as expected during first try; the seals are checked before trying for second sample.

1035 Second sample attempt much better. Hook sample bag to Frog.

1050 MB on site to take AS back to field trailer to meet with drill crew to move to new site.

1100 ATS leaves site. Jennifer Frame (JF) will spell her.

1116 - Collect screening sample @ SV02. Analyze on FROG.

1130 - Jenn on-site. Get set-up @ SV03. Helium detector dies (Jenn to shop to get charger.

1200 - Plug in detector, says it is charged ~5 minutes later. Unplug turn on & dies. Appears to have a bad battery. Call TTT to get replacement.

1245 - Jenn off-site to get new detector. Will send other back to Pine

Scale: 1 square = _____

FTL MB 6/4/14

6/4/14 DP009 JBER-P

1245 - Return to field office/Lunch. Inspect TO-17 tubes. Need to order union to connect to pump & place tubes in series. Contact Swagelok NW, will pick-up tomorrow morning ~ 7 AM along with Teflon tubing.

1400 - Mob back to DP009 to finish screening last 3 SV probes.

1420 - Begin purge/sampling SV03 - Refer to sampling log for this location.

1518 - Start collecting duplicate sample for this location.

1535 - Move to SV05 - SE corner,

1540 - Begin purging / sample screening - See sampling log for this location.

1555 - Collect 14Q2DP009-SV0501-SG-0 Screening sample.

1620 - Setup @ SV04. Located in NE corner,

1635 - Collect 14Q2DP009-SV0401-SG-0, screening samples analyzed using FROG, GEM 2000, & PID

1700 - Return to office to run cal check on FROG & complete paperwork

1845 - B. Jones-Stanley departs site for day.

6/4/2014

FTL MB 6/4/14

FQM / JWP

Rite in the Rain

Scale: 1 square =

JBER - R

6/10/14

Site: DP-009, Building 986

CH2M Staff: Brandon Jones, Stanley, Jennifer Frame

Purpose: Conduct building survey @ 986 (POL laboratory) at site DP009

0845: Arrive on-site. Check temp of TO-17 cooler ~32°F refresh ice

0905: Arrive @ Building 986. Conduct Daily HAS briefing, discuss potential hazards within the laboratory

0910 – Meet Steve Kelly (Lab Manager) to conduct building survey. See ADEC survey form. Building 986 is a POL laboratory to test the quality of fuels. This includes multiple jet fuels and ground fuels. Noticeable petroleum odor when entering the building.

0950 - Complete survey, if pressure monitoring required will be staged in main lab office, with tubing exiting through a window

1000 - Return to field office, complete paperwork

1400 Depart site for day

6/10/14

FTL MN 6/10/14

Scale: 1 square = _____

JBER TU101 / AT029 / DP009 6/16/14

TASK: Return to TU101 to ~~turn off~~ collect data @ TU101, from air pressure monitor & remove from site. Air pressure monitoring is part of the building survey that was conducted at this site last week. Air pressure monitoring will begin ~~conducted~~ at DP009 also ~~tmr~~ today.
Head to AT029 to re-test helium leak check & methane ats per SM | FTL | C. Schwabenlander.

Personnel: J. Frame

1230 - onsite TU101. ~~Breakdown~~ Setup computer & download data log & report from 1 week monitoring effort
1400 - Mob to DP009
1430 - check in w/ staff at Bldg. Place system & setup for 1 wk. collection. Provide contact # & info in-case of questions
1530 - back to field office. Send report/ log to C Schwabenlander & B. Jones-Stanley.
1630 - gather needs for AT029, head to site
1650 - onsite AT029-SV01. Setup on SV probe.
- Conduct manifold leak check → Pass • O_2 = 1.2%
- Conduct helium leak check → fail >100,000 ppm
- measure methane → hi = 17.2%. • CO_2 = 11.8%

1710 - Contact SV pro B. Jones-Stanley. He will confer w/ Ben Thompson to determine whether to move forward w/ sampling.
1725 - FTL contacts SM. No word from B. Thompson. will pack up & return based on SM's conversation w/ B. Thompson
1800 - Back to field office

Jennifer Frame 6/16/14

Rite in the Rain

FTL MB 6/16/14

Scale: 1 square = _____

the day.

0800 - AS mobs to site SS044 with field team lead (FTL) Morgan Bruno (MB)

0815 - Arrive at site and meet GeoTek drillers. Soldier arrives at building to make sure radio towers are off. M. Bruno leaves site

0830 - Hold health and safety tailgate meeting. Discuss:
- Yesterday's events (site evac., bear at site) and how our responses to the issues were timely and appropriate. Continue with good communication today.
- hydration and work/rest regimine. Continue to take breaks as needed, and stay hydrated
- proper PPE; working on a flush mount in asphalt. Concrete pieces may fly up.
- communicate any changing conditions

~~0845 AS Begin~~

0845 - Begin set up at AP-3920
- Site: SS044
- Task/Activity for the day: decommission 1 flush mount well in parking lot, decommission 1 stick up well behind fence of abandoned building (if able)
- Personnel: Annika Seay (qualified sampler and logbook scribe)
- Subcontractors: Mick McHaney (MM) (driller) and Chris Buchta (helper) of GeoTek Alaska, Inc.
- PN 457958 09. JM. 02

0900 - Begin breaking up concrete around flush mount AP-3920.

0915 - Young male moose walks up ~~to within~~ near site in brush and trees. Does not retreat when hearing horn sound. Driller MM makes noise and the moose runs off. CH Van is positioned near rig; AS has drillers move their work truck to position near rig in case they need to get in and away from curious moose.

0930 - Driller MM has added sand to well before beginning to pull flush mount. Added a little more than anticipated (sand is to 8 ft bgs) *Note* the bottom of the well was knocked out before adding sand. MM attaches PVC puller to begin to pull up on well casing to add more sand. ~~MM~~

0935 - MM pulls ~2 ft of casing up and GB adds more sand. MM attempts to pull more casing and the PVC snaps. MM tags sand at 7.8 ft bgs.

Scale: 1 square = _____

FTL mb 7/31/14

JBER SSØ44 7-31-14

late entry 0845 - AS takes WL and TD of AP-392Ø
- DTW = 12.2 ft bgs
- TD = 17.7 ft bgs

Ø945 - Drillers need to chisle around flush mount metal ring to remove the ring. Asphalt/concrete is about 4-5" thick. Attempt to pull with rig; it is still stuck. Drillers chisel more around it. Bentonite is pulled out from inside the ring. Some has sloughed in to the hole. After ring removal, MM will lower rod in to open hole back up for more sand and bentonite.

1ØØØ - Drillers attempt to drill around metal ring to extract it; drill ~ 2' down

1Ø1Ø - Chain is wrapped around ring and extracted with rig. Attempt to photograph the hole after the ring is extracted; the hole has a 'swollen' appearance (lifted above level surface of parking lot) that was not caused by driller's actions during decommissioning.
Sloughed from 7.8 to 3' bgs with bentonite from the previous well. Driller had lowered rod in before this second sloughing to reopen the hole. Sloughing is anticipated to continue. Fresh bentonite is added from 3' to 1.5' bgs, sand from 1.5' to 0.5' bgs.
Asphalt patch to ~~top~~ make flush with ground surface.
Elliot Wilson is supposed to be bring asphalt to complete patch, as the drillers do not have enough on site to complete.

1Ø45 - Drillers clean up as much as they can; Elliot Wilson will be taking most of the trash. Drillers attempt to stay busy while waiting for Elliott. AS calls M. Bruno to inquire about key to fence.

11ØØ - MM finds asphalt while cleaning out truck. Almost completes patch. Will still need more

11Ø5 - Elliot Wilson and Morgan Bruno arrive on site. Morgan calls about key.

~~1145 - Mobe to site DPØØ4.~~ Key not available at this time. Drillers continue to pack up site.

1145 - Mobe to DPØØ9. Stake out location for SV-Ø6. It will be located near ~~SVØ1.~~ SBØ1.

12Ø5 - Hold health and safety Tailgate briefing. Discuss:
- general procedures for installing SV probes. Main concern on rig is pinch points.
- uneven ground, slips/trips/falls.
- do not touch tubing for probe; use new nitrile gloves for handling
- no smoking within 50 ft of storage tanks along building; no smoking near the rig

MB and AS have checked for any utility markings - all clear. MB has checked in with building.

1225 - Set rig at probe installation location.

FTL m/b 7/31/14

Rite in the Rain

Scale: 1 square =

JBER

- Project site: DP09
- Task/Activity for day: install 1 SV probe to 8' bgs
- Personnel: Annika Seay (qualified sampler and logbook scribe)
- Subcontractors: Elliot Wilson (driller) Mick McHaney (driller) Chris Buchta (helper)
- PN 457958 09

1235 - Begin drilling DP09 - SV06
1255 - Drill to 8'3" bgs. Screen from 7.5 to 8' bgs, sand from 8'3" to 6" bgs. Bentonite from 6' to 1' bgs. Sand from 1' to ground surface. 1/2 bag sand, 1/2 bag bentonite
1255 - installation complete, AS caps tubing
1305 - MB arrives with plastic monument cover for tubing. Drillers clear up site. A.S attempts to check out with building - no one is there. Sign on door says they will return at 2 PM
1325 - Mobe to TU074. Check utility markings. 3rd party locate found a metal anomaly and SV probe spot has been adjusted to account for that. Set up rig.
1345 - Hold health and safety tailgate briefing. Discuss:
- pinch points on rig
- uneven ground, with slips / trips, falls
- bees flying in area
- wildlife has been previously seen by railroad tracks, be mindful

- Project Site: TU074
- Task / Activity for day: install 1 SV probe to 8' bgs
- Personnel: Annika Seay (qualified sampler / logbook scribe)
- Subcontractors: Elliot Wilson (driller), Mick McHaney (driller) Chris Buchta (helper)

1350 - Begin drilling TU074 - SV01
1355 - hole sloughed when pulling rod - redrilling in same hole. Sand from 8'3" to 7". Screen is from 7.5' to 8' bgs
1415 - Bentonite from 7" to 1" bgs
1415 - complete SV probe installation. EW leaves site. AS and CB secure monument. Drillers clean up site.
1430 - A.S completes paperwork in office. Meets with Jennifer Frame about boring logs
1610 - End of day.

Annika Seay 7-31-14

FTL mB 7/31/14

Scale: 1 square = _____

JBER TU074 8.13.14

0830 - Annika Seay (AS) and Jennifer Frame (JF) meet at the CH field office. Begin prep. for the day's sampling.
- Project Site: TU074
- Task / Activity for the day: Sample 1 Soil vapor probe
- Personnel: Jennifer Frame (qualified sampler) Annika Seay (qualified sampler and logbook scribe)
- Project Number: 457958.09.KT.06

1115 - Set up for SVP sampling at TU074-SV011
1130 - manifold check passes; helium check also passes. ~~Begin~~ AFS
1132 - field measurements taken; pre $ample checks complete.
1139 - Sample collection begins - flow rate = 194.73 (end flow rate = 193.62) collect sample 14Q3TU074-SV01001-SG-0-A and sample 14Q3TU074-SV01001-SG-0B for analysis of:
- TO-17 (2HN only)

1150 - begin DUP sample collection. flow rate = 199.11 collect sample 14Q3TU074-SV01001-SG-1-A and sample 14Q3TU074-SV01001-SG-1-B for analysis of:
- TO-17 (2-HN only)

1200 - Collect TU074 BLANK (outdoor air)
14Q3TU074-BLANK-SG-0-A
14Q3TU074-BLANK-SG-0-B

1202 - demobe from site. Prepare for next site.
1300 - mobe to DP009.
1310 - arrive at site. JF checks in with the building.
- Project Site: DP009
- Task / Activity for the day: sample 1 SV probe
- Personnel: Annika Seay (qualified sampler and logbook scribe) Jennifer Frame (qualified sampler)
- Project Number: 457958.09.HR.04

1315 - Set up at DP009-SV001. See sampling log for canister / flow controller data
1330 - begin manifold leak check.
1335 - begin purge. All checks pass.
1347 - begin collecting sample 14Q3DP009-SV001-SG-0 for analysis of:
- TO15 (limited suite)

1352 - sample collected
mobe to DP009-SV03.
1420 - Begin manifold check. Pass.
1421 Begin purge (4 minute purge) (Helium check)

Scale: 1 square = AFS

FTL mrb 8/13/14

JBER TU037 8-13-14

~~1428~~ 1433 - ~~Begin~~ At collecting sample 14Q3DP009-SV03Q1-SG-0 for analysis of: AS AT
- TO-15

~~1444~~ 1509 - ~~Begin~~ At collecting DUP sample 14Q3DP009-SV03Q1-SG-1 for analysis of: AS AT
- TO-15

1455 - DUP sample pressure < 2; will resample.

~~1520 - pack up and move back to CH field office after completing sample collection~~ DUP

1458 - Setup new canister & flow controller. See Sample log for details.

1503 - begin re-sample of DP009-SV03 DUP sample TO-15

1508 - stop sample, check final pressure. Final pressure = 5.77 Hg.
Run sample for an additional 45 seconds. ~~Final pressure~~ DUP

1509 - ~~-3.24 Hg @ 1509~~ DUP Final pressure -3.24 Hg.

1520 - packup & demobe to CH field office after completing sample collection.
Samples will be shipped via FedEx tomorrow.

1700 - end of day

8.13.14

Rite in the Rain

FTL MRS 8/13/14 Scale: 1 square = _____

Appendix A-2
Soil Gas Probe Completion Diagrams

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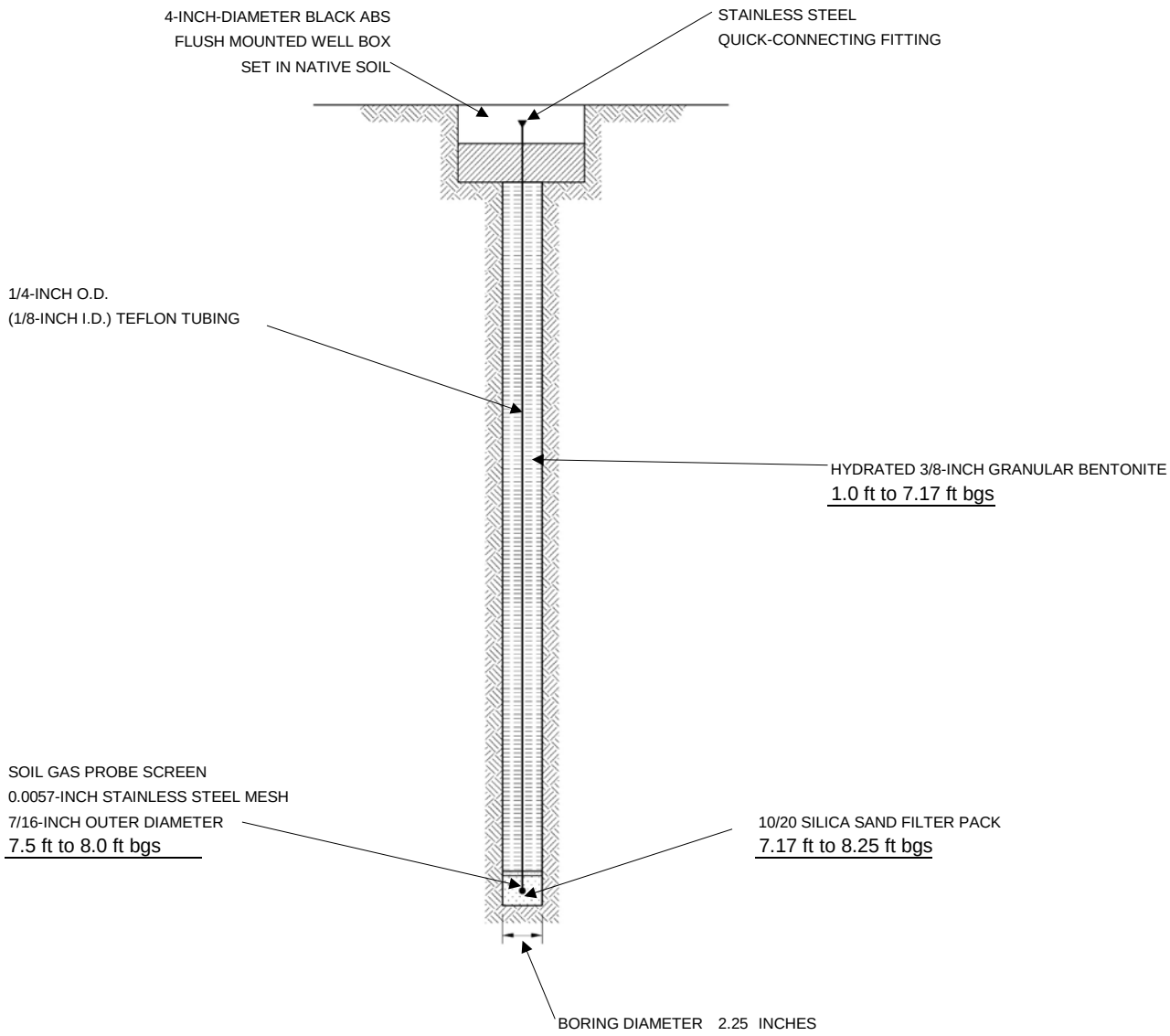
PROJECT NUMBER	WELL NUMBER	
457958.09.HR.04	DP009-SV01	SHEET 1 OF 1

SOIL GAS PROBE COMPLETION DIAGRAM

PROJECT : DP009 - Building 986 Dry Well				LOCATION :	JBER, Alaska
DRILLING CONTRACTOR :	GeoTek Alaska, Inc.				
DRILLING METHOD AND EQUIPMENT USED :	Direct Push with Geoprobe 8040DT			PERMIT NO:	NA
WATER LEVELS : NA	START : 6.02.14	END :	6.02.14	LOGGER :	B. Jones-Stanley



SOIL VAPOR PROBE CONSTRUCTION

NOT TO SCALE

SOIL VAPOR PROBE CONSTRUCTION DIAGRAM

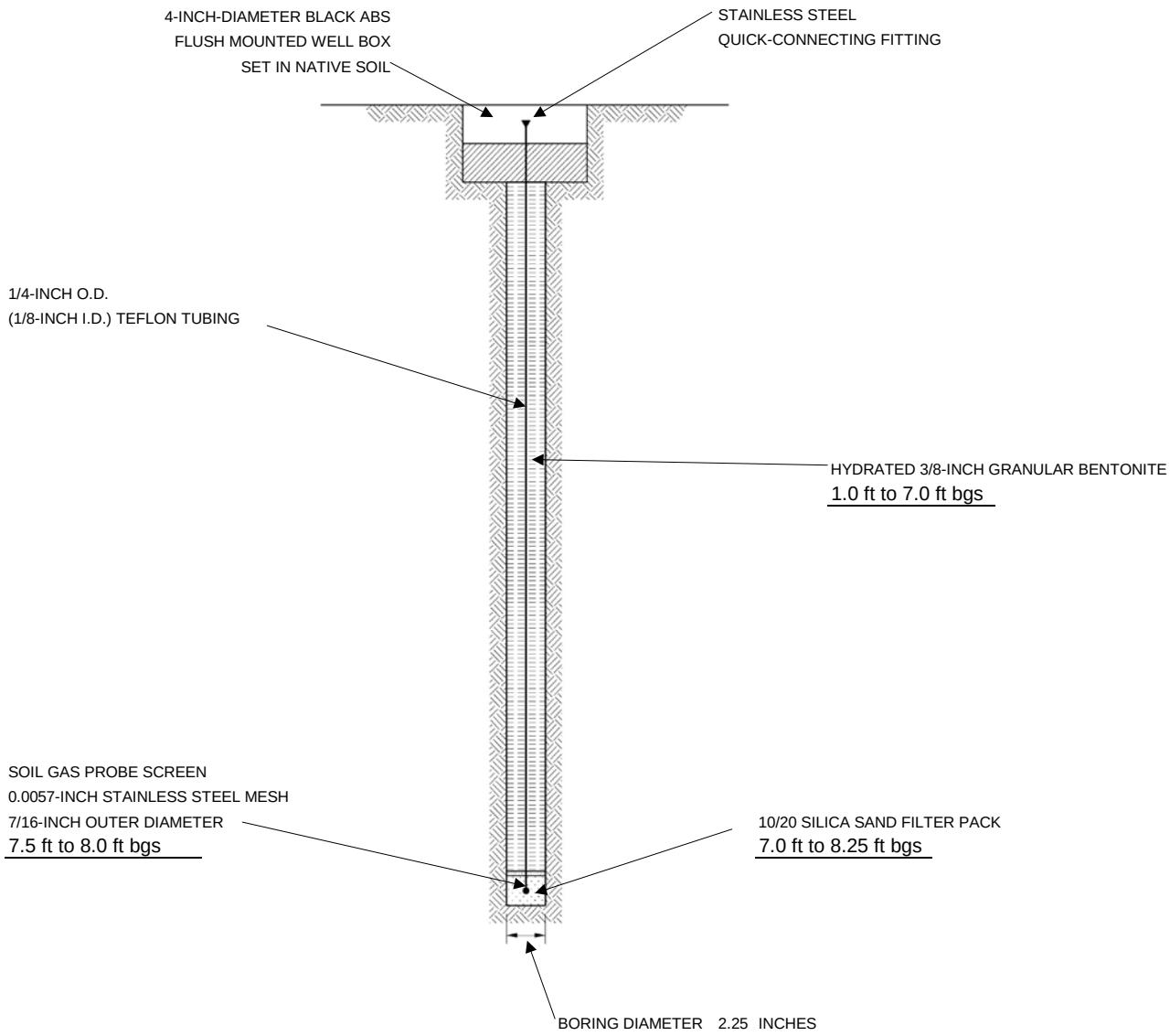
ES101210233324RDD_01

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
457958.09.HR.04	DP009-SV02	SHEET 1 OF 1

SOIL GAS PROBE COMPLETION DIAGRAM

PROJECT :	DP009 - Building 986 Dry Well			LOCATION :	JBER, Alaska
DRILLING CONTRACTOR :	GeoTek Alaska, Inc.				
DRILLING METHOD AND EQUIPMENT USED :	Direct Push with Geoprobe 8040DT			PERMIT NO:	NA
WATER LEVELS :	NA	START : 6.02.14	END : 6.02.14	LOGGER :	B. Jones-Stanley



SOIL VAPOR PROBE CONSTRUCTION

NOT TO SCALE

SOIL VAPOR PROBE CONSTRUCTION DIAGRAM

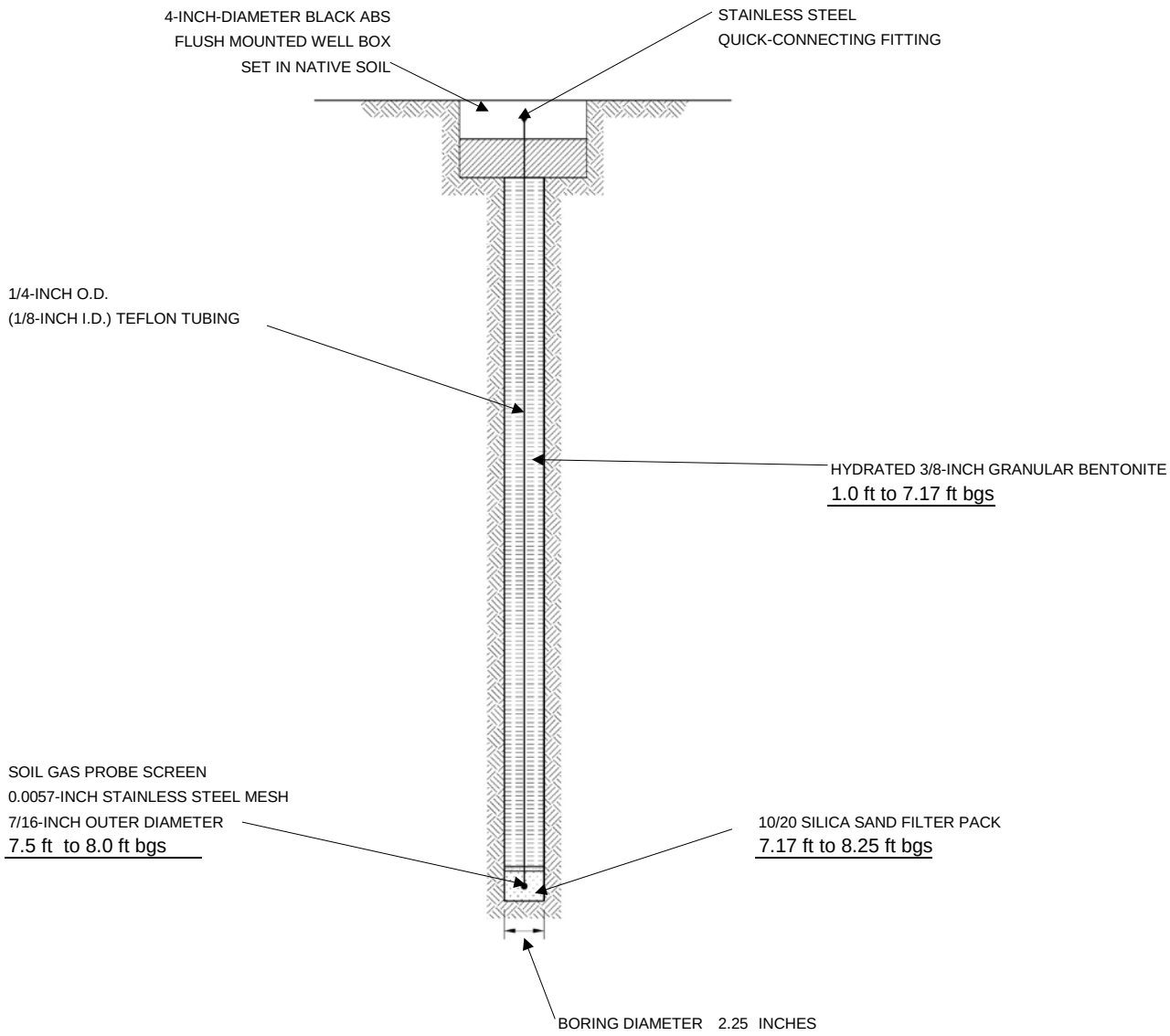
ES101210233324RDD_01

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
457958.09.HR.04	DP009-SV03	SHEET 1 OF 1

SOIL GAS PROBE COMPLETION DIAGRAM

PROJECT : DP009 - Building 986 Dry Well				LOCATION :	JBER, Alaska
DRILLING CONTRACTOR :	GeoTek Alaska, Inc.				
DRILLING METHOD AND EQUIPMENT USED :	Direct Push with Geoprobe 8040DT			PERMIT NO:	NA
WATER LEVELS : NA	START : 6.02.14	END :	6.02.14	LOGGER :	B. Jones-Stanley



SOIL VAPOR PROBE CONSTRUCTION

NOT TO SCALE

SOIL VAPOR PROBE CONSTRUCTION DIAGRAM

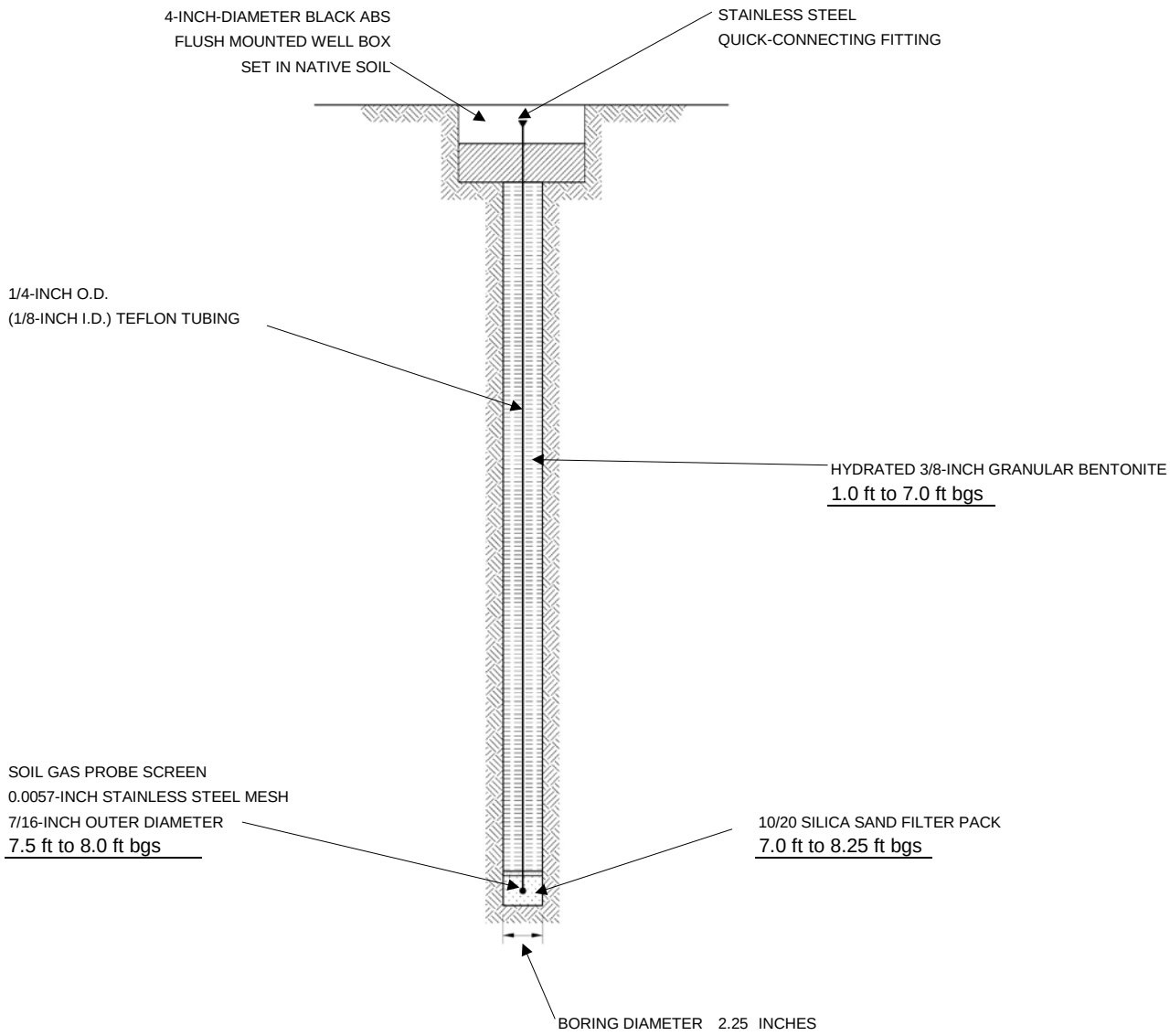
ES101210233324RDD_01

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
457958.09.HR.04	DP009-SV04	SHEET 1 OF 1

SOIL GAS PROBE COMPLETION DIAGRAM

PROJECT : DP009 - Building 986 Dry Well				LOCATION :	JBER, Alaska
DRILLING CONTRACTOR :	GeoTek Alaska, Inc.				
DRILLING METHOD AND EQUIPMENT USED :	Direct Push with Geoprobe 8040DT			PERMIT NO:	NA
WATER LEVELS : NA	START : 6.02.14	END :	6.02.14	LOGGER :	B. Jones-Stanley



SOIL VAPOR PROBE CONSTRUCTION

NOT TO SCALE

SOIL VAPOR PROBE CONSTRUCTION DIAGRAM

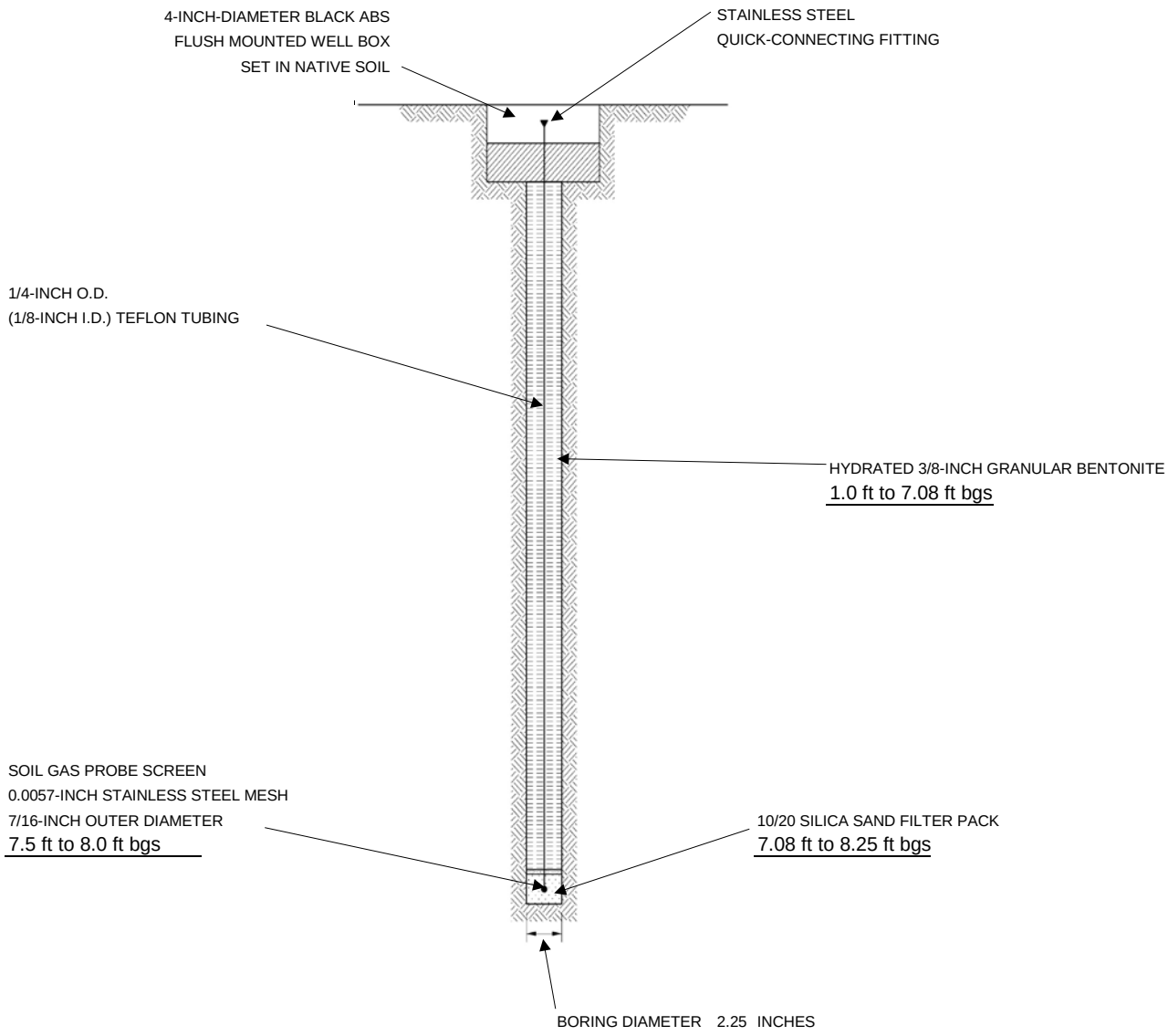
ES101210233324RDD_01

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
457958.09.HR.04	DP009-SV05	SHEET 1 OF 1

SOIL GAS PROBE COMPLETION DIAGRAM

PROJECT : DP009 - Building 986 Dry Well				LOCATION :	JBER, Alaska
DRILLING CONTRACTOR :	GeoTek Alaska, Inc.				
DRILLING METHOD AND EQUIPMENT USED :	Direct Push with Geoprobe 8040DT			PERMIT NO:	NA
WATER LEVELS : NA	START : 6.02.14	END :	6.02.14	LOGGER :	B. Jones-Stanley



SOIL VAPOR PROBE CONSTRUCTION

NOT TO SCALE

SOIL VAPOR PROBE CONSTRUCTION DIAGRAM

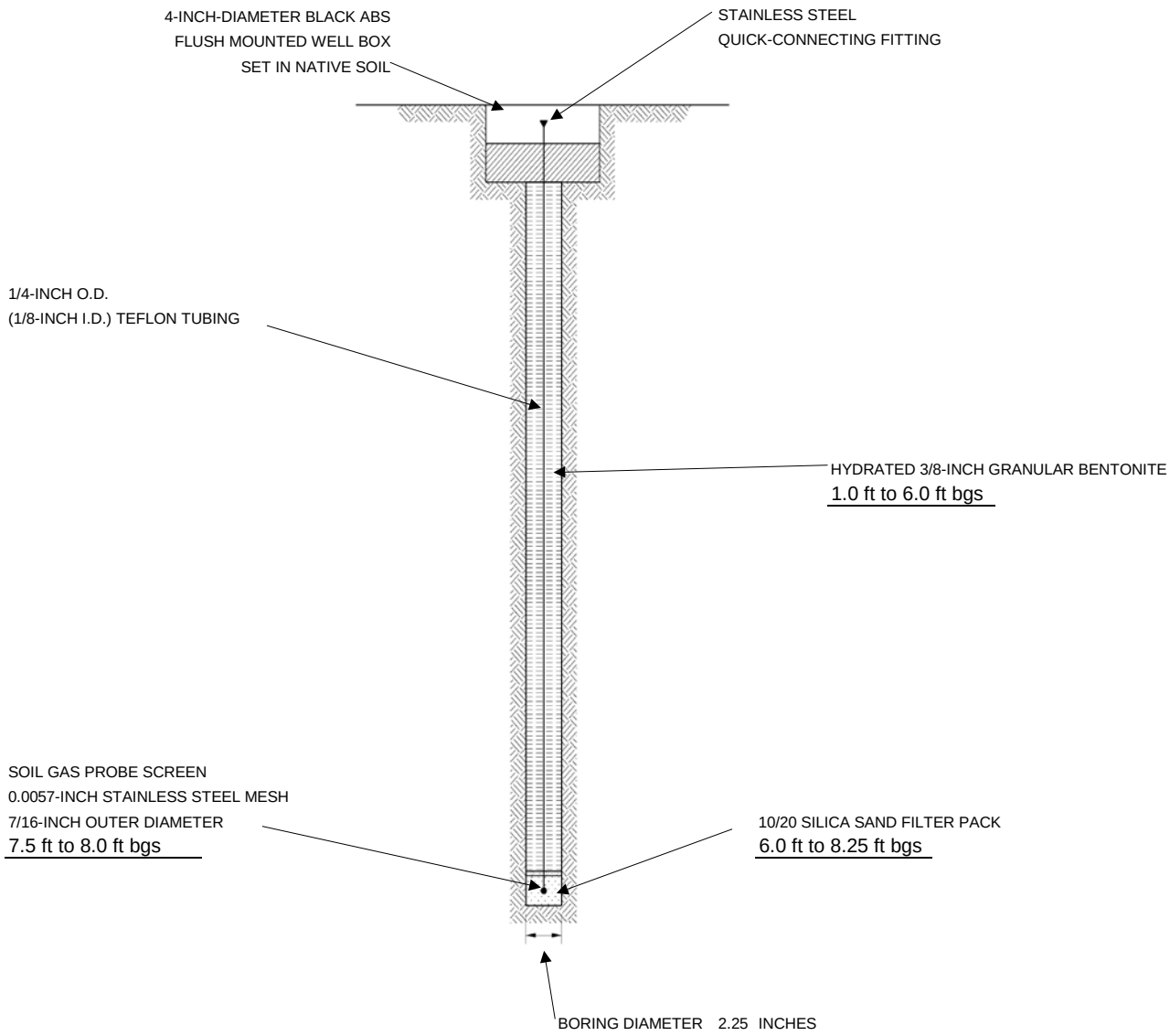
ES101210233324RDD_01

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
457958.09.HR.04	DP009-SV06	SHEET 1 OF 1

SOIL GAS PROBE COMPLETION DIAGRAM

PROJECT : DP009 - Building 986 Dry Well				LOCATION :	JBER, Alaska
DRILLING CONTRACTOR :	GeoTek Alaska, Inc.				
DRILLING METHOD AND EQUIPMENT USED :	Direct Push with Geoprobe 8040DT			PERMIT NO:	NA
WATER LEVELS : NA	START : 7.31.14	END :	7.31.14	LOGGER :	A. Seay



SOIL VAPOR PROBE CONSTRUCTION

NOT TO SCALE

SOIL VAPOR PROBE CONSTRUCTION DIAGRAM

ES101210233324RDD_01

Appendix A-3
Soil Gas Sampling Logs

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Sheet 1 of 2

Vapor Intrusion Best Practices
Exterior Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: JBFR - DP009 Project #: 457458.09.HR.04

Sampler Name: B. Jones-Stanley Date: 6/4/2014

Site

Identification: DP009 - Dry Well

Address: Bldg. 986, ~~Corner of~~ (NE)

Site Information:

Describe ground cover: Grass / Soil

Depth to groundwater (feet below ground surface): Not measured

Describe vadose zone soil type(s): Gravelly Sand / Sandy Gravel

Was a soil boring log completed? No Was a probe diagram completed? Yes

Soil Gas Probe Installation, Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		DP009-SV01
Probe and Sample Identification (field ID)		14Q2DP009-SV0101-SG-0
Probe Installation	Date and time	6/2/2014 1130
	Depth of hole drilled (feet below ground surface)	8.25'
	Bottom of probe screen (feet below ground surface)	8'
	Length of probe screen (inches)	6
	Width of probe screen (inches)	1/4
	Dead volume - including screen, sand pack, and tubing (mL)	259 x 3 = 776
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Purge rate (mL/min)	200
	Purge start time	1000
	Purge vacuum (" Hg)	0
	Purge completion time	1004
Helium Leak Check*	Leak check (% or ppmv helium)	0

Field Analysis (optional)	GEM2000 - O2 (%)	19.5
	GEM2000 - CO2 (%)	0.1
	GEM2000 - CH4 (%)	0.0
	PID - Total VOCs (ppmv)	0.9
Canister Sampling	Canister ID	N/A
	Flow controller ID	N/A
	Pressure gauge ID (optional)	N/A
	Sampling rate or period (mL/min or hours)	200
	Sample start date and time	6/4/14 1012
	Initial canister pressure (" Hg)	N/A
	Sampling vacuum (" Hg)	0
	Sample completion date and time	10
	Final canister pressure (" Hg)	N/A

* The soil gas probe passes the helium leak check if the detected helium concentration is less than 1,000 ppm (0.1%). Do NOT collect a soil gas sample if the probe fails the helium leak test.

Weather conditions during sampling: Sunny, clear, light breeze ~60°F

Observations and Comments: None

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FTL MB 6/4/14

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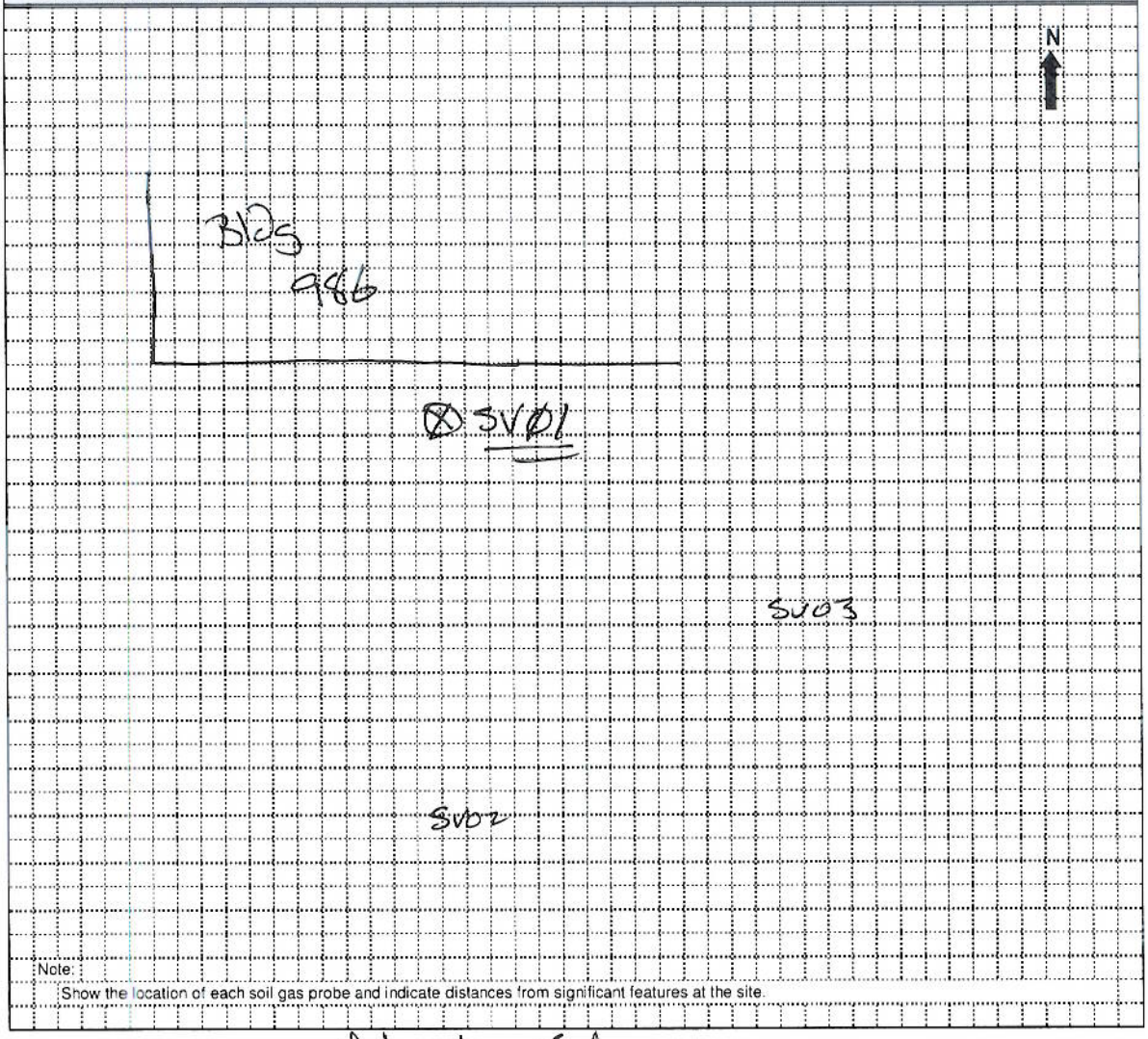
Vapor Intrusion Best Practices
Soil Gas Field Sampling Log

Sheet 2 of 2

Diagram - Outline of Site & Location of Soil Gas Probes



Note:
Show the location of each soil gas probe and indicate distances from significant features at the site.

Other observations and comments: Not to Scale

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Vapor Intrusion Best Practices
Exterior Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: JBER - DP009 Project #: 457958.09. HR.04

Sampler Name: B. Jones-Stanley Date: 6/4/2014

Site

Identification: DP009 - Dry Well

Address: Bldg 986

Site Information:

Describe ground cover: Grass / Soil

Depth to groundwater (feet below ground surface): Not measured

Describe vadose zone soil type(s): Sandy Gravel

Was a soil boring log completed? No Was a probe diagram completed? Yes

Soil Gas Probe Installation, Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		DP009-SV02
Probe and Sample Identification (field ID)		14Q2DP009-SV0201-S6-0
Probe Installation	Date and time	6/2/14 1200
	Depth of hole drilled (feet below ground surface)	5.25
	Bottom of probe screen (feet below ground surface)	5
	Length of probe screen (inches)	6
	Width of probe screen (inches)	1/4
	Dead volume - including screen, sand pack, and tubing (mL)	254 x 3 = 776
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Purge rate (mL/min)	200
	Purge start time	1101
	Purge vacuum (" Hg)	0
	Purge completion time	1105
Helium Leak Check*	Leak check (% or ppmv helium)	0

* The soil gas probe passes the helium leak check if the detected helium concentration is less than 1,000 ppm (0.1%). Do NOT collect a soil gas sample if the probe fails the helium leak test.

Field Analysis (optional)	GEM2000 - O2 (%)	20.8
	GEM2000 - CO2 (%)	0.4
	GEM2000 - CH4 (%)	0.0
	PID - Total VOCs (ppmv)	0.2
Canister Sampling	Canister ID	N/A
	Flow controller ID	N/A
	Pressure gauge ID (optional)	N/A
	Sampling rate or period (mL/min or hours)	200
	Sample start date and time	1110
	Initial canister pressure (" Hg)	N/A
	Sampling vacuum (" Hg)	0
	Sample completion date and time	1115
	Final canister pressure (" Hg)	N/A

Weather conditions during sampling: Sunny, Clear, Light breeze ~60°F

Observations and Comments: None

FTL MB 6/4/14

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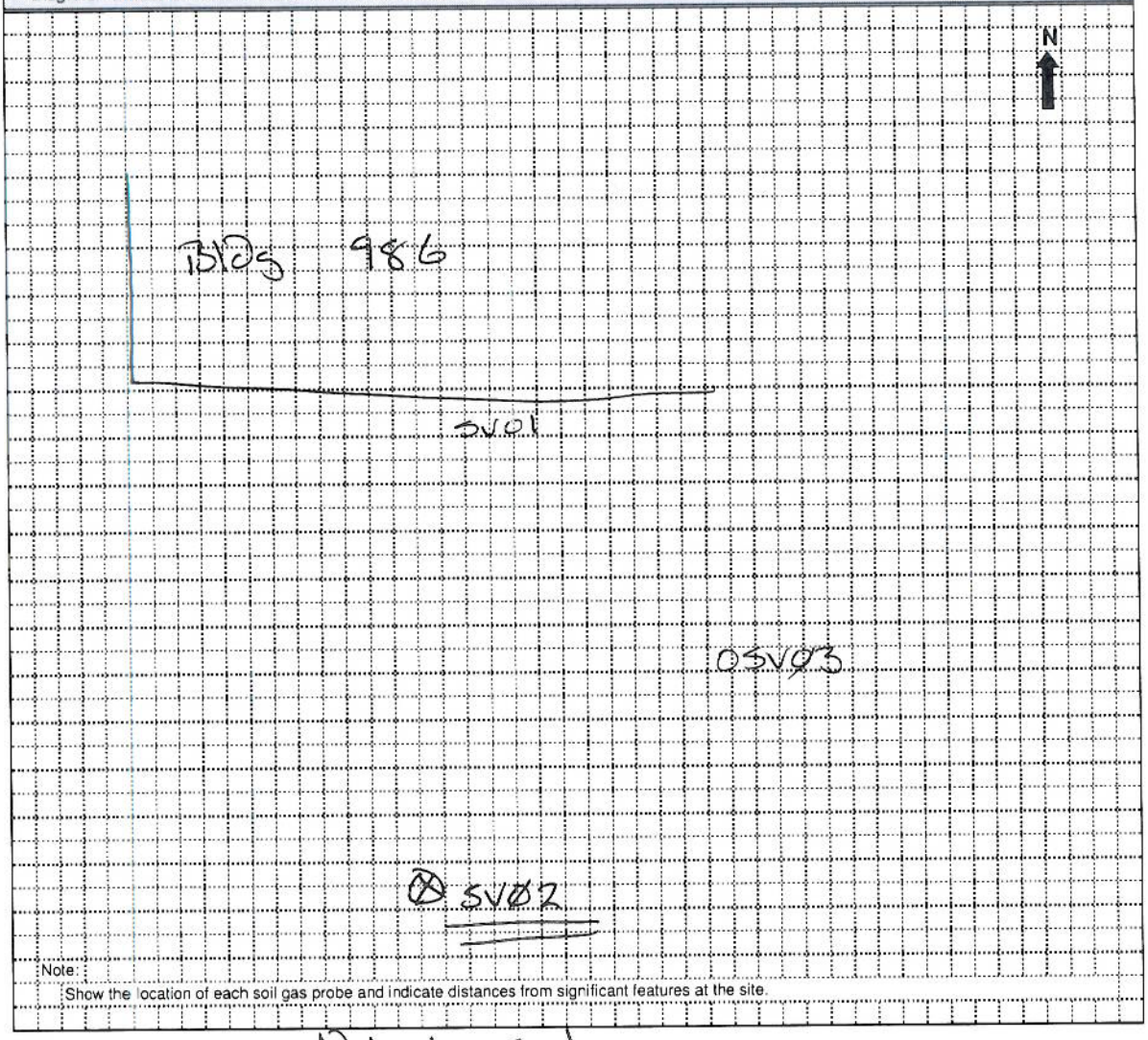
Vapor Intrusion Best Practices
Soil Gas Field Sampling Log

Sheet 2 of 2

Diagram - Outline of Site & Location of Soil Gas Probes



Note:
Show the location of each soil gas probe and indicate distances from significant features at the site.

Other observations and comments: Not to Scale

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Vapor Intrusion Best Practices
Exterior Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: JBER - DP009 Project #: 457958.09.HP.04

Sampler Name: B. Jones-Stanley Date: 6/4/2014

Site

Identification: DP009 - Dry Well

Address: Bldg. 986

Site Information:

Describe ground cover: Grass/Soil

Depth to groundwater (feet below ground surface): Not measured

Describe vadose zone soil type(s): Gravelly Sand

Was a soil boring log completed? No Was a probe diagram completed? Yes

Soil Gas Probe Installation, Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		DP009-SV03
Probe and Sample Identification (field ID)		14Q2DP009-SV0301-SG-0
Probe Installation	Date and time	6/2/14 1320
	Depth of hole drilled (feet below ground surface)	8.25
	Bottom of probe screen (feet below ground surface)	8
	Length of probe screen (inches)	6
	Width of probe screen (inches)	1/4
	Dead volume - including screen, sand pack, and tubing (mL)	259 x 3 = 776
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Purge rate (mL/min)	200
	Purge start time	1424
	Purge vacuum (" Hg)	0
	Purge completion time	1428
Helium Leak Check*	Leak check (% or ppmv helium)	0

Field Analysis (optional)	GEM2000 - O2 (%)	19.0
	GEM2000 - CO2 (%)	0.9
	GEM2000 - CH4 (%)	19.355 0.0
	PID - Total VOCs (ppmv)	45
Canister Sampling	Canister ID	NA
	Flow controller ID	NA
	Pressure gauge ID (optional)	NA
	Sampling rate or period (mL/min or hours)	200
	Sample start date and time	1434
	Initial canister pressure (" Hg)	NA
	Sampling vacuum (" Hg)	0
	Sample completion date and time	1439
	Final canister pressure (" Hg)	NA

* The soil gas probe passes the helium leak check if the detected helium concentration is less than 1,000 ppm (0.1%). Do NOT collect a soil gas sample if the probe fails the helium leak test.

Weather conditions during sampling: Sunny clear, light breeze, ~60°F

Observations and Comments:

Duplicate Start 15:18, Stop 1523, PID = 47

O_2 = 18.4%, CO_2 = 0.8%, CH_4 = 0

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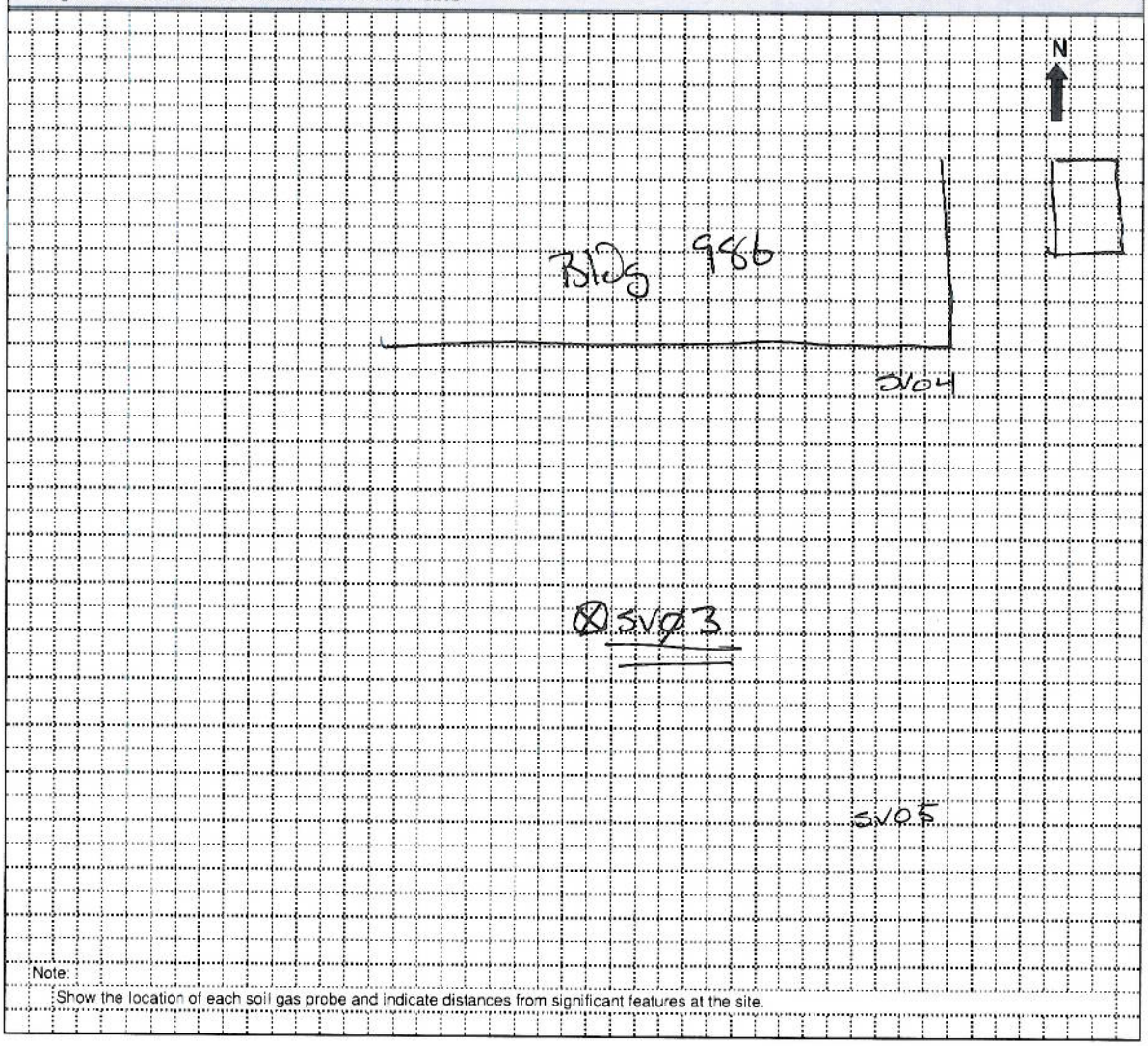
Vapor Intrusion Best Practices
Soil Gas Field Sampling Log

Sheet 2 of 2

Diagram - Outline of Site & Location of Soil Gas Probes



Note:
Show the location of each soil gas probe and indicate distances from significant features at the site.

Other observations and comments:

REV. 11/15/11

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Sheet 1 of 1

Vapor Intrusion Best Practices
Exterior Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: JBER PBR
Project #: 457958.89.HR.02
Sampler Name: Jennifer Frame
Date: 8.13.14

Site

Identification: DP0009-SV03
Address: —
Site Information:
Describe ground cover: grass cover, soft soil
Depth to groundwater (feet below ground surface): not measured
Describe vadose zone soil type(s): gravelly sand
Was a soil boring log completed? No
Was a probe diagram completed? Yes

Soil Gas Probe Installation, Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		DP0009-SV03
Probe and Sample Identification (field ID)		1403 DP0009-SV0301-SG-0
Probe Installation	Date and time	6/2/14 1325
	Depth of hole drilled (feet below ground surface)	8.3
	Bottom of probe screen (feet below ground surface)	8
	Length of probe screen (inches)	6
	Width of probe screen (inches)	1/4
	Dead volume - including screen, sand pack, and tubing (mL)	259x3=776
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Purge rate (mL/min)	200
	Purge start time	1421
	Purge vacuum (" Hg)	0
	Purge completion time	1425
Helium Leak Check*	Leak check (% or ppmv helium)	0

* The soil gas probe passes the helium leak check if the detected helium concentration is less than 1,000 ppm (0.1%). Do NOT collect a soil gas sample if the probe fails the helium leak test.

Field Analysis (optional)	GEM2000 - O2 (%)	18.8
	GEM2000 - CO2 (%)	2.4
	GEM2000 - CH4 (%)	0.0
	PID - Total VOCs (ppmv)	0.5
Canister Sampling	Canister ID	SG2002, DUP = SG 1996
	Flow controller ID	FC3938B, DUP = FC3953B
	Pressure gauge ID (optional)	N/A
	Sampling rate or period (mL/min or hours)	150 mL/min
	Sample start date and time	8.13.14, 1428 DUP = 8.13.14, 1503
	Initial canister pressure (" Hg)	-29.26 DUP = -29.24
	Sampling vacuum (" Hg)	0
	Sample completion date and time	8.13.14, 1433 DUP = 8.13.14, 1509
	Final canister pressure (" Hg)	-2.43 DUP = -3.24

Weather conditions during sampling: overcast, light rain, 50s

Observations and Comments: TO-15 collected
DUP sample collected here: 1403DP0009-SV0301-SG-1

REV. 11/15/11

FTL, MB

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Vapor Intrusion Best Practices
Exterior Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: JBER
Project #: 457958.09.HR.04
Sampler Name: B. Jones-Stanley
Date: 6/4/2014

Site

Identification: DP009 - Dry well
Address: Bldg 586
Site Information:
Describe ground cover: Grass/Kool
Depth to groundwater (feet below ground surface): Not measured
Describe vadose zone soil type(s): Gravelly Sand
Was a soil boring log completed? No
Was a probe diagram completed? Yes

Soil Gas Probe Installation, Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		DP009-SV04
Probe and Sample Identification (field ID)		HQZDPC09-SV0401-SG-0
Probe Installation	Date and time	6/4/14 1620 (6/4/2014 1450)
	Depth of hole drilled (feet below ground surface)	8.25
	Bottom of probe screen (feet below ground surface)	8
	Length of probe screen (inches)	6
	Width of probe screen (inches)	1/4
	Dead volume - including screen, sand pack, and tubing (mL)	259x3=776
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Purge rate (mL/min)	200
	Purge start time	1625
	Purge vacuum (" Hg)	0
	Purge completion time	1629
Helium Leak Check*	Leak check (% or ppmv helium)	0

Field Analysis (optional)	GEM2000 - O2 (%)	20.5
	GEM2000 - CO2 (%)	0.2
	GEM2000 - CH4 (%)	0.0
	PID - Total VOCs (ppmv)	4.0
Canister Sampling	Canister ID	N/A
	Flow controller ID	N/A
	Pressure gauge ID (optional)	N/A
	Sampling rate or period (mL/min or hours)	200
	Sample start date and time	1635
	Initial canister pressure (" Hg)	N/A
	Sampling vacuum (" Hg)	N/A
	Sample completion date and time	1640
	Final canister pressure (" Hg)	N/A

* The soil gas probe passes the helium leak check if the detected helium concentration is less than 1,000 ppm (0.1%). Do NOT collect a soil gas sample if the probe fails the helium leak test.

Weather conditions during sampling: Sunny, ~60°F

Observations and Comments: None

REV. 11/15/11

MB FTL 6/4/14

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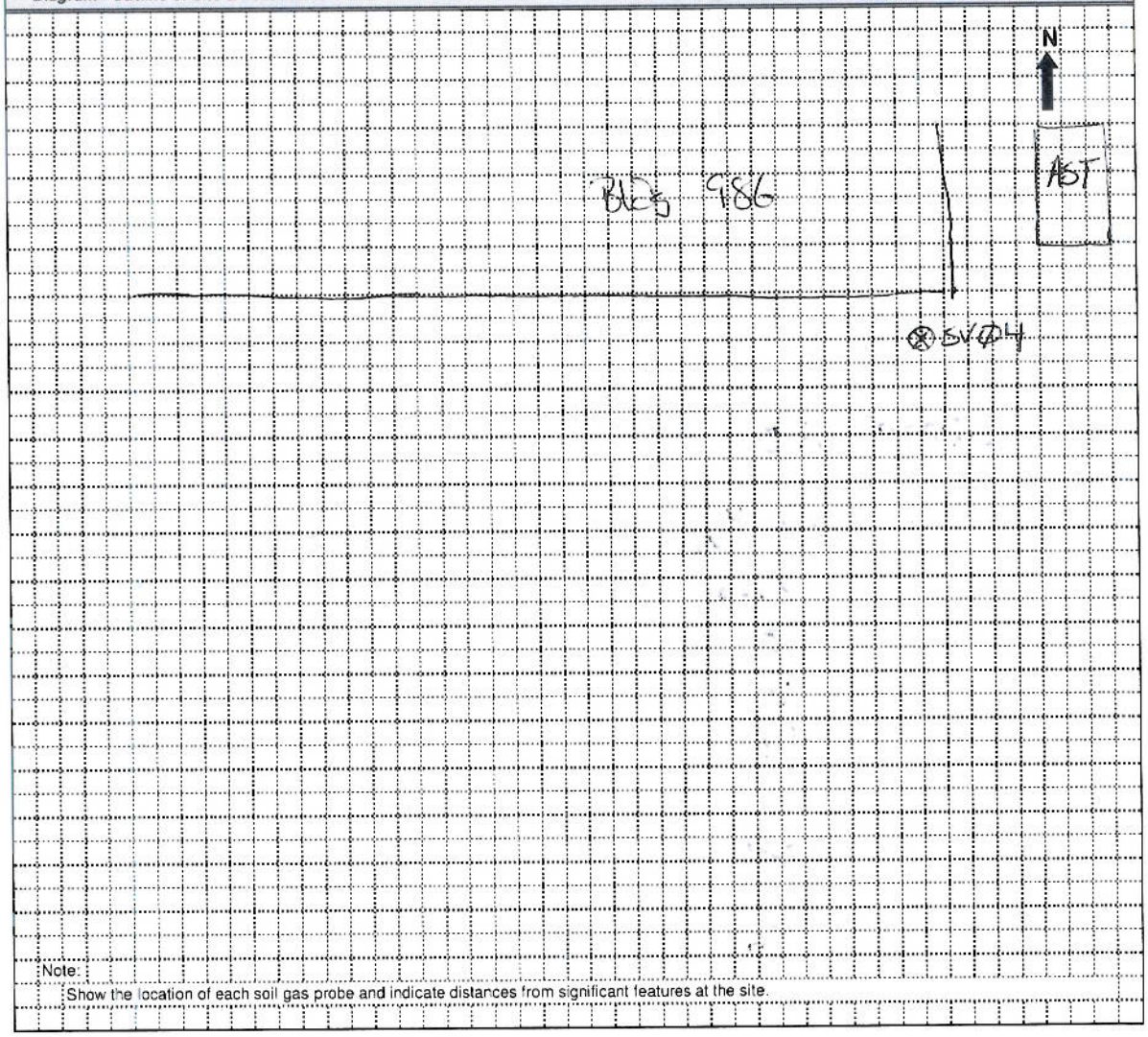
Vapor Intrusion Best Practices
Soil Gas Field Sampling Log

Diagram - Outline of Site & Location of Soil Gas Probes



Note:
Show the location of each soil gas probe and indicate distances from significant features at the site.

Other observations and comments:

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Vapor Intrusion Best Practices
Exterior Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: JBER-DP009
Project #: 457958.09.HR.04
Sampler Name: B. Jones - Stanley
Date: 6/4/2014

Site

Identification: DP009 - Dry Well
Address: Bldg 956
Site Information:
Describe ground cover: Grass/Soil
Depth to groundwater (feet below ground surface): Not measured
Describe vadose zone soil type(s): Gravelly Sand
Was a soil boring log completed? NO
Was a probe diagram completed? Yes

Soil Gas Probe Installation, Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		DP009-SV05
Probe and Sample Identification (field ID)		14@2DP009-SV0501-SG-0
Probe Installation	Date and time	6/2/14 1335
	Depth of hole drilled (feet below ground surface)	8.25
	Bottom of probe screen (feet below ground surface)	8
	Length of probe screen (inches)	6
	Width of probe screen (inches)	1/4
	Dead volume - including screen, sand pack, and tubing (mL)	259x3=776
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Purge rate (mL/min)	200
	Purge start time	1545
	Purge vacuum (" Hg)	0
	Purge completion time	1549
Helium Leak Check*	Leak check (% or ppmv helium)	0

Field Analysis (optional)	GEM2000 - O2 (%)	19.7
	GEM2000 - CO2 (%)	0.9
	GEM2000 - CH4 (%)	0.0
	PID - Total VOCs (ppmv)	1.6
Canister Sampling	Canister ID	NA
	Flow controller ID	NA
	Pressure gauge ID (optional)	NA
	Sampling rate or period (mL/min or hours)	200
	Sample start date and time	1555
	Initial canister pressure (" Hg)	NA
	Sampling vacuum (" Hg)	0
	Sample completion date and time	1600
	Final canister pressure (" Hg)	NA

* The soil gas probe passes the helium leak check if the detected helium concentration is less than 1,000 ppm (0.1%). Do NOT collect a soil gas sample if the probe fails the helium leak test.

Weather conditions during sampling: Sunny, clear, light breeze, ~60°F

Observations and Comments: None

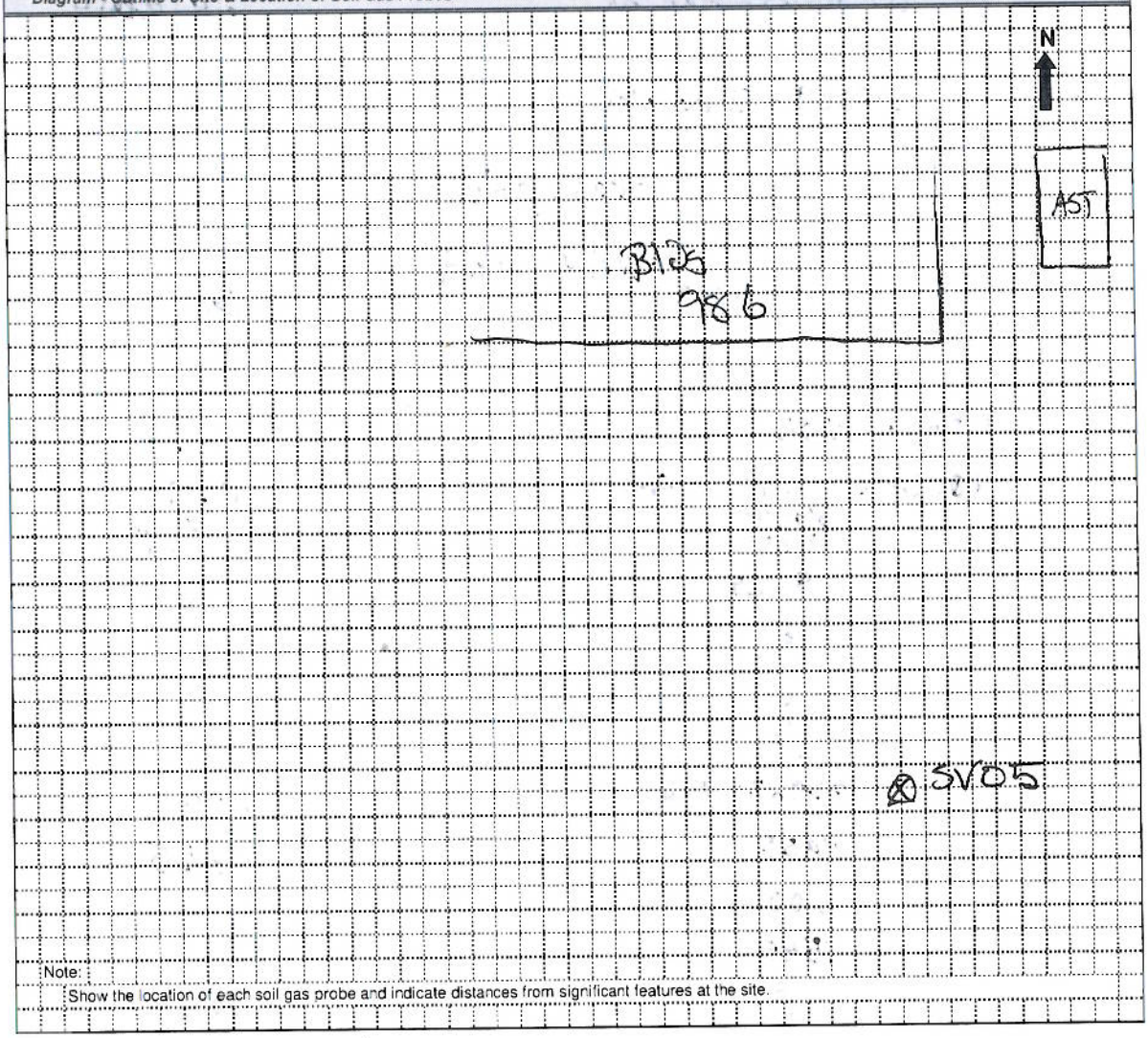
MB FTL 6/4/14

CH2MHILL

Vapor Intrusion Best Practices
Soil Gas Field Sampling Log

Sheet 2 of 2

Diagram - Outline of Site & Location of Soil Gas Probes



Note:
Show the location of each soil gas probe and indicate distances from significant features at the site.

Other observations and comments: None

REV. 11/15/11

CH2MHILL

Sheet 1 of 1

Vapor Intrusion Best Practices
Exterior Soil Gas Probe Installation and Sampling Log - Canister Method

Project Info

Project Name: JBER PBR
Project #: 457958.0009.HR.02
Sampler Name: Jennifer Frame
Date: 8.13.14

Site

Identification: DP0009-SV06
Address: —
Site Information:
Describe ground cover: grass cover, soft soil
Depth to groundwater (feet below ground surface): not measured
Describe vadose zone soil type(s): gravelly sand
Was a soil boring log completed? No
Was a probe diagram completed? Yes

Soil Gas Probe Installation, Purging, Leak Checking, & Sampling Log

Sample location (describe and show in diagram)		DP0009 - SV06
Probe and Sample Identification (field ID)		1403DP0009 - SV0601-SG-0
Probe Installation	Date and time	7/31/14 1255
	Depth of hole drilled (feet below ground surface)	8.3
	Bottom of probe screen (feet below ground surface)	8
	Length of probe screen (inches)	6
	Width of probe screen (inches)	1/4
	Dead volume - including screen, sand pack, and tubing (mL)	488x3=1464
Manifold Leak Check	Leak check (sampling manifold) - Pass/No Pass	Pass
Probe Purge	Purge rate (mL/min)	200
	Purge start time	1335
	Purge vacuum (" Hg)	0
	Purge completion time	1343
Helium Leak Check*	Leak check (% or ppmv helium)	0.0

Field Analysis (optional)	GEM2000 - O2 (%)	21.3
	GEM2000 - CO2 (%)	00.3
	GEM2000 - CH4 (%)	0.0
	PID - Total VOCs (ppmv)	0.1
Canister Sampling	Canister ID	SG1998
	Flow controller ID	FC3937B
	Pressure gauge ID (optional)	N/A
	Sampling rate or period (mL/min or hours)	150 mL/min
	Sample start date and time	8.13.14 1347
	Initial canister pressure (" Hg)	-29.23
	Sampling vacuum (" Hg)	0
	Sample completion date and time	8.13.14 1352
	Final canister pressure (" Hg)	-2

* The soil gas probe passes the helium leak check if the detected helium concentration is less than 1,000 ppm (0.1%). Do NOT collect a soil gas sample if the probe fails the helium leak test.

Weather conditions during sampling: Overcast, light rain, 50s

Observations and Comments: TO15 collected
~~Dup sample 1403DP0009-SV0601-SG-1 collected AFS~~

REV. 11/15/11

FTL mB 8/13/14

Appendix A-4
Building Survey

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ALASKA DEPARTMENT OF ENVIRONMENAL CONSERVATION
BUILDING INVENTORY AND INDOOR AIR SAMPLING QUESTIONNAIRE

This form should be prepared by a person familiar with indoor air assessments with assistance from a person knowledgeable about the building. Complete this form for each building where interior samples (e.g., indoor air, crawl space, or subslab soil gas samples) will be collected. Section I of this form should be used to assist in choosing an investigative strategy during workplan development. Section II should be used to assist in identification of complicating factors during a presampling building walk-through.

Preparer's Name Brandon Jones-Stanley Date/Time Prepared 6/10/14 9:00

Preparer's Affiliation CH2M HILL Phone No. 541-760-7130

Purpose of Investigation Assess vapor intrusion potential from former dry well

SECTION I: BUILDING INVENTORY

1. **OCCUPANT OR BUILDING PERSONNEL:**

Interviewed: (Y) N

Last Name Kelley First Name Steve

Address Building 9486, Warehouse Rd.

City JBER, AK

Phone No. 384-7180

Number of Occupants/people at this location ~~up to~~ 3 Age of Occupants

full-time typical shift 7-4 (5 days/week)

2. **OWNER or LANDLORD:** (Check if same as occupant ____.)

Interviewed: Y / N

Last Name DLA -> owns building DOD owns the land First Name NA

Address NA

City NA

Phone No. NA

3. **BUILDING CHARACTERISTICS**

Type of Building: (Circle appropriate response.)

~~Residential~~ School Commercial/Multi-use
~~Industrial~~ Church Other POL Lab

test for physical/chemical properities

FTL MB

If the property is residential, what type? (Circle appropriate response.)

Ranch	2-Family	3-Family
Raised Ranch	Split Level	Colonial
Cape Cod	Contemporary	Mobile Home
Duplex	Apartment House	Townhouse/Condo
Modular	Log Home	Other_____

If multiple units, how many? N/A

If the property is commercial, what type?

Business types(s) POL laboratory

Does it include residences (i.e., multi-use)? Y (N) If yes, how many?_____

Other characteristics:

Number of floors 1 Building age Constructed 1956 Complete remodel - 2012

Is the building insulated? (Y) / N How airtight? (Tight) / Average / Not Tight

Have occupants noticed chemical odors in the building? (Y) / N

If yes, please describe: Only related to samples. JP-8, JP-A, marine gas-oil Arinton gasoline, diesel, gasoline, Jet A, Jet-B

4. **AIRFLOW**

Use air current tubes, tracer smoke, or knowledge about the building to evaluate airflow patterns and qualitatively describe:

Airflow between floors
N/A

Airflow in building near suspected source
- Roof air intakes w/ multiple air exhausts. Constant air flow in building due to nature of operation. Windows near suspected source, only opened occasionally in summer.

Outdoor air infiltration
Multiple air exchanges per hour to meet code for Laboratory Air drawn from roof.

Infiltration into air ducts
New construction, sealed ducts

FTL MB 6/10/14

5. **BASEMENT AND CONSTRUCTION CHARACTERISTICS** (Circle all that apply.)

a. Above-grade construction:	wood frame	log	(concrete)	brick
	constructed on pilings with enclosed air space		constructed on pilings with open air space	
b. ~~Basement~~ Building type:	full	crawlspace	(slab-on-grade)	other _____
c. ~~Basement~~ Building floor:	(concrete)	dirt	stone	other _____
d. ~~Basement~~ Building floor:	unsealed	(sealed)	sealed with Floor sealer/coating	
e. Foundation walls:	poured	block	stone	other Cinder block exterior dry wall interior.
f. Foundation walls:	unsealed	sealed	sealed with Painted	
g. The ~~basement~~ building is:	wet	damp	(dry)	
h. The ~~basement~~ building is:	(finished)	unfinished	partially finished	
i. Sump present?	Y / (N)			
j. Water in sump?	Y / N (not applicable)			

Basement or lowest level depth below grade N/A. At grade (feet).

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, and drains).

2 floor drains in building + 1 clean-out. No cracks in building walls/floors. Utilities enter on NW corner, sealed penetrations.

6. **HEATING, VENTING, and AIR CONDITIONING** (Circle all that apply.)

Type of heating system(s) used in this building: (Circle all that apply – not just primary.)

(Hot air circulation)	Heat pump	Hot water baseboard	
Space heaters	Stream radiation	Radiant floor	
(Electric baseboard)	Wood stove	Outdoor wood boiler	Other baseboard w/ antifreeze to heat

The primary type of fuel used is:

(~~Natural gas~~)	Fuel oil	Kerosene
Electric	Propane	Solar
Wood	Coal	

Domestic hot water tank is fueled by: Gas

Boiler/furnace is located in: Basement Outdoors (Main floor) Other NW corner

Do any of the heating appliances have cold-air intakes? (Y) / N

Type of air conditioning or ventilation used in this building:

Central air	Window units	Open windows	None
(Commercial HVAC)	Heat-recovery system	Passive air system	

-Also, Lab hoods (x4)

FTL mg

Are there air distribution ducts present? (Y)/N

Describe the ventilation system in the building, its condition where visible, and the tightness of duct joints. Indicate the location of air supply and exhaust points on the floor plan.

Commercial HVAC, provides multiple air exchanges per hour to meet code for POL laboratory. New system installed in 2012

Is there a radon mitigation system for the building/structure? Y /(N) Date of Installation_____

Is the system active or passive? Active/Passive

7. **OCCUPANCY**

Is basement/lowest level occupied? Full-time (Work shift, (7-4), 5 days/week) Occasionally Seldom Almost never

Level	**General Use of Each Floor (e.g., family room, bedroom, laundry, workshop, or storage).**
Basement	N/A
1st Floor	POL laboratory, office space, Hazardous material storage
2nd Floor	NA
3rd Floor	NA

8. **WATER AND SEWAGE**

Water supply: (Public water) Drilled well Driven well Dug well Other_____

Sewage disposal: (Public sewer) Septic tank Leach field Dry well Other_____

FTL MB 6/10/14

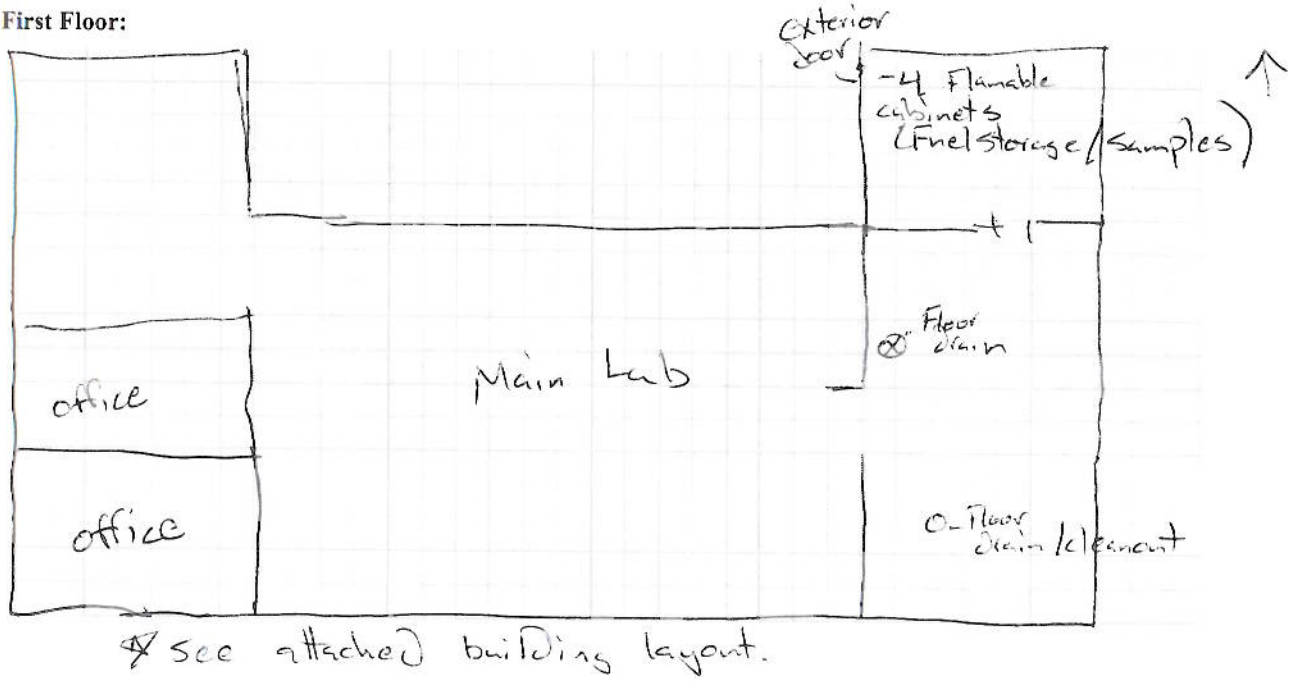
9. FLOOR PLANS

Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note that.

Basement:

NA

First Floor:



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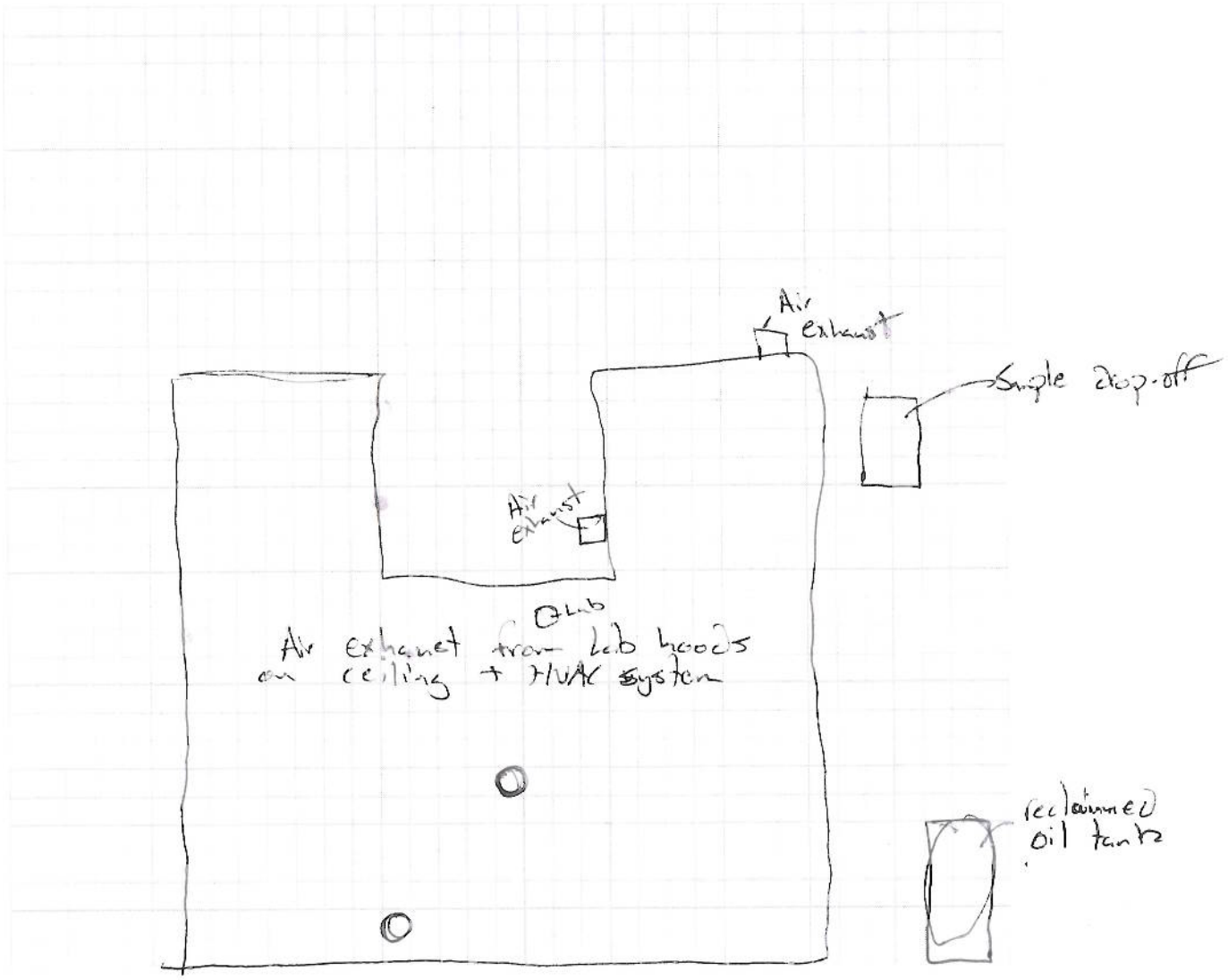
6/10/14

10. OUTDOOR PLOT

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (e.g., industries, gas stations, repair shops, landfills, etc.), outdoor air sampling locations and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the location of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.



FIL MB 6/10/14

SECTION II: INDOOR AIR SAMPLING QUESTIONNAIRE

This section should be completed during a presampling walk-through. If indoor air sources of COCs are identified and removed, consider ventilating the building prior to sampling. However, ventilation and heating systems should be operating normally for 24 hours prior to sampling.

a) **1. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY**

Is there an attached garage? Y / (N)

Does the garage have a separate heating unit? Y / (N) / NA

Are petroleum-powered machines or vehicles stored in the garage (e.g., lawnmower, ATV, or car) Y / N (NA)

Please specify NA

Has the building ever had a fire? Y / (N) When?

Is a kerosene or unvented gas space heater present? Y / (N) Where?

Is there a workshop or hobby/craft area? Y / (N) Where and type

Is there smoking in the building? Y / (N) How frequently?

Has painting/staining been done in the last six months? Y / N Where and when?

Is there new carpet, drapes or other textiles? Y / (N) Where and when?

Is there a kitchen exhaust fan? Y / N If yes, where is it vented? NA - Lab hoods

Is there a bathroom exhaust fan? (Y) / N If yes, where is it vented? Outside

Is there a clothes dryer? Y / (N) If yes, is it vented outside? Y / N

Are cleaning products, cosmetic products, or pesticides used that could interfere with indoor air sampling? Y / N

If yes, please describe See chemical inventory. Stainless steel cleaner

Do any of the building occupants use solvents at work? (Y) / N

(For example, is the building used for chemical manufacturing or a laboratory, auto mechanic or auto body shop, painting shop, fuel oil delivery area, or do any of the occupants work as a boiler mechanic, pesticide applicator, or cosmetologist?)

If yes, what types of solvents are used? Part of lab operation

If yes, are his/her/their clothes washed at work? Y / N

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry cleaning regularly (weekly) (No)

Yes, use dry cleaning infrequently (monthly or less) Unknown

Yes, work at a dry cleaning services

PTL MB 6/10/14

2. **PRODUCT INVENTORY FORM** (For use during building walk-through.)

Make and model of field instrument used: NA

List specific products found in the residence that have the potential to affect indoor air quality:

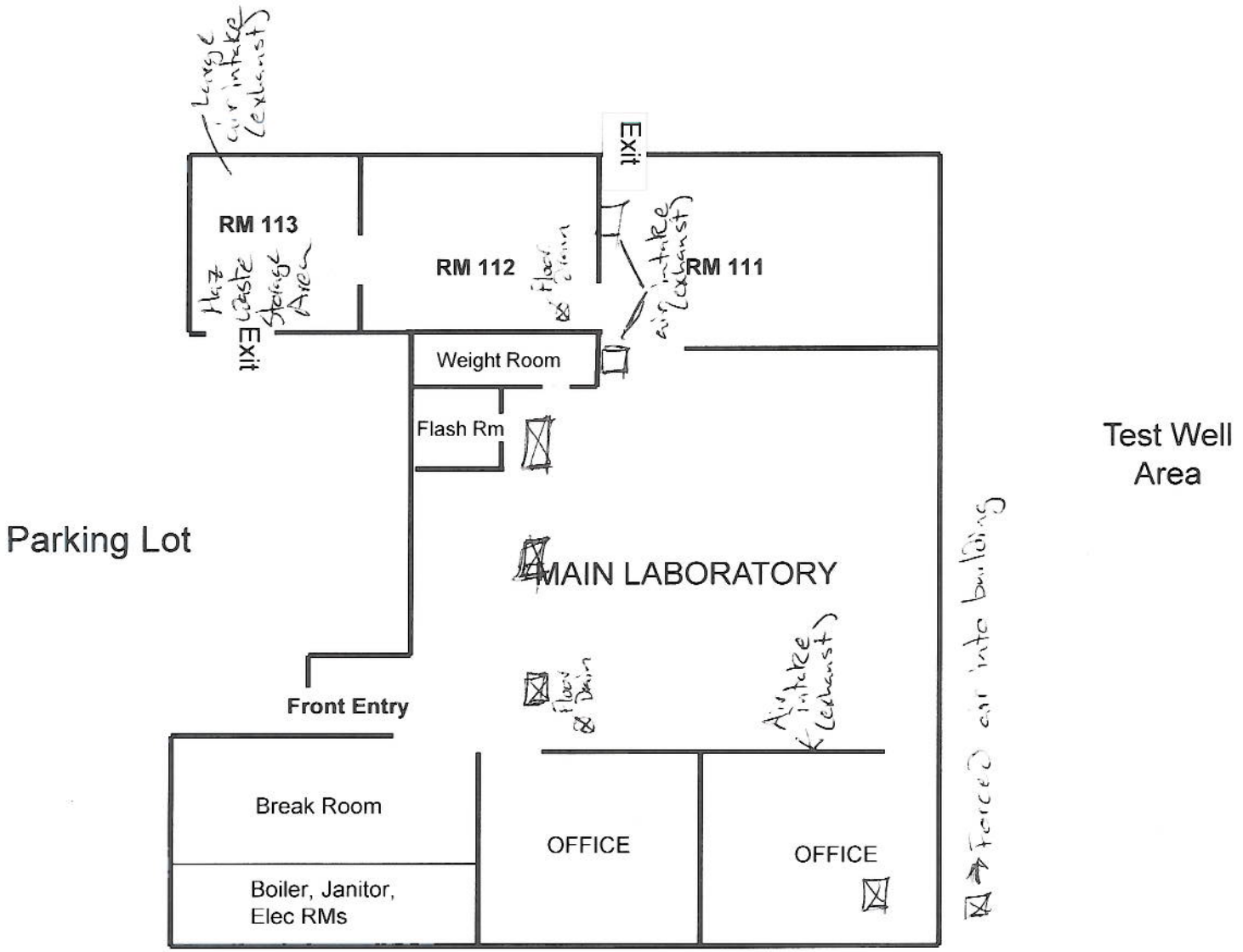
Location	Product Description	Site (units)	Condition[1]	Chemical Ingredients	Field Instrument Reading (units)	Photo[2] Y / N
	See chemical inventory (attached)					
	Multiple POL samples					

[1] Describe the condition of the product containers as **Unopened (UO), Used (U),** or **Deteriorated (D)**.

[2] Photographs of the front and back of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

This form was modified from:
ITRC (Interstate Technology and Regulatory Council). 2007. *Vapor Intrusion Pathway: A Practical Guideline*. VI-1. Washington, D.C.: Interstate Technology and Regulatory Council, Vapor Intrusion Team. Available at: www.itreweb.org.

FTL MB 6/10/14

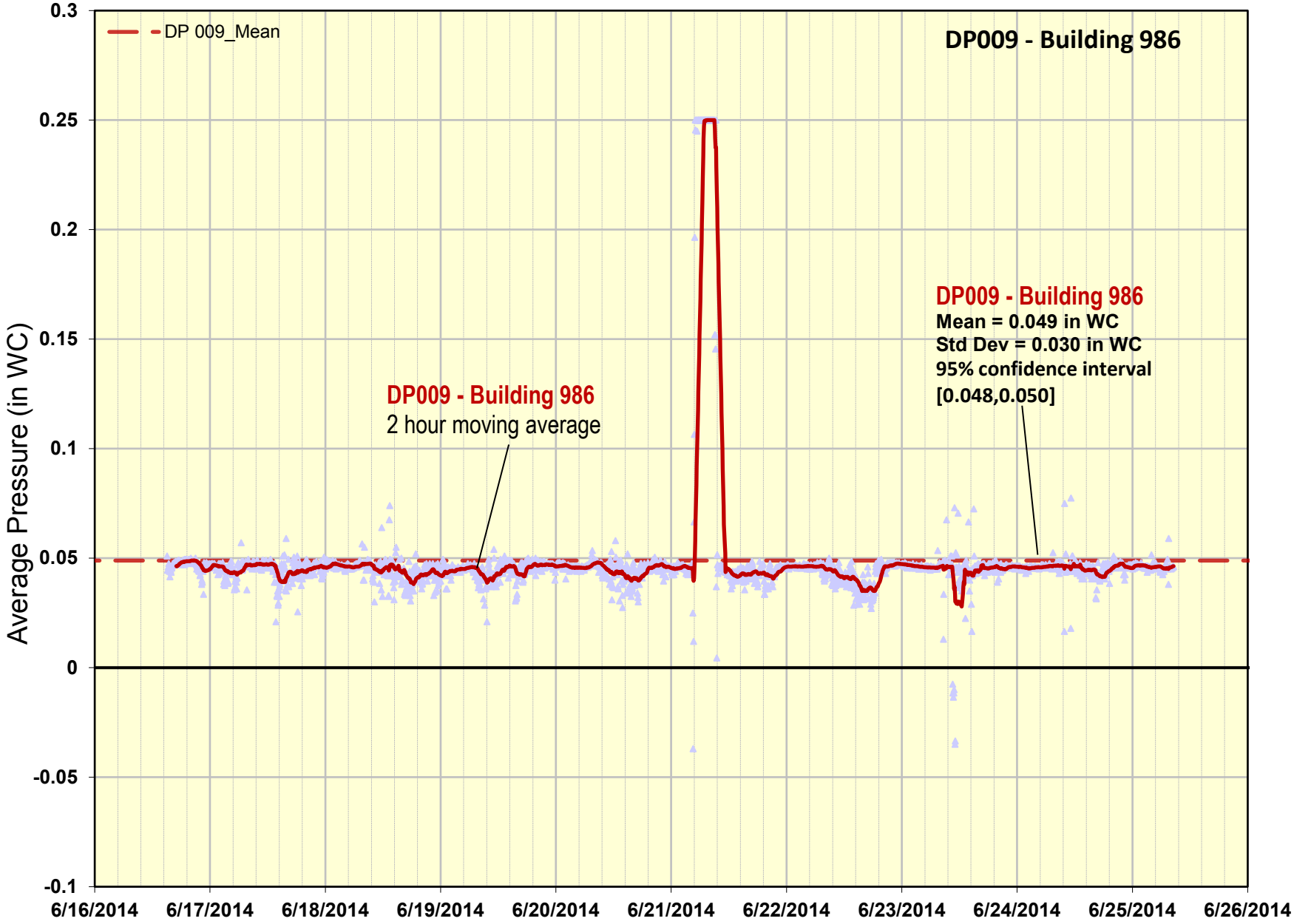


DLA Lab – Bldg 986

Chemical Inventory -DLA Energy Alaska POL Lab

Date	Acetone gal	Isopropyl gal	Heptane gal	Toluene gal	Pet Ether gal	Iso Octane gal	Potassium Dibasic btl	Potassium Monobasic btl	Potassium Hydroxide kg
8-Aug-13	16	20	15	5	2	9	0.5	0.5	0.5
28 Aug 13	15	17	16	5	10.5	9	500g 1	500g 1	3
20 Sept 13	14	13	[redacted]15	5	10	9	1	1	3
	12	12	15	4.5	8	8			
6-9-14	10	20	20	4.5	6	15			

FIL mA


DP 009_Mean
DP009 - Building 986
DP009 - Building 986
Mean = 0.049 in WC
Std Dev = 0.030 in WC
95% confidence interval
[0.048,0.050]
DP009 - Building 986
2 hour moving average
Average Pressure (in WC)
0.3
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
6/16/2014
6/17/2014
6/18/2014
6/19/2014
6/20/2014
6/21/2014
6/22/2014
6/23/2014
6/24/2014
6/25/2014
6/26/2014

Appendix A-5
Chain-of-Custody Forms

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CH2MHILL A Sciences Lab
CHAIN OF CUSTO RECORD
AND AGREEMENT TO PERFORM SERVICES

Chain of Custody Record

1100 NE Circle Suite 300
Corvallis, OR 97
(541) 768-3120

Client Contact	Analysis Turnaround Time	Preservation Used	For Lab Use Only:
Project Name: JBER-R JBR	**TAT is business days**	N/A	Job / SDG No.:
Project # or PO #: 457958.09.HR.04	TAT if different from below _____	**Analysis Requested**	Custody Seals intact? ☐Yes ☐No
Company Name: CH2M Hill	☑ 14 days (STD) ☐ 3 day *		Cooler Temp: ____°C ☐Yes ☐No
Address: 949 E. 36th Ave Suite 500	☐ 7 days * ☐ 2 days *		Therm ID No.: ____ Therm Exp.____
City/State/Zip: ANCHORAGE, AK 99508	☐ 5 days * ☐ 1 day *		Packing Material: Circle below
Project Manager: Andy Castor	* (Surcharges will apply)		Ice Blue Ice Box Bubble Wrap
Phone #: 385-474-8511			Radiological Screen? ☐Yes ☐No
Report to email: Bernice.Kidd@ch2m.com			

Sample Identification (Limit of 20 characters)	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix (Water, Soil, Air)	Total # of Cont.	TO-15 - See Note	Initial Pressure ("Hg)	Final Pressure ("Hg)						Sample Specific Notes:	Lab ID:
											CANISTER ID				
14Q3DP009-SV0001-SG-0	8/13/14	1352	G	A	1	X	-29	-2			SG1998	FC3737B			
14Q3DP009-SV0801-SG-0	8/13/14	1433	G	A	1	X	-29	-2			SG2002	FC3938B			
14Q3DP009-SV0301-SG-1	8/13/14	1509	G	A	1	X	-29	-3			SG1994	FC3953B			

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste?
☐Non-Hazard ☐Flammable ☐Skin Irritant ☐Poison B ☑Unknown

Sample Disposal (A fee may be added if samples are retained longer than 30 day per client request, samples are returned to client, or classified as hazardous.)
☐Return to Client ☑Disposal by Lab ☐Archive for _____ months

Sampled By: Jennifer Frame	Date/Time: 8/13/14 1510	Relinquished by: Morgan Bruno	Date/Time: 8/14/14 1300
Received by:	Date/Time:	Relinquished by:	Date/Time:
Received by:	Date/Time:	Relinquished by:	Date/Time:
Received in Laboratory by:	Date/Time:	Shipped Via: ☐UPS ☑Fed-Ex ☐USPS ☐Other	Tracking #:

Special Instructions/QC Requirements
Please analyze for only: BTEX, TCE, PCE, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, & VC

DOC CONTROL ID: ASL1081-0214

Appendix A-6
Photo Log

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Photo A6-1: Installation of soil gas probe at DP009-SV02, S view

Photo A6-2: Installation of soil gas probe at DP009-SV03, NW view

Photo A6-3: Installation of soil gas probe at DP009-SV04, W view

Photo A6-4: Installation of soil gas probe at DP009-SV05, E view

Photo A6-5: DP009-SV03, soil vapor probe after installation

Photo A6-6: DP009-SV03, soil vapor probe monument after installation

Photo A6-7: Site DP009, site overview following completion of work, SW view

Appendix A-7
Survey Elevation Measurements and Coordinates

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Appendix A-7: Survey Elevation Measurements and Coordinates

Location	Ground Surface Elevation (feet amsl)	Northing	Easting
DP009-SV01	299.25	2654028.61	1690089.90
DP009-SV02	298.46	2654004.58	1690089.85
DP009-SV03	299.26	2654015.74	1690110.03
DP009-SV04	299.45	2654029.15	1690135.11
DP009-SV05	299.03	2654004.48	1690136.44
DP009-SV06	300.09	2654026.05	1690106.65

Notes:

Survey data were provided in the Alaska State Plane coordinate system, Zone 4. Horizontal data are referenced to the North American Datum 1983 (NAD83, 2011 Adjustment, 6/24/14). The unit of horizontal measure for NAD83, Alaska State Plane, Zone 4 is U.S. Survey Feet. Vertical data are referenced to the North American Vertical Datum of 1988 (NAVD88). The basis of vertical control are derived from NAVD88, in feet.

amsl = above mean sea level

Appendix B
Laboratory Reports and Data Quality Review

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Appendix B-1
FROG-4000 Output Log Files
(electronic only)

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Appendix B-2
Data Quality Evaluation Report
(includes ADEC Checklists)

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JOINT BASE ELMENDORF-RICHARDSON – BUILDING 986 DRY WELL DP009 SOIL VAPOR SAMPLING – 2014 DATA QUALITY EVALUATION REPORT

Introduction

The objective of this data quality evaluation (DQE) report is to assess the data quality of analytical results for soil vapor samples collected at the Joint Base Elmendorf-Richardson (JBER) Building 986 Dry Well Site DP009. Samples were collected and analyzed in support of the additional site characterization. The data may also be used to support future activities such as feasibility studies, risk assessments, fate and transport modeling, and remedial actions. Individual method requirements and guidelines from the *Draft United States Air Force, Joint Base Elmendorf-Richardson, Alaska, Environmental Restoration Program, Basewide Uniform Federal Policy Quality Assurance Project Plan* (April 2014) *(*JBER Basewide UFP-QAPP) were used in this assessment.

This report is intended as a general data quality assessment designed to summarize data issues.

Analytical Data

This DQE report covers two primary samples and one field duplicate (FD). Samples were collected on August 13, 2014. A list of samples associated with this DQE is included in Attachment B1-1.

The Work Plan requires a collection frequency of 10 percent for FDs for soil vapor samples; collection frequencies are outlined in Table B-1 below. The required frequency was met for the method collected.

Table B-1: Percentage of FD Collected by Method

Method	Matrix	Count of Primary Samples	Count of FD	Percent of FD
TO-15	Soil Vapor	2	1	50

The sample results were reported as one sample delivery group (SDG) (N2474). The analyses were performed by Applied Sciences Laboratory in Corvallis, Oregon (Department of Defense Environmental Laboratory Accreditation Program Certification #ADE-1485).

One method was used to analyze the environmental samples. Samples were collected and shipped via overnight carrier to the laboratory. Samples were analyzed for the following analyte/method in Table B-2.

Table B-2: Analytical Parameters

Parameter	Method
Volatile organic compounds	TO-15

The assessment of data includes a review of (1) the chain-of-custody (COC) documentation, (2) holding-time compliance, (3) the required quality control (QC) samples at the specified frequencies, (4) method blanks, (5) laboratory control samples (LCS), (6) surrogate spike

recoveries, (7) internal standard recoveries, and (8) initial and continuing calibration information and other method-specific criteria as defined by the JBER Basewide UFP-QAPP.

Field samples were also reviewed to ascertain field compliance and data quality issues. This included the review of a FD.

Data flags were assigned according to the JBER Basewide UFP-QAPP. Multiple flags are routinely applied to specific sample method/matrix/analyte combinations, but there will be only one final flag. A final flag is applied to the data and is the most conservative of the applied validation flags. The final flag also includes matrix and blank sample impacts.

The data flags are defined below:

- **J** = The analyte was positively identified, and the quantitation is an estimation because of discrepancies in meeting certain analyte-specific quality control criteria. Or the analyte was positively identified, but the associated concentration is estimated above the method detection limit and below the limit of quantitation (LOQ).

- **R** = The data are rejected because of deficiencies in meeting QC criteria and may not be used for decision making.

- **B** = The analyte was detected in the sample at a concentration less than or equal to five times (10 times for common laboratory contaminants) the blank concentration.

- **U** = The analyte was analyzed for, but the analyte was not detected.

- **UJ** = The analyte was not detected; however, the result is estimated because of discrepancies in meeting certain analyte-specific QC criteria.

Findings

The overall summaries of the data validation findings are contained in the following sections. No data required qualification as a result of this assessment.

Also included as documentation of data validation findings is the Alaska Department of Environmental Conservation Laboratory Data Review Checklist for Air Samples (Version 2, September 2012). A checklist is provided for each laboratory SDG and can be found in Attachment B1-2 to this DQE.

Holding Times

All holding-time criteria were met.

Calibration

All initial and continuing calibration criteria were met.

Method Blanks

A method blank was analyzed at the required frequency and was free of contamination.

Field Blanks

An ambient blank was not collected.

Field Duplicates

One FD set was collected. Precision was acceptable.

Surrogates

Surrogates were added to all samples, and all acceptance criteria were met.

Laboratory Control Samples

LCSs were analyzed and all accuracy criteria were met.

Internal Standards

All internal standard acceptance criteria were met.

Tentatively Identified Compounds

Tentatively identified compounds were not reported.

Chain-of-Custody and Sample Receipt Discrepancies

- **SDG N2474:** No discrepancies.

Overall Assessment

The final activity in the DQE is an assessment of whether the data meet the data quality objectives. The goal of this assessment is to demonstrate that a sufficient number of representative samples were collected and the resulting analytical data can be used to support the decision making process. The precision, accuracy, representativeness, completeness, and comparability are addressed in the JBER Basewide UFP-QAPP. The following summary highlights the data evaluation findings for the above defined events:

1. No data were rejected, and completeness was 100 percent for all method/matrix/analyte combinations.

2. No data were qualified because of low-level blank detections.

3. Although data were qualified as estimated because of QC exceedances as noted, overall precision and accuracy of the data, as measured by field and laboratory QC indicators suggest that data are usable for project objectives.

Attachment B1-1: Samples Associated with DQE

Sample ID	Collection Date	Sample Type	Matrix
14Q3DP009-SV0301-SG-0	13-Aug-14	N	Soil Vapor
14Q3DP009-SV0301-SG-1	13-Aug-14	FD	Soil Vapor
14Q3DP009-SV0601-SG-0	13-Aug-14	N	Soil Vapor

Notes:

FD = field duplicate

N = primary sample

Attachment B1-2 – ADEC Checklist

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Contaminated Sites Program
Spill Prevention and Response Division
Alaska Department of Environmental Conservation

Laboratory Data Review Checklist for Air Samples

Completed by:	Berney Kidd		
Title:	Project Chemist	Date:	10/1/2014
CS Report Name:		Report Date:	9/2/2014
Consultant Firm:	CH2M HILL		
Laboratory Name:	Applied Sciences Laboratory	Laboratory Report Number:	N2474
DEC File Number:		DEC Haz ID:	

1. Laboratory
   a. Did a NELAP-certified laboratory receive and perform all of the submitted sample analyses?
      ☑ Yes ☐ No ☐ N/A (Please explain.)

      Comments:

      b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses NELAP-approved?
      ☐ Yes ☐ No ☑ N/A (Please explain.)

      Comments:

      No samples transferred.

2. Chain of Custody (COC)
   a. Was the COC information completed, signed and dated (including released/received by)?
      ☑ Yes ☐ No ☐ N/A (Please explain.)

      Comments:

      b. Was the correct analyses requested?
      ☑ Yes ☐ No ☐ N/A (Please explain.)

      Comments:

3. Laboratory Sample Receipt Documentation
   a. Was the sample condition documented? Were samples collected in gas-tight, opaque/dark Summa canisters or other DEC-approved containers? Was the canister vacuum/pressure checked, recorded upon receipt and were there no open valves?
      ☑ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

   b. If there were any discrepancies, were they documented? Examples include incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, canister not holding a vacuum, etc.
      ☐ Yes ☐ No ☑ N/A (Please explain.)

   Comments:

   No discrepancies noted. Samples received at 17.6C.

   c. Was the data quality or usability affected? (Please explain.)

   Comments:

   Data are usable as reported.

4. Case Narrative
   a. Is there a case narrative and is it understandable?
      ☑ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

   b. Were there any discrepancies, errors or QC failures identified by the lab?
      ☐ Yes ☑ No ☐ N/A (Please explain.)

   Comments:

   c. Were all corrective actions documented?
      ☐ Yes ☐ No ☑ N/A (Please explain.)

   Comments:

   No corrective actions required.

   d. What is the effect on data quality/usability according to the case narrative?

   Comments:

   Data are usable as reported.

5. Samples Results
   a. Was the correct analyses performed/reported as requested on COC?
      ☑ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

   b. Were the samples analyzed within 30 days of collection or within the time required by the method?
      ☑ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

   c. Are the reported PQLs less than the Target Screening Level or the minimum required detection level for the project?
      ☐ Yes ☑ No ☐ N/A (Please explain.)

   Comments:

   See site-specific report for details.

   d. Was the data quality or usability affected?

   Comments:

   Data are usable as reported.

6. QC Samples
   a. Method Blank
      i. Was one method blank reported per analysis and 20 samples?
      ☑ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

      ii. Were all method blank results less than PQL?
      ☑ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

      iii. If above PQL, what samples are affected?

   Comments:

iv. Do the affected sample(s) have data flags and, if so, are the data flags clearly defined?

☐ Yes ☐ No ☑ N/A (Please explain.)

Comments:

v. Was the data quality or usability affected? (Please explain.)

Comments:

Data are usable as reported.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Was there one LCS/LCSD or one LCS and a sample/sample duplicate pair reported per analysis and 20 samples?

☑ Yes ☐ No ☐ N/A (Please explain.)

Comments:

ii. Accuracy – Were all percent recoveries (%R) reported and within method or laboratory limits? What were the project specified DQOs, if applicable?

☑ Yes ☐ No ☐ N/A (Please explain.)

Comments:

iii. Precision – Were all relative percent differences (RPD) reported and were they less than method or laboratory limits? What were the project-specified DQOs, if applicable.

☑ Yes ☐ No ☐ N/A (Please explain.)

Comments:

iv. If the %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

v. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☐ No ☑ N/A (Please explain.)

Comments:

No flags applied.

vi. Is the data quality or usability affected? (Please explain.)

Comments:

Data are usable as reported.

c. Surrogates

i. Are surrogate recoveries reported for field, QC and laboratory samples?
☑ Yes ☐ No ☐ N/A (Please explain.)

Comments:

ii. Accuracy – Are all percent recoveries (%R) reported and within method or laboratory limits? What were the project-specified DQOs, if applicable?
☑ Yes ☐ No ☐ N/A (Please explain.)

Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?
☐ Yes ☐ No ☑ N/A (Please explain.)

Comments:

No surrogate failures.

iv. Was the data quality or usability affected? (Please explain.)

Comments:

Data are usable as reported.

d. Field Duplicate

i. Was one field duplicate submitted per analysis and 10 type (soil gas, indoor air, etc.) samples?
☑ Yes ☐ No ☐ N/A (Please explain.)

Comments:

ii. Were they or was it submitted blind to the lab?
☑ Yes ☐ No ☐ N/A (Please explain.)

Comments:

iii. Precision – Were all relative percent differences (RPD) less than the specified DQOs? (Recommended: 25 %)

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

☑Yes ☐No ☐N/A (Please explain.)

Comments:

iv. Was the data quality or usability affected? (Please explain.)

Comments:

e. Field Blank (If not used, explain why.)

☐Yes ☑No ☐N/A (Please explain.)

Comments:

i. Were all results less than the PQL?

☐Yes ☐No ☑N/A (Please explain.)

Comments:

Ambient blank not collected for TO15 soil vapor samples.

ii. If above PQL, what samples are affected?

Comments:

iii. Was the data quality or usability affected? (Please explain.)

Comments:

Data are usable as reported.

7. Other Data Flags/Qualifiers

a. Were other data flags/qualifiers defined and appropriate?

☐Yes ☐No ☑N/A (Please explain.)

Comments:

No other flags applied.

Appendix B-3
Laboratory Data Packages
(electronic only)

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