

APPENDIX D

**SHALLOW TEMPORARY SOIL GAS PROBE INSTALLATION AND
SAMPLING REPORT, BROADWAY NORTH AND SOUTH LANDFILLS
BROADWAY-PANTANO WQARF SITE, LANDFILL OPERABLE UNIT
TUCSON, ARIZONA**

APPENDIX D

SHALLOW TEMPORARY SOIL GAS PROBE INSTALLATION AND SAMPLING REPORT

Broadway North and Broadway South Landfills

Broadway-Pantano WQARF Site

Landfill Operable Unit

Tucson, Arizona

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1.0 INTRODUCTION

This report was prepared by Clear Creek Associates (Clear Creek) as part of the Broadway-Pantano Landfill Operable Unit (LOU) Remedial Investigation (RI) report for the Arizona Department of Environmental Quality (ADEQ) to summarize the installation of 20 temporary soil gas probes and the collection of soil gas samples from these temporary probes. The temporary probe installation activities, sampling, and analyses were conducted from February 21, 2013 to March 1, 2013 and in general accordance with the procedures described in the RI Work Plan (Clear Creek, 2013). The objectives of installing and sampling the temporary probes within the former Broadway South Landfill (BSL) and the Broadway North Landfill (BNL) were:

- To evaluate the risk of exposure to onsite vapor containing volatile organic compounds (VOCs).
- To evaluate whether soil equivalent concentrations¹ of VOCs exceed Arizona Soil Remediation Levels (SRLs) (ADEQ, 2007).
- To compare soil equivalent concentrations with minimum Groundwater Protection Levels (GPLs) (ADEQ, 1996b, revised 2008) to evaluate risk to groundwater.

¹ Soil gas concentrations were converted to soil concentrations (assuming equilibrium partitioning of the VOCs) to yield “soil equivalent” concentrations, based on a formula in the ADEQ Soil Vapor Sampling Guidance (2011). The dimensionless Henry’s Law constant and the soil organic carbon-water partitioning coefficient, used in the equation, were obtained from USEPA (2013) if not provided in the ADEQ (2011). The soil equivalent concentration was not calculated if the constants for a particular compound were not provided by ADEQ (2011) or USEPA (2013).

2.0 SUMMARY OF FIELD ACTIVITIES

Field activities included drilling, installing, and sampling of the temporary soil gas probes located at BSL and BNL. Clear Creek provided oversight during the temporary probe drilling and installation, logged the cuttings, and performed the soil gas purging and sampling of the temporary probes. Field activities were documented in field notebooks (Appendix J of this RI report), Soil Gas Probe Installation Forms (Attachment D1), and Soil Vapor Sampling Forms (Attachment D2).

2.1 SITE AND SAMPLING LOCATIONS

Temporary probes were installed for the collection of soil gas samples at the following locations:

- Broadway North Landfill (15 probes)
- Broadway South Landfill (5 probes)

The locations of these temporary probes are shown on Figures D1 and D2.

2.2 ACCESS

The temporary probes are located at the former BSL and BNL on properties owned by several different entities. The ADEQ Project Manager coordinated access for the investigation with the owners of the properties where investigation activities were conducted.

2.3 PERMITTING

Drilling permits from the Arizona Department of Water Resource (ADWR) were not required for the temporary soil borings because it was known that groundwater would not be encountered within the shallow intervals penetrated by the boreholes.

Prior to the start of fieldwork, Clear Creek contacted the Pima County Department of Environmental Quality (PDEQ) regarding the need to permit and/or treat soil vapor that would be generated during purging of the soil vapor probes. PDEQ indicated that, based on the very small volume of effluent, there were no permitting or treatment requirements.

2.4 UTILITY CLEARANCE

Prior to installing the temporary probes, Clear Creek surveyed the proposed locations using a Global Positioning System enabled device according to ADEQ's Locational Data Policy (ADEQ, 1996a). After

the locations were identified and agreed upon by Clear Creek, ADEQ, and the property owners, each spot was marked and Blue Stake was contacted to identify underground utility locations.

2.5 INSTALLATION OF TEMPORARY PROBES

Five temporary probes were installed within BSL and 15 temporary probes were installed within the BNL for onsite risk evaluation. The probes were designated as BSL-2013-01 to BSL-2013-05 and BNL-2013-06 to BNL-2013-20. The locations of the temporary BNL and BSL soil gas probes are shown on Figures D1 and D2, respectively. The BNL and BSL boreholes were drilled to a depth of five feet below land surface (bls).

Geomechanics Southwest, Inc. (Geomechanics) was contracted to perform the drilling of the soil borings and the installation of the temporary soil gas probes. Geomechanics used an AMS 9100 PowerProbe mounted to an ASV SC-50 Scout Utility vehicle to advance 2 3/8-inch outside diameter dual tube drill pipe utilizing a direct push drill method. Continuous samples of the material penetrated were collected in acrylic liners and were logged. After the desired depth was reached, a temporary soil gas probe was constructed.

Each of the 20 temporary soil gas probes was constructed similarly. Approximately one foot of silica sand filter pack was installed at the bottom of each borehole. Inert disposable Teflon™ tubing with an outer diameter of 1/4 inch and an attached microfilter sampling tip was emplaced in the middle of the filter pack. One foot of dry Benseal® Wyoming Granular Sodium Bentonite chips was installed on top of the filter pack. A bentonite grout slurry made with 1/4 inch Pel-Plug Bentonite Pellets and water was then installed to a depth of 1/2 foot bls in each borehole. Clean soil and sand were installed from the top of the bentonite slurry to the ground surface. The depth of the annular material was verified with a measuring tape throughout the installation process. A cap was attached to the end of the Teflon™ tubing sticking out of the borehole, and the end of the tubing was placed in a zip lock bag to protect the probe from moisture at the surface. The sampling interval for all of the temporary soil gas probes consisted of the one foot of silica sand filter pack with the microfilter sampling tip in the middle of the sand and was at the same depth interval of approximately four to five feet bls. Soil borehole logs and as-built diagrams of the temporary soil gas probes are included in the Soil Gas Probe Installation Forms (Attachment D1).

2.6 PURGING, SOIL GAS SAMPLING, AND ABANDONMENT

2.6.1 Soil Gas Purging

The temporary probes were purged using a 1/16 horsepower GAST vacuum pump. During purging, the vacuum, flow rate, estimated purge volume, and other pertinent field observations were monitored and recorded on the Soil Vapor Sampling Form (Attachment D2). In addition, landfill gas (LFG) (methane, carbon dioxide, and oxygen) concentrations were measured periodically using a Landtec Gem 500 LFG monitor. The LFG monitor was calibrated by the supplier prior to delivery, according to the manufacturer's instructions. The LFG concentrations did not vary significantly during purging, and thus were considered stable and representative of ambient conditions at the time of sample collection. Table D1 shows the LFG concentrations measured right before sample collection. The flow rate and vacuum in the probe and sampling manifold were controlled using a bleed valve installed between the pump and the flow meter. Photographs and a schematic drawing of the sampling system are presented in Attachment D3.

The temporary probes were purged at a rate of 200 to 250 milliliters per minute (ml/min) and had a measured vacuum of 0 inches of water, indicating adequate air flow. In accordance with Section 5.4.1 of the ADEQ (2011) Soil Vapor Sampling Guidance document, three to five internal volumes² of the sample system were purged prior to collection of the soil gas sample. Purging and sampling of the temporary probes was performed a minimum of 22 hours after the probe was installed. Copies of the Soil Vapor Sampling Forms are included in Attachment D2.

2.6.2 Soil Gas Sample Collection

After purging, the pump was turned off and the soil gas samples were collected in 1-liter stainless steel SummaTM canisters provided by the laboratory. The laboratory certified that the canisters had been properly cleaned and evacuated prior to shipment. Each canister was used within 30 days of receipt from the laboratory. A dedicated sampling train, consisting of a mechanical vacuum gauge and flow regulator, was provided by the lab and connected directly to the SummaTM canister. The pressure inside the stainless

² ADEQ (2011) defines *internal volume* as the *dead volume* plus probe tip sand-pack volume. The *dead volume* is defined as the volume of the sampling probe and the connected sampling tubing.

steel canister was measured prior to sampling to confirm that the canister arrived from the laboratory with the laboratory-recommended minimum vacuum of -25 inches of mercury. Initial canister vacuum readings were noted on the Soil Vapor Sampling Forms. The dedicated sampling train attached to the Summa™ canister was connected to a tee and a valve that was used to isolate the dedicated Summa™ canister and sampling train from the common components of the sampling system. These common components of the sampling system included a sampling manifold, bleed valve, LFG monitor, and vacuum pump. The sampling manifold consisted of a valve, mechanical vacuum gauge, and flow meter. Photographs and a schematic drawing of the sampling systems are included in Attachment D3.

The valve to the sampling manifold was closed prior to the collection of the sample, and the valve on the Summa™ canister was opened to allow the soil gas to flow into the canister. In accordance with ADEQ (2011) guidance, the samples were collected at the default flow rate of 200 ml/min or less. The sample collection flow rate was managed by the dedicated flow regulator in the sample train provided by the laboratory. The pressure inside the Summa™ canister was measured and documented after sampling was complete. One soil gas sample was collected from each of the temporary probes, except BNL-2013-09. The temporary probe BNL-2013-09 was pulled out of the ground by an unknown person before it could be sampled.

A leak test was conducted as soil gas samples were collected. A leak detection gas, 2-propanol (a.k.a. rubbing alcohol), was used to saturate the air space around the sample train by applying it to a towel and placing it around the sampling train connections. To confirm that the sampling train and probe surface seal are tight, samples were analyzed for the leak test compound. If the concentration of the leak check compound was greater than or equal to 10 micrograms per liter ($\mu\text{g/L}$), the results were discussed with the ADEQ Project Manager, and the usability of the data were evaluated during data validation. The 10 $\mu\text{g/L}$ leak detection threshold concentration for 2-propanol was based on procedures used at similar sites in Arizona.

Duplicate samples were collected for Quality Assurance/Quality Control (QA/QC) purposes in accordance with the procedures described in Appendix B of the RI Work Plan (Clear Creek, 2013). Four duplicate samples were collected from the 20 temporary probes. The number of duplicate soil gas samples collected from the temporary and existing probes during this LOU RI investigation in February and March of 2013 was approximately 10 percent of the total number of samples. A minimum of one duplicate sample was collected from each sample delivery group sent to the lab.

2.6.3 Analyses

Samples were submitted to ESC Lab Sciences for analysis of VOCs according to the RI Work Plan (Clear Creek, 2013). ESC analyzed the soil gas samples for tetrachloroethylene (PCE), trichloroethylene (TCE), vinyl chloride (VC), and other VOCs (including the leak detection compound, 2-propanol) by Environmental Protection Agency (EPA) Method TO-15.

2.6.4 Abandonment of Temporary Probes

The temporary probes installed in BSL and BNL were not abandoned after sampling; the tubing was sealed in a plastic bag so that additional samples can be collected, if necessary.

2.7 INVESTIGATION-DERIVED WASTE HANDLING

Due to the direct push drill method used to install the temporary probes, minimal amounts of investigation-derived waste (IDW) were generated. IDW consisted of soil and soil/landfill waste generated during direct push drilling, disposable gloves, and acrylic liners from the direct push sampling probes.

Gloves, acrylic liners, and other non-soil wastes were collected in garbage bags and disposed of as trash. Soils and landfill wastes from the BSL and BNL borings remained at the location of the probe.

3.0 SUMMARY OF INVESTIGATION RESULTS

3.1 BROADWAY NORTH LANDFILL

3.1.1 Landfill Gas

The concentrations of LFG measured prior to sample collection are provided in Table D1. The oxygen concentrations in the temporary soil gas probes in the BNL ranged from 14.6% to 21.0%. The lowest concentration of oxygen was measured in BNL-2013-20. The methane concentrations ranged from 0.0% to 4.6%. The highest concentration of methane was measured in BNL-2013-11. The carbon dioxide concentrations ranged for 0.5% to 6.0%, with the highest concentration of carbon dioxide in BNL-2013-20.

3.1.2 VOCs

Fifteen samples were collected from temporary probes in the BNL, including one duplicate sample. One soil gas sample was collected from each of the temporary probes, except BNL-2013-09. The temporary probe BNL-2013-09 was pulled out of the ground by an unknown person before it could be sampled. Samples were analyzed by ESC Lab Sciences by EPA Method TO-15. A complete list of parameters analyzed, along with the analytical results, is presented in Table D2. The maximum concentration detected for each analyte, the equivalent soil concentration (calculated according to ADEQ, 2011), SRLs, and minimum GPLs are presented at the end of Table D2. In Table D2, the soil equivalent concentration of the maximum soil gas concentration for each analyte can be compared with the most stringent SRL and with the minimum GPL, if one has been established. None of the soil equivalent concentrations exceeded either level. A Detection Summary is present in Table D3. A discussion of specific chemicals of potential concern is provided below:

3.1.2.1 PCE

PCE was detected in six of the 15 temporary soil gas probe samples in the BNL at concentrations above the laboratory reporting limits. The highest soil gas PCE concentration was 0.19 milligrams per meter cubed (mg/m^3) (or micrograms per liter [$\mu\text{g}/\text{L}$]) in BNL-2013-08. Using the dimensionless Henry's Law conversion, the soil equivalent concentration of the highest soil gas PCE concentration is 0.000295 milligram per kilogram (mg/kg). This soil equivalent concentration is less than the minimum GPL of 0.80 mg/kg and the most stringent SRL of 0.51 mg/kg .

3.1.2.2 TCE

TCE was detected in three of the 15 shallow temporary soil gas probe samples in the BNL at concentrations above the laboratory reporting limits. The highest TCE concentration was 0.064 mg/m³ (or µg/L) in BNL-2013-08. The soil equivalent concentration of the highest soil gas TCE concentration is 0.000178 mg/kg. This soil equivalent concentration is less than the minimum GPL of 0.76 mg/kg and the most stringent SRL of 3.0 mg/kg.

3.1.2.3 Vinyl Chloride

VC was detected in four of the 15 shallow temporary soil gas probe samples in the BNL at concentrations above the laboratory reporting limits. The highest VC concentration was 0.028 mg/m³ (or µg/L) in BNL-2013-14. The soil equivalent concentration of the highest soil gas VC concentration is 0.000011 mg/kg. This soil equivalent concentration is less than the most stringent SRL of 0.085 mg/kg. ADEQ has not set a minimum GPL for VC.

3.2 BROADWAY SOUTH LANDFILL

3.2.1 Landfill Gas

The concentrations of LFG measured prior to sample collection are provided in Tables D1. The oxygen concentrations in the shallow temporary soil gas probes in the BSL ranged from 17.4% to 21.9%. The lowest concentration of oxygen was measured in BSL-2013-01. The methane concentrations ranged from 0.0% to 0.4%. The highest concentration of methane was measured in BSL-2013-03. The carbon dioxide concentrations ranged for 0.1% to 3.4%, with the highest concentration of carbon dioxide in BSL-2013-01.

3.2.2 VOCs

Eight samples were collected from temporary probes in the BSL, including 3 duplicates. A complete list of parameters analyzed, along with the analytical results, is presented in Table D4. The maximum concentration detected for each analyte, the equivalent soil concentration (calculated according to ADEQ, 2011), SRLs, and minimum GPLs are presented at the end of Table D4. In Table D4, the soil equivalent concentration of the maximum soil gas concentration for each analyte can be compared with the most stringent SRL and with the minimum GPL, if one has been established. None of the soil equivalent concentrations exceeded either level. A Detection Summary is presented in Table D5. A discussion of specific chemicals of concern is provided below:

3.2.2.1 PCE

PCE was detected in three of the eight temporary soil gas probe samples in the BSL at concentrations above the laboratory reporting limits. The highest soil gas PCE concentration was 0.024 mg/m³ (or µg/L) in BSL-2013-04 from a depth of five feet bls. Using the dimensionless Henry's Law conversion, the soil equivalent concentration of the highest soil gas PCE concentration is 0.00004 mg/kg. This soil equivalent concentration is less than the minimum GPL of 0.80 mg/kg and the most stringent SRL of 0.51 mg/kg.

3.2.2.2 TCE

TCE was not detected in the eight temporary soil gas probe samples in the BSL at concentrations above the laboratory reporting limits.

3.2.2.3 Vinyl Chloride

Vinyl chloride (VC) was detected in two of the eight temporary soil gas probe samples in the BSL at concentrations above the laboratory reporting limits. The highest VC concentration was 0.0066 mg/m³ (or µg/L) in BSL-2013-03 from a depth of five feet. The soil equivalent concentration of the highest soil gas VC concentration is 0.0000025 mg/kg. This soil equivalent concentration is less than the most stringent SRL of 0.085 mg/kg. ADEQ has not set a minimum GPL for methylene chloride.

4.0 RESULTS OF DATA VALIDATION

Clear Creek contracted Innovative Technical Solutions, Inc. (ITSI) to conduct data validation according to USEPA guidance (USEPA, 2008) and according to the Quality Assurance Project Plan in the RI Work Plan (Clear Creek, 2013). The data validation included review of reports from the laboratory equivalent to EPA Level III data deliverables, which include sample results, chain-of custody forms, basic quality control summaries including surrogate recoveries, method blank results, and precision and accuracy data summaries for the sample preparation batch. Fourteen soil gas samples of the 150 soil gas samples collected by Clear Creek for the LOU RI underwent full data validation for which the laboratory provided a level IV data deliverable. Full data validation included all of the items listed above plus a review of the data for instrument calibrations, sample quantitation, compound identification and internal standard recoveries and raw data.

The laboratory reports and chain-of-custody documentation are in Appendix H of this RI report. The Data Validation report is in Appendix I.

Relevant data validation results for the temporary probe samples are:

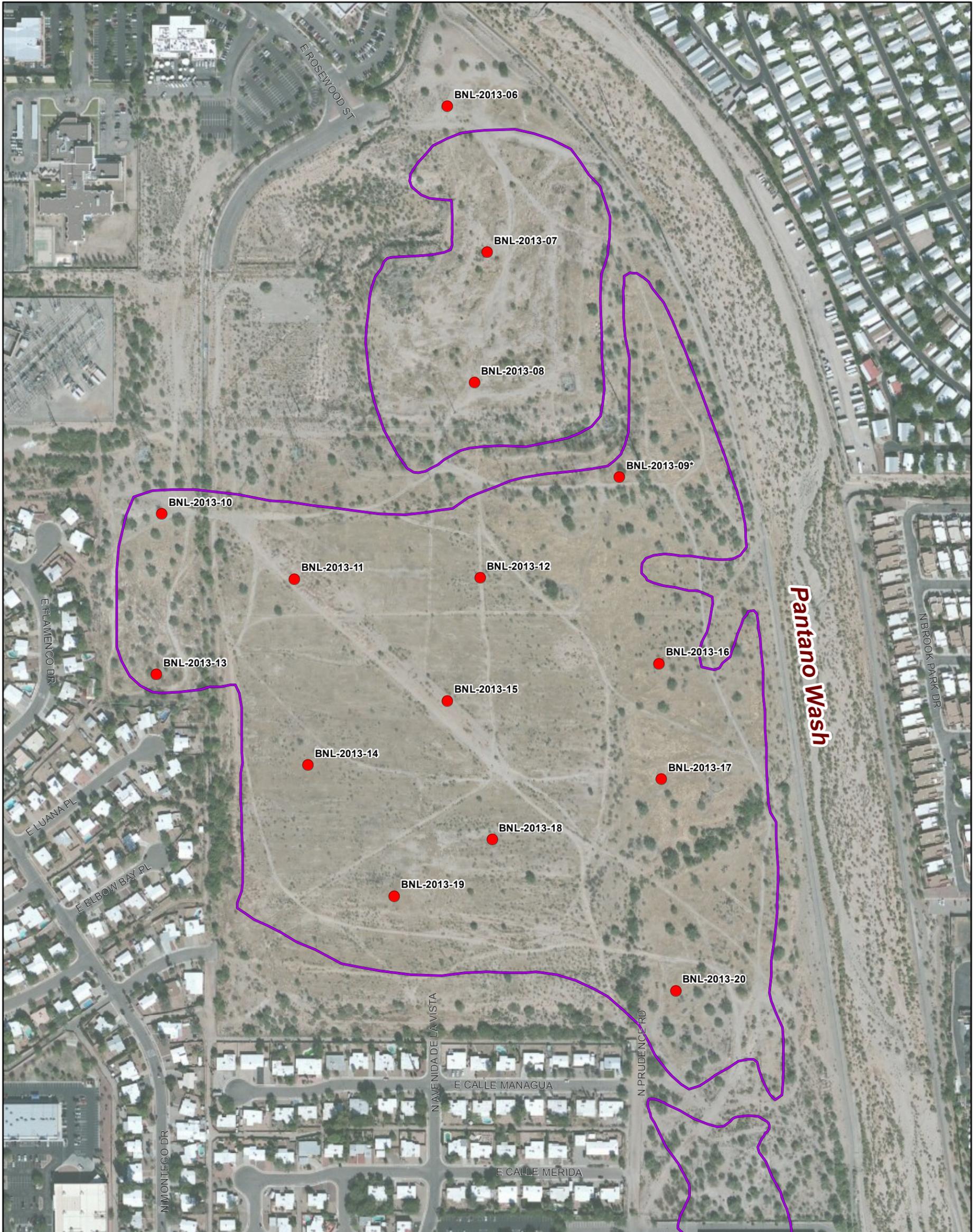
- The surrogate percent recovery for 1,4-bromofluorobenzene was out of criteria for the sample BNL-2013-11. The associated positive result has been qualified as “J+” for an estimated value with a high bias.
- Detections of the leak detection compound, 2-propanol, were less than the 4,069 parts per billion by volume (ppbv) (or 10 mg/m³) criteria. No results were flagged for exceeding this criterion.

The data, as qualified, are considered useable for the intended purposes of evaluating soil quality and the risks of onsite vapor exposure.

5.0 REFERENCES

- Arizona Department of Environmental Quality (ADEQ), 1996a. Locational Data Policy. Issue Date February 3, 1995; amended November 13, 1996.
- Arizona Department of Environmental Quality (ADEQ), 1996b, rev. 2008. A Screening Method to Determine Soil Concentrations Protective of Groundwater Quality, September 1996. Minimum GPLs were revised in 2008 using 2007 chemical properties.
- Arizona Department of Environmental Quality (ADEQ), 2007, Title 18 Environmental Quality, Chapter 7 Department of Environmental Quality Remedial Action, Supp. 09-1, Issue Date March 29, 1996; amended 13 A.A.R. 971 effective. May 5, 2007.
http://www.azsos.gov/public_services/title_18/18-07.htm
- Arizona Department of Environmental Quality (ADEQ), 2011. Soil Vapor Sampling Guidance. July 10, 2008 (Revised May 19, 2011).
- Clear Creek Associates (Clear Creek), 2013, Remedial Investigation Work Plan, Broadway-Pantano WQARF Site Landfill Operable Unit, Tucson, Arizona, Prepared for Arizona Department of Environmental Quality, February 1, 2013.
- USEPA, 2008. Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, EPA-540-R-08-01. June.

APPENDIX D
FIGURES



Legend

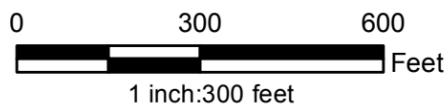
- Temporary Soil Gas Probe
- Landfill Operable Unit Boundary**

Notes:

*Probe vandalized prior to sampling event. No sample collected
 **LOU RI Extent for BNL from Stantec, 2012

Map Projection: NAD 1983 UTM Zone 12N

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community



Job No. 233005

Revision: A



Figure D1 - Shallow Temporary Soil Gas Probe Locations Broadway North Landfill



Legend

- Temporary Soil Gas Probe
- Extent of Refuse*
- ▨ Estimated Extent of Refuse Removed**

0 300 Feet
1 inch:300 feet

Map Projection:
NAD 1983 UTM Zone 12N

Notes:
*Refuse was reported to have been removed at Hilton, Culver's, and Broadway Proper prior to construction of the buildings. The areas of removal were not documented. The "Extent of Refuse" boundary is dashed in areas where removal may have occurred.
**Estimated extent of refuse removed during construction operations at Broadway Proper (Brinsko, 1989).

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

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| | Job No. 233005 | |
| | Revision: A | |

Figure D2 - Shallow Temporary Soil Gas Probe Locations Broadway South Landfill

APPENDIX D
TABLES

**Table D1
Landfill Gas Concentrations
Temporary Soil Gas Probes
Broadway North Landfill and Broadway South Landfill 2013**

| Sample Point ID | Date | Methane (% by volume) | Carbon Dioxide (% by volume) | Oxygen (% by volume) |
|-----------------|--|--------------------------|---------------------------------|-------------------------|
| BSL-2013-01 | 03/01/2013 | 0.0 | 3.4 | 17.4 |
| BSL-2013-02 | 02/26/2013 | 0.1 | 2.3 | 17.9 |
| BSL-2013-03 | 02/26/2013 | 0.4 | 1.0 | 19.1 |
| BSL-2013-04 | 02/22/2013 | 0.3 | 0.1 | 21.9 |
| BSL-2013-05 | 02/22/2013 | 0.1 | 1.1 | 20.3 |
| BNL-2013-06 | 02/27/2013 | 0.0 | 3.6 | 17.9 |
| BNL-2013-07 | 03/01/2013 | 0.2 | 1.9 | 21.0 |
| BNL-2013-08 | 03/01/2013 | 0.4 | 5.9 | 15.6 |
| BNL-2013-09 | Probe vandalized prior to sampling event - No sample collected | | | |
| BNL-2013-10 | 03/01/2013 | 0.1 | 2.4 | 19.5 |
| BNL-2013-11 | 02/26/2013 | 4.6 | 3.9 | 15.6 |
| BNL-2013-12 | 02/26/2013 | 0.3 | 2.2 | 18.7 |
| BNL-2013-13 | 03/01/2013 | 0.1 | 0.5 | 19.8 |
| BNL-2013-14 | 03/01/2013 | 1.7 | 1.4 | 19.2 |
| BNL-2013-15 | 02/26/2013 | 0.3 | 0.9 | 20.6 |
| BNL-2013-16 | 03/01/2013 | 0.0 | 2.0 | 19.5 |
| BNL-2013-17 | 03/01/2013 | 0.3 | 3.4 | 17.4 |
| BNL-2013-18 | 02/26/2013 | 0.2 | 3.1 | 17.8 |
| BNL-2013-19 | 02/26/2013 | 1.1 | 4.1 | 16.5 |
| BNL-2013-20 | 02/26/2013 | 0.3 | 6.0 | 14.6 |

Notes:

% - percentage by volume measured during soil gas purge.

Sample ID (BNL-2013-20) = probe ID (BNL-2013-20). The depth of the probe is NOT included in the sample ID. All the temporary probes in this table had a sample depth of 5 feet below land surface.

**Table D2
Soil Gas Analytical Results
Temporary Shallow Probes
Broadway North Landfill 2013**

| Location ID | | | | BNL-2013-06 | BNL-2013-07 | BNL-2013-08 | BNL-2013-10 | BNL-2013-10DUP | BNL-2013-11 | BNL-2013-12 | BNL-2013-13 | BNL-2013-14 | BNL-2013-15 | BNL-2013-16 | | | | | | | | | | |
|------------------------|------------|---|-------------------|---------------|---------------|---------------|----------------|----------------|---------------|---------------|----------------|---------------|---------------|----------------|------|-----------|------|----------|------|----------|------|-----------|------|-----------|
| Sample ID ₁ | | | | BNL-2013-06-5 | BNL-2013-07-5 | BNL-2013-08-5 | BNL-2013-10-5 | BNL-2013-100-5 | BNL-2013-11-5 | BNL-2013-12-5 | BNL-2013-13-5 | BNL-2013-14-5 | BNL-2013-15-5 | BNL-2013-16-5 | | | | | | | | | | |
| Latitude (Degrees) | | | | 32°13'53.52"N | 32°13'49.04"N | 32°13'45.04"N | 32°13'41.00"N | | 32°13'38.98"N | 32°13'39.04"N | 32°13'36.06"N | 32°13'33.29"N | 32°13'35.24"N | 32°13'36.40"N | | | | | | | | | | |
| Longitude (Degrees) | | | | 110°50'3.47"W | 110°50'2.03"W | 110°50'2.53"W | 110°50'13.81"W | | 110°50'9.00"W | 110°50'2.31"W | 110°50'14.01"W | 110°50'8.55"W | 110°50'3.51"W | 110°49'55.86"W | | | | | | | | | | |
| Collect Date | | | | 2/27/2013 | 3/1/2013 | 3/1/2013 | 3/1/2013 | | 2/26/2013 | 2/26/2013 | 3/1/2013 | 3/1/2013 | 2/26/2013 | 3/1/2013 | | | | | | | | | | |
| Method | CAS No. | Parameter | Units | Value | Qual | Value | Qual | Value | Qual | Value | Qual | Value | Qual | Value | Qual | Value | Qual | Value | Qual | Value | Qual | Value | Qual | |
| TO-15 | 71-43-2 | Benzene | mg/m ³ | <0.00128 | | <0.00128 | | 0.022 | | <0.00511 | | <0.00128 | | 0.017 | J+ | 0.0018 | | <0.00128 | | 0.057 | | 0.0051 | | <0.00128 |
| TO-15 | 74-83-9 | Bromomethane | mg/m ³ | <0.00155 | | <0.00155 | | <0.00621 | | <0.00621 | | <0.00155 | | <0.00155 | | <0.00155 | | <0.00155 | | <0.00776 | | <0.00155 | | <0.00155 |
| TO-15 | 56-23-5 | Carbon tetrachloride | mg/m ³ | <0.00252 | | <0.00252 | | <0.0101 | | <0.0101 | | <0.00252 | | <0.00252 | | <0.00252 | | <0.00252 | | <0.0126 | | <0.00252 | | <0.00252 |
| TO-15 | 108-90-7 | Chlorobenzene | mg/m ³ | <0.00185 | | <0.00185 | | <0.00739 | | <0.00739 | | <0.00185 | | <0.00185 | | <0.00185 | | <0.00185 | | <0.00924 | | <0.00185 | | <0.00185 |
| TO-15 | 75-00-3 | Chloroethane | mg/m ³ | <0.00106 | | <0.00106 | | <0.00422 | | <0.00422 | | <0.00106 | | <0.00106 | | <0.00106 | | <0.00106 | | <0.00528 | | <0.00106 | | <0.00106 |
| TO-15 | 67-66-3 | Chloroform | mg/m ³ | 0.026 | | <0.00195 | | 0.44 | | <0.00779 | | <0.00195 | | <0.00195 | | 0.063 | | <0.00195 | | <0.00973 | | <0.00195 | | <0.00195 |
| TO-15 | 74-87-3 | Chloromethane | mg/m ³ | <0.000826 | | <0.000826 | | <0.00330 | | <0.00330 | | <0.000826 | | <0.000826 | | <0.000826 | | 0.0014 | | <0.00413 | | <0.000826 | | <0.000826 |
| TO-15 | 106-93-4 | 1,2-Dibromoethane | mg/m ³ | <0.00308 | | <0.00308 | | <0.0123 | | <0.0123 | | <0.00308 | | <0.00308 | | <0.00308 | | <0.00308 | | <0.0154 | | <0.00308 | | <0.00308 |
| TO-15 | 95-50-1 | 1,2-Dichlorobenzene | mg/m ³ | <0.00240 | | <0.00240 | | <0.00962 | | <0.00962 | | <0.00240 | | <0.00240 | | <0.00240 | | <0.00240 | | <0.0120 | | <0.00240 | | <0.00240 |
| TO-15 | 541-73-1 | 1,3-Dichlorobenzene | mg/m ³ | <0.00240 | | <0.00240 | | <0.00962 | | <0.00962 | | <0.00240 | | <0.00240 | | <0.00240 | | <0.00240 | | <0.0120 | | <0.00240 | | <0.00240 |
| TO-15 | 106-46-7 | 1,4-Dichlorobenzene | mg/m ³ | <0.00240 | | <0.00240 | | 0.18 | | <0.00962 | | <0.00240 | | <0.00240 | | 0.0037 | J+ | <0.00240 | | <0.00240 | | <0.0120 | | <0.00240 |
| TO-15 | 107-06-2 | 1,2-Dichloroethane | mg/m ³ | <0.00162 | | <0.00162 | | <0.00648 | | <0.00648 | | <0.00162 | | <0.00162 | | 0.0065 | J+ | <0.00162 | | <0.00162 | | <0.00810 | | <0.00162 |
| TO-15 | 75-34-3 | 1,1-Dichloroethane | mg/m ³ | <0.00160 | | <0.00160 | | <0.00641 | | <0.00641 | | <0.00160 | | <0.00160 | | <0.00160 | | <0.00160 | | <0.00802 | | <0.00160 | | <0.00160 |
| TO-15 | 75-35-4 | 1,1-Dichloroethene | mg/m ³ | <0.00159 | | <0.00159 | | <0.00634 | | <0.00634 | | <0.00159 | | <0.00159 | | <0.00159 | | <0.00159 | | <0.00793 | | <0.00159 | | <0.00159 |
| TO-15 | 156-59-2 | cis-1,2-Dichloroethene | mg/m ³ | <0.00159 | | <0.00159 | | 0.083 | | <0.00634 | | <0.00159 | | 0.013 | J+ | <0.00159 | | <0.00159 | | <0.00159 | | 0.027 | | <0.00159 |
| TO-15 | 156-60-5 | trans-1,2-Dichloroethene | mg/m ³ | <0.00159 | | <0.00159 | | <0.00634 | | <0.00634 | | <0.00159 | | <0.00159 | | <0.00159 | | <0.00159 | | <0.00793 | | <0.00159 | | <0.00159 |
| TO-15 | 78-87-5 | 1,2-Dichloropropane | mg/m ³ | <0.00185 | | <0.00185 | | <0.00739 | | <0.00739 | | <0.00185 | | <0.00185 | | <0.00185 | | <0.00185 | | <0.00924 | | <0.00185 | | <0.00185 |
| TO-15 | 10061-01-5 | cis-1,3-Dichloropropene | mg/m ³ | <0.00182 | | <0.00182 | | <0.00726 | | <0.00726 | | <0.00182 | | <0.00182 | | <0.00182 | | <0.00182 | | <0.00908 | | <0.00182 | | <0.00182 |
| TO-15 | 10061-02-6 | trans-1,3-Dichloropropene | mg/m ³ | <0.00182 | | <0.00182 | | <0.00726 | | <0.00726 | | <0.00182 | | <0.00182 | | <0.00182 | | <0.00182 | | <0.00908 | | <0.00182 | | <0.00182 |
| TO-15 | 100-41-4 | Ethylbenzene | mg/m ³ | 0.003 | | <0.00173 | | 0.28 | | <0.00694 | | <0.00173 | | 0.029 | J+ | <0.00173 | | <0.00173 | | <0.00867 | | 0.0036 | | 0.0028 |
| TO-15 | 76-13-1 | 1,1,2-Trichlorotrifluoroethane- Freon 113 | mg/m ³ | <0.00307 | | <0.00307 | | <0.0123 | | <0.0123 | | <0.00307 | | <0.00307 | | <0.00307 | | <0.00307 | | <0.0153 | | <0.00307 | | <0.00307 |
| TO-15 | 75-69-4 | Trichlorofluoromethane- Freon 11 | mg/m ³ | <0.00225 | | 0.0034 | | <0.00899 | | <0.00899 | | 0.0027 | | <0.00225 | | 0.025 | | <0.00225 | | <0.0112 | | <0.00225 | | <0.00225 |
| TO-15 | 75-71-8 | Dichlorodifluoromethane- Freon 12 | mg/m ³ | 1.2 | | 0.64 | | 3.3 | | 0.013 | | <0.00198 | | 0.013 | J+ | 0.13 | | 0.0033 | | 0.089 | | 0.024 | | 0.011 |
| TO-15 | 76-14-2 | 1,2-Dichlorotetrafluoroethane- Freon 114 | mg/m ³ | 0.34 | | 0.34 | | 1.7 | | 0.049 | | 0.038 | | 0.22 | J+ | 0.17 | | <0.00280 | | 0.77 | | 0.1 | | 0.26 |
| TO-15 | 87-68-3 | Hexachloro-1,3-butadiene | mg/m ³ | <0.0135 | | <0.0135 | | <0.0538 | | <0.0538 | | <0.0135 | | <0.0135 | | <0.0135 | | <0.0135 | | <0.0673 | | <0.0135 | | <0.0135 |
| TO-15 | 75-09-2 | Methylene Chloride | mg/m ³ | <0.00139 | | <0.00139 | | 0.028 | | <0.00556 | | <0.00139 | | 0.0097 | J+ | <0.00139 | | 0.014 | | <0.00694 | | 0.0035 | | <0.00139 |
| TO-15 | 100-42-5 | Styrene | mg/m ³ | 0.0032 | | <0.00170 | | <0.00681 | | <0.00681 | | 0.0031 | | 0.0051 | J+ | 0.0037 | | <0.00170 | | <0.00851 | | 0.0034 | | 0.0085 |
| TO-15 | 79-34-5 | 1,1,2,2-Tetrachloroethane | mg/m ³ | <0.00275 | | <0.00275 | | <0.0110 | | <0.0110 | | <0.00275 | | <0.00275 | | <0.00275 | | <0.00275 | | <0.0137 | | <0.00275 | | <0.00275 |
| TO-15 | 127-18-4 | Tetrachloroethylene (PCE) | mg/m ³ | 0.039 | | 0.012 | | 0.19 | | <0.0109 | | <0.00272 | | <0.00272 | | <0.00272 | | <0.00272 | | <0.0136 | | <0.00272 | | 0.011 |
| TO-15 | 108-88-3 | Toluene | mg/m ³ | 0.0041 | | 0.0023 | | 0.13 | | <0.00603 | | 0.0041 | | 0.035 | J+ | 0.0068 | | 0.0022 | | 0.016 | | 0.018 | | 0.0072 |
| TO-15 | 120-82-1 | 1,2,4-Trichlorobenzene | mg/m ³ | <0.00933 | | <0.00933 | | <0.0373 | | <0.0373 | | <0.00933 | | <0.00933 | | <0.00933 | | <0.00933 | | <0.0466 | | <0.00933 | | <0.00933 |
| TO-15 | 71-55-6 | 1,1,1-Trichloroethane | mg/m ³ | <0.00218 | | <0.00218 | | <0.00870 | | <0.00870 | | <0.00218 | | <0.00218 | | 0.006 | | <0.00218 | | <0.0109 | | <0.00218 | | <0.00218 |
| TO-15 | 79-00-5 | 1,1,2-Trichloroethane | mg/m ³ | <0.00218 | | <0.00218 | | <0.00870 | | <0.00870 | | <0.00218 | | <0.00218 | | <0.00218 | | <0.00218 | | <0.0109 | | <0.00218 | | <0.00218 |
| TO-15 | 79-01-6 | Trichloroethylene (TCE) | mg/m ³ | <0.00214 | | <0.00214 | | 0.064 | | <0.00857 | | <0.00214 | | 0.0039 | J+ | <0.00214 | | <0.00214 | | <0.0107 | | <0.00214 | | <0.00214 |
| TO-15 | 95-63-6 | 1,2,4-Trimethylbenzene | mg/m ³ | 0.0022 | | <0.00196 | | 0.28 | | <0.00785 | | 0.0042 | | 0.023 | J+ | <0.00196 | | 0.0083 | | <0.00982 | | 0.054 | | <0.00196 |
| TO-15 | 108-67-8 | 1,3,5-Trimethylbenzene | mg/m ³ | <0.00196 | | <0.00196 | | 0.16 | | <0.00785 | | <0.00196 | | 0.0083 | J+ | <0.00196 | | <0.00196 | | <0.00982 | | 0.038 | | <0.00196 |
| TO-15 | 75-01-4 | Vinyl chloride | mg/m ³ | <0.00102 | | <0.00102 | | 0.0097 | | <0.00409 | | <0.00102 | | <0.00102 | | <0.00102 | | <0.00102 | | 0.028 | | <0.00102 | | <0.00102 |
| TO-15 | 1330-20-7 | Xylenes, Total | mg/m ³ | 0.0078 | | <0.00521 | | 0.74 | | <0.0208 | | <0.00521 | | 0.042 | J+ | 0.0065 | | <0.00521 | | <0.0261 | | 0.027 | | 0.0087 |
| TO-15 | 67-63-0 | 2-Propanol _s | mg/m ³ | 0.019 | | 0.0088 | | <0.0246 | | <0.0246 | | <0.00615 | | 0.024 | | <0.00615 | | 0.0066 | | <0.0307 | | 4.9 | | 0.014 |

Notes:
mg/m³ milligrams per cubic meter
mg/kg milligrams per kilogram
DUP Duplicate sample
NA Not applicable
ND Analyte not detected above reporting limit
NS Not sampled
UNK Depth unknown
WH Wellhead
SRL Soil Remediation Level
GPL Groundwater Protection Level
Qual Qualifier
Shaded cell indicates detection

Notes continued:
1 Sample ID (BNL-2013-20) = probe ID (BNL-2013-20). The depth of the probe is NOT included in the sample ID. All the temporary probes in this table had a sample depth of 5 feet below land surface.
2 Calculated according to ADEQ (2011) guidance. Constants for chemical properties were obtained from USEPA (2013) if not provided by ADEQ (2011). Soil equivalents were not calculated if constants were not provided by ADEQ (2011) or USEPA (2013).
3 Soil Remediation Levels, Arizona Administrative Code Title 18, Article 2, Effective as May 5, 2007- http://www.azsos.gov/public_services/title_18/18-07.htm.
4 Groundwater Protection Levels, Arizona Department of Environmental Quality, A Screening Method to Determine Soil Concentrations Protective of Groundwater Quality, September 1996, VOCs revised 2008.
5 2-Propanol was used as the leak detection compound.
6 Maximum soil gas result of Methylene Chloride detected in BNL-2013-08 and BNL-2013-17 at 0.028 mg/m³.
* Indicates SRL is based on the chemical-specific saturation level in soil for volatile organic chemicals only.
** Based on SRL for CAS 542-75-6.
*** Indicates GPL based upon saturation limit.

Qualifiers:
J Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
U Undetected: The analyte was analyzed for, but not detected.
UJ The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
B (EPA) - The indicated compound was found in the associated method blank as well as the laboratory sample.
B3 (ESC) - The indicated compound was found in the associated method blank, but all reported samples were non-detect.
(-) Indicates a low bias.
(+) Indicates a high bias.
< Less than laboratory reporting limit.

There may be a slight discrepancy between the reported value in the laboratory report and the reported value in the data validator's report due to a conversion of units (from parts per billion to mg/m³). These values are very small and do not result in any substantive difference relative to SRLs.

**Table D2
Soil Gas Analytical Results
Temporary Shallow Probes
Broadway North Landfill 2013**

| Location ID | | | | BNL-2013-17 | BNL-2013-18 | BNL-2013-19 | BNL-2013-20 | Max Soil Gas Result (mg/m ³) | Max Soil Gas Result Location | Soil Equivalent of Max Soil Gas Result ₂ (mg/kg) | Soil Remediation Levels ₃ | | | | Minimum GPL ₄ (mg/kg) | |
|------------------------|------------|---|-------------------|----------------|---------------|---------------|----------------|--|------------------------------|---|--------------------------------------|-------------------------------|-------------------------------|-----------------------------|----------------------------------|----------------------------------|
| Sample ID ₁ | | | | BNL-2013-17-5 | BNL-2013-18-5 | BNL-2013-19-5 | BNL-2013-20-5 | | | | Residential SRL | | | | | |
| Latitude (Degrees) | | | | 32°13'32.83"N | 32°13'30.98"N | 32°13'29.23"N | 32°13'26.33"N | | | | Carcinogen | | Non-Carcinogen (mg/kg) | Non-Residential SRL (mg/kg) | | |
| Longitude (Degrees) | | | | 110°49'55.79"W | 110°50'1.91"W | 110°50'5.43"W | 110°49'55.27"W | | | | 10 ⁻⁶ Risk (mg/kg) | 10 ⁻⁵ Risk (mg/kg) | | | | |
| Collect Date | | | | 3/1/2013 | 2/26/2013 | 2/26/2013 | 2/26/2013 | | | | | | | | | |
| Method | CAS No. | Parameter | Units | Value | Qual | Value | Qual | Value | Qual | Value | Qual | 10 ⁻⁶ Risk (mg/kg) | 10 ⁻⁵ Risk (mg/kg) | Non-Carcinogen (mg/kg) | Non-Residential SRL (mg/kg) | Minimum GPL ₄ (mg/kg) |
| TO-15 | 71-43-2 | Benzene | mg/m ³ | 0.023 | | 0.0038 | | 0.061 | | <0.00128 | | 0.65 | NA | | 1.4 | 0.70 |
| TO-15 | 74-83-9 | Bromomethane | mg/m ³ | <0.00621 | | <0.00155 | | ND | | | | | | 3.9 | 13 | |
| TO-15 | 56-23-5 | Carbon tetrachloride | mg/m ³ | <0.0101 | | <0.00252 | | ND | | | | 0.25 | 2.5 | 2.2 | 5.5 | 0.95 |
| TO-15 | 108-90-7 | Chlorobenzene | mg/m ³ | <0.00739 | | <0.00185 | | ND | | | | | | 150 | 530 | 16.5 |
| TO-15 | 75-00-3 | Chloroethane | mg/m ³ | <0.00422 | | <0.00106 | | ND | | | | 3 | 30 | | 65 | |
| TO-15 | 67-66-3 | Chloroform | mg/m ³ | 0.11 | | 0.0034 | | 0.44 | BNL-2013-08 | 0.0011 | | 0.94 | 9.4 | | 20 | |
| TO-15 | 74-87-3 | Chloromethane | mg/m ³ | <0.00330 | | <0.000826 | | 0.0014 | BNL-2013-13 | 0.000001 | | | | 48 | 160 | |
| TO-15 | 106-93-4 | 1,2-Dibromoethane | mg/m ³ | <0.0123 | | <0.00308 | | ND | | | | 0.029 | 0.29 | | 0.63 | |
| TO-15 | 95-50-1 | 1,2-Dichlorobenzene | mg/m ³ | 0.016 | | <0.00240 | | 0.016 | BNL-2013-17 | 0.00049 | | | | 600* | 600* | 116*** |
| TO-15 | 541-73-1 | 1,3-Dichlorobenzene | mg/m ³ | <0.00962 | | <0.00240 | | ND | | | | | | 530 | 600* | |
| TO-15 | 106-46-7 | 1,4-Dichlorobenzene | mg/m ³ | 0.16 | | <0.00240 | | 0.18 | BNL-2013-08 | 0.00433 | | 3.5 | 35 | | 79 | 27 |
| TO-15 | 107-06-2 | 1,2-Dichloroethane | mg/m ³ | <0.00648 | | <0.00162 | | <0.00810 | BNL-2013-11 | 0.000034 | | 0.28 | 2.8 | | 6 | 0.23 |
| TO-15 | 75-34-3 | 1,1-Dichloroethane | mg/m ³ | <0.00641 | | <0.00160 | | ND | | | | | | 510 | 1,700* | 0.85 |
| TO-15 | 75-35-4 | 1,1-Dichloroethene | mg/m ³ | <0.00634 | | <0.00159 | | ND | | | | | | 120 | 410 | |
| TO-15 | 156-59-2 | cis-1,2-Dichloroethene | mg/m ³ | 0.071 | | <0.00159 | | 0.083 | BNL-2013-08 | 0.000171 | | | | 43 | 150 | 5.3 |
| TO-15 | 156-60-5 | trans-1,2-Dichloroethene | mg/m ³ | <0.00634 | | <0.00159 | | ND | | | | | | 69 | 230 | 9.2 |
| TO-15 | 78-87-5 | 1,2-Dichloropropane | mg/m ³ | <0.00739 | | <0.00185 | | ND | | | | 0.34 | 3.4 | | 7.4 | 0.36 |
| TO-15 | 10061-01-5 | cis-1,3-Dichloropropene | mg/m ³ | <0.00726 | | <0.00182 | | ND | | | | 0.79** | 7.9** | | 18** | |
| TO-15 | 10061-02-6 | trans-1,3-Dichloropropene | mg/m ³ | <0.00726 | | <0.00182 | | ND | | | | | | | | |
| TO-15 | 100-41-4 | Ethylbenzene | mg/m ³ | 0.039 | | 0.0022 | | <0.00867 | BNL-2013-17 | 0.00282 | | | | 400* | 400* | 82*** |
| TO-15 | 76-13-1 | 1,1,2-Trichlorotrifluoroethane- Freon 113 | mg/m ³ | <0.0123 | | <0.00307 | | ND | | | | | | 5,600* | 5,600* | |
| TO-15 | 75-69-4 | Trichlorofluoromethane- Freon 11 | mg/m ³ | <0.00899 | | <0.00225 | | 0.034 | BNL-2013-20 | 0.000009 | | | | 390 | 1,300 | |
| TO-15 | 75-71-8 | Dichlorodifluoromethane- Freon 12 | mg/m ³ | 3.2 | | 0.046 | | 0.49 | BNL-2013-08 | 0.00070 | | | | 94 | 310 | |
| TO-15 | 76-14-2 | 1,2-Dichlorotetrafluoroethane- Freon 114 | mg/m ³ | 1.1 | | 0.13 | | 0.43 | BNL-2013-08 | 0.00039 | | | | | | |
| TO-15 | 87-68-3 | Hexachloro-1,3-butadiene | mg/m ³ | <0.0538 | | <0.0135 | | <0.0673 | ND | | | 7 | 70 | 18 | 180 | |
| TO-15 | 75-09-2 | Methylene Chloride | mg/m ³ | 0.028 | | <0.00139 | | <0.00694 | BNL-2013-08 ₆ | 0.000058 | | 9.3 | 93 | | 210 | |
| TO-15 | 100-42-5 | Styrene | mg/m ³ | 0.029 | | 0.0043 | | <0.00851 | BNL-2013-17 | 0.00123 | | | | 1,500* | 1,500* | 45 |
| TO-15 | 79-34-5 | 1,1,2,2-Tetrachloroethane | mg/m ³ | <0.0110 | | <0.00275 | | <0.00275 | ND | | | 0.42 | 4.2 | | 9.3 | |
| TO-15 | 127-18-4 | Tetrachloroethylene (PCE) | mg/m ³ | 0.041 | | <0.00272 | | <0.0136 | BNL-2013-08 | 0.00030 | | 0.51 | 5.1 | | 13 | 0.8 |
| TO-15 | 108-88-3 | Toluene | mg/m ³ | 0.32 | | 0.0075 | | 0.012 | BNL-2013-17 | 0.00146 | | | | 650* | 650* | 159*** |
| TO-15 | 120-82-1 | 1,2,4-Trichlorobenzene | mg/m ³ | <0.0373 | | <0.00933 | | <0.0466 | ND | | | | | 62 | 220 | |
| TO-15 | 71-55-6 | 1,1,1-Trichloroethane | mg/m ³ | <0.00870 | | <0.00218 | | <0.0109 | BNL-2013-12 | 0.000008 | | | | 1,200* | 1,200* | 0.94 |
| TO-15 | 79-00-5 | 1,1,2-Trichloroethane | mg/m ³ | <0.00870 | | <0.00218 | | <0.0109 | ND | | | 0.74 | 7.4 | | 16 | |
| TO-15 | 79-01-6 | Trichloroethylene (TCE) | mg/m ³ | 0.023 | | <0.00214 | | <0.0107 | BNL-2013-08 | 0.00018 | | 3 | 30 | 17 | 65 | 0.76 |
| TO-15 | 95-63-6 | 1,2,4-Trimethylbenzene | mg/m ³ | 0.59 | | 0.0029 | | <0.00982 | BNL-2013-17 | 0.0576 | | | | 52 | 170 | |
| TO-15 | 108-67-8 | 1,3,5-Trimethylbenzene | mg/m ³ | 0.27 | | <0.00196 | | <0.00982 | BNL-2013-17 | 0.00428 | | | | 21 | 70 | |
| TO-15 | 75-01-4 | Vinyl chloride | mg/m ³ | 0.0072 | | <0.00102 | | 0.01 | BNL-2013-14 | 0.000011 | | 0.085 | NA | | 0.75 | |
| TO-15 | 1330-20-7 | Xylenes, Total | mg/m ³ | 0.4 | | 0.0082 | | <0.0261 | BNL-2013-08 | 0.00662 | | | | 270 | 420* | 31*** |
| TO-15 | 67-63-0 | 2-Propanol ₅ | mg/m ³ | <0.0246 | | 0.025 | | 0.13 | BNL-2013-15 | NA | | NA | | | | |

Notes:
mg/m³ milligrams per cubic meter
mg/kg milligrams per kilogram
DUP Duplicate sample
NA Not applicable
ND Analyte not detected above reporting limit
NS Not sampled
UNK Depth unknown
WH Wellhead
SRL Soil Remediation Level
GPL Groundwater Protection Level
Qual Qualifier
Shaded cell indicates detection

Notes continued:
1 Sample ID (BNL-2013-20) = probe ID (BNL-2013-20). The depth of the probe is NOT included in the sample ID. All the temporary probes in this table had a sample depth of 5 feet below land surface.
2 Calculated according to ADEQ (2011) guidance. Constants for chemical properties were obtained from USEPA (2013) if not provided by ADEQ (2011). Soil equivalents were not calculated if constants were not provided by ADEQ (2011) or USEPA (2013).
3 Soil Remediation Levels, Arizona Administrative Code Title 18, Article 2, Effective as May 5, 2007- http://www.azsos.gov/public_services/title_18/18-07.htm.
4 Groundwater Protection Levels, Arizona Department of Environmental Quality, A Screening Method to Determine Soil Concentrations Protective of Groundwater Quality, September 1996, VOCs revised 2008.
5 2-Propanol was used as the leak detection compound.
6 Maximum soil gas result of Methylene Chloride detected in BNL-2013-08 and BNL-2013-17 at 0.028 mg/m³.
* Indicates SRL is based on the chemical-specific saturation level in soil for volatile organic chemicals only.
** Based on SRL for CAS 542-75-6.
*** Indicates GPL based upon saturation limit.
Qualifiers:
J Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
U Undetected: The analyte was analyzed for, but not detected.
UJ The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
B (EPA) - The indicated compound was found in the associated method blank as well as the laboratory sample.
B3 (ESC) - The indicated compound was found in the associated method blank, but all reported samples were non-detect.
(-) Indicates a low bias.
(+) Indicates a high bias.
< Less than laboratory reporting limit.

There may be a slight discrepancy between the reported value in the laboratory report and the reported value in the data validator's report due to a conversion of units (from parts per billion to mg/m³). These values are very small and do not result in any substantive difference relative to SRLs.

**Table D3
Detection Summary - Temporary Soil Gas Probes
Broadway North Landfill 2013**

| Compound | Samples Analyzed | Number of detections > RL | Feb-Mar 2013 Maximum Concentration (mg/m ³) | Feb-Mar 2013 Location of Maximum Concentration |
|--------------------------------|------------------|---------------------------|---|--|
| Benzene | 15 | 8 | 0.061 | BNL-2013-19 |
| Bromomethane | 15 | 0 | ND | |
| Carbon tetrachloride | 15 | 0 | ND | |
| Chlorobenzene | 15 | 0 | ND | |
| Chloroethane | 15 | 0 | ND | |
| Chloroform | 15 | 5 | 0.44 | BNL-2013-08 |
| Chloromethane | 15 | 2 | 0.0014 | BNL-2013-13 |
| 1,2-Dibromoethane | 15 | 0 | ND | |
| 1,2-Dichlorobenzene | 15 | 1 | 0.016 | BNL-2013-17 |
| 1,3-Dichlorobenzene | 15 | 0 | ND | |
| 1,4-Dichlorobenzene | 15 | 4 | 0.18 | BNL-2013-08 |
| 1,2-Dichloroethane | 15 | 1 | 0.0065 | BNL-2013-11 |
| 1,1-Dichloroethane | 15 | 0 | ND | |
| 1,1-Dichloroethene | 15 | 0 | ND | |
| cis-1,2-Dichloroethene | 15 | 1 | 0.083 | BNL-2013-08 |
| trans-1,2-Dichloroethene | 15 | 0 | ND | |
| 1,2-Dichloropropane | 15 | 0 | ND | |
| cis-1,3-Dichloropropene | 15 | 0 | ND | |
| trans-1,3-Dichloropropene | 15 | 0 | ND | |
| Ethylbenzene | 15 | 8 | 0.39 | BNL-2013-17 |
| 1,1,2-Trichlorotrifluoroethane | 15 | 0 | ND | |
| Trichlorofluoromethane | 15 | 4 | 0.034 | BNL-2013-20 |
| Dichlorodifluoromethane | 15 | 14 | 3.3 | BNL-2013-08 |
| 1,2-Dichlorotetrafluoroethane | 15 | 14 | 1.7 | BNL-2013-08 |
| Hexachloro-1,3-butadiene | 15 | 0 | ND | |
| Methylene Chloride | 15 | 5 | 0.028 | BNL-2013-08* |
| 2-Propanol | 15 | 8 | 4.9 | BNL-2013-15 |
| Styrene | 15 | 9 | 0.029 | BNL-2013-17 |
| 1,1,2,2-Tetrachloroethane | 15 | 0 | ND | |
| Tetrachloroethylene (PCE) | 15 | 6 | 0.19 | BNL-2013-08 |
| Toluene | 15 | 14 | 0.32 | BNL-2013-17 |
| 1,2,4-Trichlorobenzene | 15 | 0 | ND | |
| 1,1,1-Trichloroethane | 15 | 1 | 0.006 | BNL-2013-12 |
| 1,1,2-Trichloroethane | 15 | 0 | ND | |
| Trichloroethylene (TCE) | 15 | 3 | 0.064 | BNL-2013-08 |
| 1,2,4-Trimethylbenzene | 15 | 9 | 0.59 | BNL-2013-17 |
| 1,3,5-Trimethylbenzene | 15 | 5 | 0.27 | BNL-2013-17 |
| Vinyl chloride | 15 | 4 | 0.028 | BNL-2013-14 |
| Xylenes, Total | 15 | 8 | 0.74 | BNL-2013-08 |

Notes:

* Maximum soil gas result of Methylene Chloride detected in BNL-2013-08 and BNL-2013-17 at 0.028 mg/m³.

mg/m³ - milligrams per meter cubed

ND - Not detected above reporting limit

RL - Laboratory reporting limits

Sample ID (BNL-2013-20) = probe ID (BNL-2013-20). The depth of the probe is NOT included in the sample ID.

All the temporary probes in this table had a sample depth of 5 feet below land surface.

**Table D4
Soil Gas Analytical Results
Temporary Shallow Probes
Broadway South Landfill 2013**

| Location ID | | | | BSL-2013-01 | BSL-2013-01DUP | BSL-2013-02 | BSL-2013-03 | BSL-2013-03DUP | BSL-2013-04 | BSL-2013-05 | BSL-2013-05DUP | Max Soil Gas Result (mg/m ³) | Max Soil Gas Result Location | Soil Equivalent of Max Soil Gas Result ₂ (mg/kg) | Soil Remediation Levels ₃ | | | | Minimum GPL ₄ (mg/kg) | | | | | | | | | |
|------------------------|------------|---|-------------------|----------------|----------------|---------------|----------------|----------------|---------------|----------------|----------------|--|------------------------------|---|--------------------------------------|------------------------|-------------------------------|-------------------------------|----------------------------------|--------|-------------|----------|--------|-------|------|--------|--------|--------|
| Sample ID ₁ | | | | BSL-2013-01-5 | BSL-2013-010-5 | BSL-2013-02-5 | BSL-2013-03-5 | BSL-2013-030-5 | BSL-2013-04-5 | BSL-2013-05-5 | BSL-2013-050-5 | | | | Residential SRL | | | Non-Residential SRL (mg/kg) | | | | | | | | | | |
| Latitude (Degrees) | | | | 32°12'59.00"N | | | 32°13'2.45"N | | | 32°13'5.79"N | | | | | 32°13'3.27"N | | | | | | | | | | | | | |
| Longitude (Degrees) | | | | 110°49'47.18"W | | | 110°49'48.63"W | | | 110°49'53.89"W | | | | | 110°49'53.86"W | | | | | | | | | | | | | |
| Collect Date | | | | 3/1/2013 | | 2/26/2013 | | 2/26/2013 | | 2/22/2013 | | 2/22/2013 | | Carcinogen | | Non-Carcinogen (mg/kg) | | | | | | | | | | | | |
| Method | CAS No. | Parameter | Units | Value | Qual | Value | Qual | Value | Qual | Value | Qual | Value | Qual | Value | Qual | | 10 ⁻⁶ Risk (mg/kg) | 10 ⁻⁵ Risk (mg/kg) | | | | | | | | | | |
| TO-15 | 71-43-2 | Benzene | mg/m ³ | <0.0102 | | <0.0128 | | 0.0025 | | 0.03 | | 0.02 | | 0.0028 | | 0.0061 | | 0.007 | | 0.03 | BSL-2013-03 | 0.000065 | 0.65 | NA | 3.9 | 13 | 1.4 | 0.70 |
| TO-15 | 74-83-9 | Bromomethane | mg/m ³ | <0.0124 | | <0.0155 | | <0.00155 | | <0.00621 | | <0.00155 | | <0.00155 | | <0.00155 | | <0.00155 | | ND | | | | | | | | |
| TO-15 | 56-23-5 | Carbon tetrachloride | mg/m ³ | <0.0202 | | <0.0252 | | <0.00252 | | <0.0101 | | <0.00252 | | <0.00252 | | <0.00252 | | <0.00252 | | ND | | | 0.25 | 2.5 | 2.2 | 5.5 | 0.95 | |
| TO-15 | 108-90-7 | Chlorobenzene | mg/m ³ | <0.0148 | | <0.0185 | | <0.00185 | | <0.00739 | | <0.00185 | | <0.00185 | | <0.00185 | | <0.00185 | | ND | | | | | 150 | 530 | 16.5 | |
| TO-15 | 75-00-3 | Chloroethane | mg/m ³ | <0.00844 | | <0.0106 | | <0.00106 | | <0.00422 | | <0.00106 | | <0.00106 | | <0.00106 | | <0.00106 | | ND | | | 3 | 30 | | 65 | | |
| TO-15 | 67-66-3 | Chloroform | mg/m ³ | <0.0156 | | <0.0195 | | <0.00195 | | <0.00779 | | <0.00195 | | <0.00195 | | <0.00195 | | <0.00195 | | ND | | | 0.94 | 9.4 | | 20 | | |
| TO-15 | 74-87-3 | Chloromethane | mg/m ³ | <0.00661 | | 0.013 | | <0.000826 | | <0.00330 | | <0.000826 | | <0.000826 | | <0.000826 | | <0.000826 | | 0.013 | BSL-2013-01 | 0.000009 | | | 48 | 160 | | |
| TO-15 | 106-93-4 | 1,2-Dibromoethane | mg/m ³ | <0.0246 | | <0.0308 | | <0.00308 | | <0.0123 | | <0.00308 | | <0.00308 | | <0.00308 | | <0.00308 | | ND | | | 0.029 | 0.29 | | 6.3 | | |
| TO-15 | 95-50-1 | 1,2-Dichlorobenzene | mg/m ³ | <0.0192 | | <0.0240 | | <0.00240 | | <0.00962 | | <0.00240 | | <0.00240 | | <0.00240 | | <0.00240 | | ND | | | | | 600* | 600* | 116*** | |
| TO-15 | 541-73-1 | 1,3-Dichlorobenzene | mg/m ³ | <0.0192 | | <0.0240 | | <0.00240 | | <0.00962 | | <0.00240 | | <0.00240 | | <0.00240 | | <0.00240 | | ND | | | | | 530 | 600* | | |
| TO-15 | 106-46-7 | 1,4-Dichlorobenzene | mg/m ³ | <0.0192 | | <0.0240 | | <0.00240 | | <0.00962 | | <0.00240 | | <0.00240 | | <0.00240 | | <0.00240 | | ND | | | 3.5 | 35 | | 79 | 27 | |
| TO-15 | 107-06-2 | 1,2-Dichloroethane | mg/m ³ | <0.0130 | | <0.0162 | | <0.00162 | | <0.00648 | | <0.00162 | | <0.00162 | | <0.00162 | | <0.00162 | | ND | | | 0.28 | 2.8 | | 6 | 0.23 | |
| TO-15 | 75-34-3 | 1,1-Dichloroethane | mg/m ³ | <0.0128 | | <0.0160 | | <0.00160 | | <0.00641 | | <0.00160 | | <0.00160 | | <0.00160 | | <0.00160 | | ND | | | | | 510 | 1,700* | 0.85 | |
| TO-15 | 75-35-4 | 1,1-Dichloroethene | mg/m ³ | <0.0127 | | <0.0159 | | <0.00159 | | <0.00634 | | <0.00159 | | <0.00159 | | <0.00159 | | <0.00159 | | ND | | | | | 120 | 410 | | |
| TO-15 | 156-59-2 | cis-1,2-Dichloroethene | mg/m ³ | <0.0127 | | <0.0159 | | <0.00159 | | 0.017 | | 0.012 | | <0.00159 | | <0.00159 | | <0.00159 | | 0.017 | BSL-2013-03 | 0.000035 | | | | 43 | 150 | 5.3 |
| TO-15 | 156-60-5 | trans-1,2-Dichloroethene | mg/m ³ | <0.0127 | | <0.0159 | | <0.00159 | | <0.00634 | | <0.00159 | | <0.00159 | | <0.00159 | | <0.00159 | | ND | | | | | 69 | 230 | 9.2 | |
| TO-15 | 78-87-5 | 1,2-Dichloropropane | mg/m ³ | <0.0148 | | <0.0185 | | <0.00185 | | <0.00739 | | <0.00185 | | <0.00185 | | <0.00185 | | <0.00185 | | ND | | | 0.34 | 3.4 | | 7.4 | 0.36 | |
| TO-15 | 10061-01-5 | cis-1,3-Dichloropropene | mg/m ³ | <0.0145 | | <0.0182 | | <0.00182 | | <0.00726 | | <0.00182 | | <0.00182 | | <0.00182 | | <0.00182 | | ND | | | 0.79** | 7.9** | | 18** | | |
| TO-15 | 10061-02-6 | trans-1,3-Dichloropropene | mg/m ³ | <0.0145 | | <0.0182 | | <0.00182 | | <0.00726 | | <0.00182 | | <0.00182 | | <0.00182 | | <0.00182 | | ND | | | | | | | | |
| TO-15 | 100-41-4 | Ethylbenzene | mg/m ³ | <0.0139 | | <0.0173 | | <0.00173 | | <0.00694 | | 0.004 | | 0.0019 | | 0.048 | | 0.056 | | 0.056 | BSL-2013-05 | 0.00041 | | | | 400* | 400* | 82*** |
| TO-15 | 76-13-1 | 1,1,2-Trichlorotrifluoroethane- Freon 113 | mg/m ³ | <0.0245 | | <0.0307 | | <0.00307 | | <0.0123 | | <0.00307 | | <0.00307 | | <0.00307 | | <0.00307 | | ND | | | | | | 5,600* | 5,600* | |
| TO-15 | 75-69-4 | Trichlorofluoromethane- Freon 11 | mg/m ³ | <0.0180 | | <0.0225 | | <0.00225 | | <0.00899 | | <0.00225 | | <0.00225 | | <0.00225 | | <0.00225 | | ND | | | | | | 390 | 1,300 | |
| TO-15 | 75-71-8 | Dichlorodifluoromethane- Freon 12 | mg/m ³ | 0.024 | | 0.022 | | 0.0037 | | 0.064 | | 0.04 | | 0.049 | | 0.049 | | 0.035 | | 0.064 | BSL-2013-03 | 0.000014 | | | | 94 | 310 | |
| TO-15 | 76-14-2 | 1,2-Dichlorotetrafluoroethane- Freon 114 | mg/m ³ | 0.027 | | <0.0280 | | 0.055 | | 0.05 | | 0.032 | | 0.067 | | 0.046 | | 0.055 | | 0.055 | BSL-2013-05 | 0.000013 | | | | | | |
| TO-15 | 87-68-3 | Hexachloro-1,3-butadiene | mg/m ³ | <0.108 | | <0.1350 | | <0.0135 | | <0.0538 | | <0.0135 | | <0.0135 | | <0.0135 | | <0.0135 | | ND | | | 7 | 70 | 18 | 180 | | |
| TO-15 | 75-09-2 | Methylene Chloride | mg/m ³ | <0.0111 | | <0.0139 | | 0.0097 | | 0.013 | | 0.0063 | | 0.0028 | | 0.0056 | | 0.0023 | | 0.013 | BSL-2013-03 | 0.000027 | 9.3 | 93 | | 210 | | |
| TO-15 | 100-42-5 | Styrene | mg/m ³ | <0.0136 | | <0.0170 | | 0.0038 | | <0.00681 | | 0.0019 | | 0.0032 | | 0.16 | | 0.18 | | 0.18 | BSL-2013-05 | 0.00761 | | | | 1,500* | 1,500* | 45 |
| TO-15 | 79-34-5 | 1,1,2,2-Tetrachloroethane | mg/m ³ | <0.0220 | | <0.0275 | | <0.00275 | | <0.0110 | | <0.00275 | | <0.00275 | | <0.00275 | | <0.00275 | | ND | | | 0.42 | 4.2 | | 9.3 | | |
| TO-15 | 127-18-4 | Tetrachloroethylene (PCE) | mg/m ³ | <0.0217 | | <0.0272 | | <0.00272 | | <0.0109 | | <0.00272 | | 0.024 | | 0.0081 | | 0.0081 | | 0.024 | BSL-2013-04 | 0.000037 | 0.51 | 5.1 | | 13 | 0.8 | |
| TO-15 | 108-88-3 | Toluene | mg/m ³ | <0.0121 | | <0.0151 | | 0.0057 | | 0.023 | | 0.017 | | 0.0075 | | 0.012 | | 0.014 | | 0.023 | BSL-2013-03 | 0.00011 | | | | 650* | 650* | 159*** |
| TO-15 | 120-82-1 | 1,2,4-Trichlorobenzene | mg/m ³ | <0.0748 | | <0.0933 | | <0.00933 | | <0.0373 | | <0.00933 | | <0.00933 | | <0.00933 | | <0.00933 | | ND | | | | | | 62 | 220 | |
| TO-15 | 71-55-6 | 1,1,1-Trichloroethane | mg/m ³ | <0.0174 | | <0.0218 | | <0.00218 | | <0.00870 | | <0.00218 | | <0.00218 | | <0.00218 | | <0.00218 | | ND | | | | | | 1,200* | 1,200* | 0.94 |
| TO-15 | 79-00-5 | 1,1,2-Trichloroethane | mg/m ³ | <0.0174 | | <0.0218 | | <0.00218 | | <0.00870 | | <0.00218 | | <0.00218 | | <0.00218 | | <0.00218 | | ND | | | 0.74 | 7.4 | | 16 | | |
| TO-15 | 79-01-6 | Trichloroethylene (TCE) | mg/m ³ | <0.0171 | | <0.0214 | | <0.00214 | | <0.00857 | | <0.00214 | | <0.00214 | | <0.00214 | | <0.00214 | | ND | | | 3 | 30 | 17 | 65 | 0.76 | |
| TO-15 | 95-63-6 | 1,2,4-Trimethylbenzene | mg/m ³ | <0.0157 | | <0.0196 | | <0.00196 | | <0.016 | | <0.00196 | | 0.0024 | | <0.00196 | | <0.00196 | | 0.016 | BSL-2013-03 | 0.00156 | | | | 52 | 170 | |
| TO-15 | 108-67-8 | 1,3,5-Trimethylbenzene | mg/m ³ | <0.0157 | | <0.0196 | | <0.00196 | | <0.00785 | | <0.00196 | | <0.00196 | | <0.00196 | | <0.00196 | | ND | | | | | | 21 | 70 | |
| TO-15 | 75-01-4 | Vinyl chloride | mg/m ³ | <0.00818 | | <0.0102 | | <0.00102 | | 0.0066 | | 0.0038 | | <0.00102 | | <0.00102 | | <0.00102 | | 0.0066 | BSL-2013-03 | 0.000002 | 0.085 | NA | | 0.75 | | |
| TO-15 | 1330-20-7 | Xylenes, Total | mg/m ³ | <0.0417 | | <0.0521 | | 0.0065 | | <0.0208 | | 0.0082 | | 0.0074 | | 0.0082 | | 0.0096 | | 0.0096 | BSL-2013-05 | 0.00009 | | | | 270 | 420* | 31*** |
| TO-15 | 67-63-0 | 2-Propanol ₅ | mg/m ³ | <0.0492 | | <0.0615 | | <0.00615 | | <0.0246 | | 0.01 | | <0.00615 | J | <0.00615 | J | <0.00615 | J | 0.01 | BSL-2013-03 | NA | | | | | | |

Notes:
mg/m³ milligrams per cubic meter
mg/kg milligrams per kilogram
DUP Duplicate sample
NA Not applicable
ND Analyte not detected above reporting limit
NS Not sampled
UNK Depth unknown
WH Wellhead
SRL Soil Remediation Level
GPL Groundwater Protection Level
Qual Qualifier

Notes continued:
1 Sample ID (BSL-2013-04) = probe ID (BSL-2013-04). The depth of the probe is NOT included in the sample ID. All the temporary probes in this table had a sample depth of 5 feet below land surface.
2 Calculated according to ADEQ (2011) guidance. Constants for chemical properties were obtained from USEPA (2013) if not provided by ADEQ (2011). Soil equivalents were not calculated if constants were not provided by ADEQ (2011) or USEPA (2013).
3 Soil Remediation Levels, Arizona Administrative Code Title 18, Article 2, Effective as May 5, 2007- http://www.azsos.gov/public_services/title_18/18-07.htm.
4 Groundwater Protection Levels, Arizona Department of Environmental Quality, A Screening Method to Determine Soil Concentrations Protective of Groundwater Quality, September 1996, VOCs revised 2008.
5 2-Propanol was used as the leak detection compound.
* Indicates SRL is based on the chemical-specific saturation level in soil for volatile organic chemicals only.
** Based on SRL for CAS 542-75-6.
*** Indicates GPL based upon saturation limit.

Qualifiers:
J Estimated: The analyte was positively identified,

**Table D5
Detection Summary - Temporary Soil Gas Probes
Broadway South Landfill 2013**

| Compound | Samples Analyzed | Number of detections > RL | Feb-Mar 2013 Maximum Concentration (mg/m ³) | Feb-Mar 2013 Location of Maximum Concentration |
|--------------------------------|------------------|---------------------------|---|--|
| Benzene | 8 | 6 | 0.03 | BSL-2013-03 |
| Bromomethane | 8 | 0 | ND | |
| Carbon tetrachloride | 8 | 0 | ND | |
| Chlorobenzene | 8 | 0 | ND | |
| Chloroethane | 8 | 0 | ND | |
| Chloroform | 8 | 0 | ND | |
| Chloromethane | 8 | 1 | 0.013 | BSL-2013-01 |
| 1,2-Dibromoethane | 8 | 0 | ND | |
| 1,2-Dichlorobenzene | 8 | 0 | ND | |
| 1,3-Dichlorobenzene | 8 | 0 | ND | |
| 1,4-Dichlorobenzene | 8 | 0 | ND | |
| 1,2-Dichloroethane | 8 | 0 | ND | |
| 1,1-Dichloroethane | 8 | 0 | ND | |
| 1,1-Dichloroethene | 8 | 0 | ND | |
| cis-1,2-Dichloroethene | 8 | 2 | 0.017 | BSL-2013-03 |
| trans-1,2-Dichloroethene | 8 | 0 | ND | |
| 1,2-Dichloropropane | 8 | 0 | ND | |
| cis-1,3-Dichloropropene | 8 | 0 | ND | |
| trans-1,3-Dichloropropene | 8 | 0 | ND | |
| Ethylbenzene | 8 | 4 | 0.056 | BSL-2013-05 |
| 1,1,2-Trichlorotrifluoroethane | 8 | 0 | ND | |
| Trichlorofluoromethane | 8 | 0 | ND | |
| Dichlorodifluoromethane | 8 | 8 | 0.064 | BSL-2013-03 |
| 1,2-Dichlorotetrafluoroethane | 8 | 7 | 0.055 | BSL-2013-05 |
| Hexachloro-1,3-butadiene | 8 | 0 | ND | |
| Methylene Chloride | 8 | 6 | 0.013 | BSL-2013-03 |
| 2-Propanol | 8 | 1 | 0.01 | BSL-2013-03 |
| Styrene | 8 | 5 | 0.18 | BSL-2013-05 |
| 1,1,2,2-Tetrachloroethane | 8 | 0 | ND | |
| Tetrachloroethylene (PCE) | 8 | 3 | 0.024 | BSL-2013-04 |
| Toluene | 8 | 6 | 0.023 | BSL-2013-03 |
| 1,2,4-Trichlorobenzene | 8 | 0 | ND | |
| 1,1,1-Trichloroethane | 8 | 0 | ND | |
| 1,1,2-Trichloroethane | 8 | 0 | ND | |
| Trichloroethylene (TCE) | 8 | 0 | ND | |
| 1,2,4-Trimethylbenzene | 8 | 2 | 0.016 | BSL-2013-03 |
| 1,3,5-Trimethylbenzene | 8 | 0 | ND | |
| Vinyl chloride | 8 | 2 | 0.0066 | BSL-2013-03 |
| Xylenes, Total | 8 | 5 | 0.0096 | BSL-2013-05 |

Notes:

mg/m³ - milligrams per meter cubed

ND - Not detected above reporting limit

RL - Laboratory reporting limits

Sample ID (BSL-2013-03) = probe ID (BSL-2013-03). The depth of the probe is NOT included in the sample ID. All the temporary probes in this table had a sample depth of 5 feet below land surface.

APPENDIX D
ATTACHMENTS

| | |
|---------------|--|
| Attachment D1 | Soil Gas Probe Installation Forms – Shallow Temporary Soil Gas Probes |
| Attachment D2 | Soil Vapor Sampling Forms – Shallow Temporary Soil Gas Probes |
| Attachment D3 | Photographs – Shallow Temporary Soil Gas Probe Installation and Sampling |

ATTACHMENT D1
SOIL GAS PROBE INSTALLATION FORMS
SHALLOW TEMPORARY SOIL GAS PROBES

Soil Gas Implant ID BSL-2013-001

Northing 3564434.79

Easting 516041.99

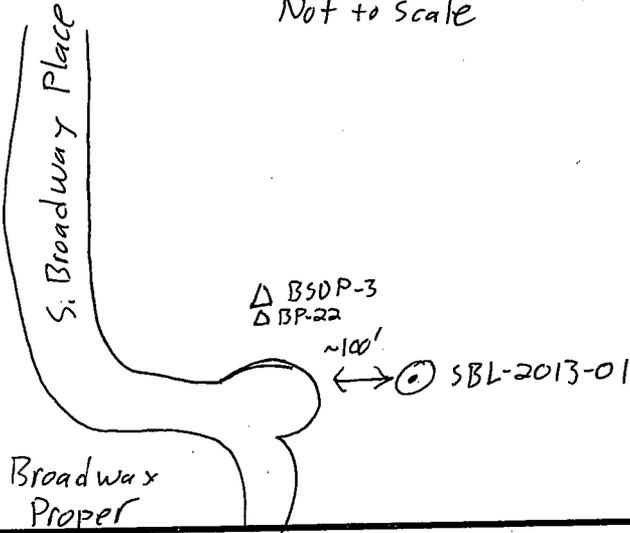
Logged By M. Busby

Drilling Contractor Geo Mechanics

Date/Time Installed 2/21/13 1430

Implant Location Map

Not to Scale



Purge Volume Calculation

$$\text{Volume Tubing} = ((D_{\text{tube}}/2)^2 * 3.14 * (L_{\text{tube}} * 12) * 16.3866$$

$$\text{Volume of Sandpack} = (D_{\text{bore}}/2)^2 * 3.14 * H_{\text{sandpack}} * 0.3 * 16.3866$$

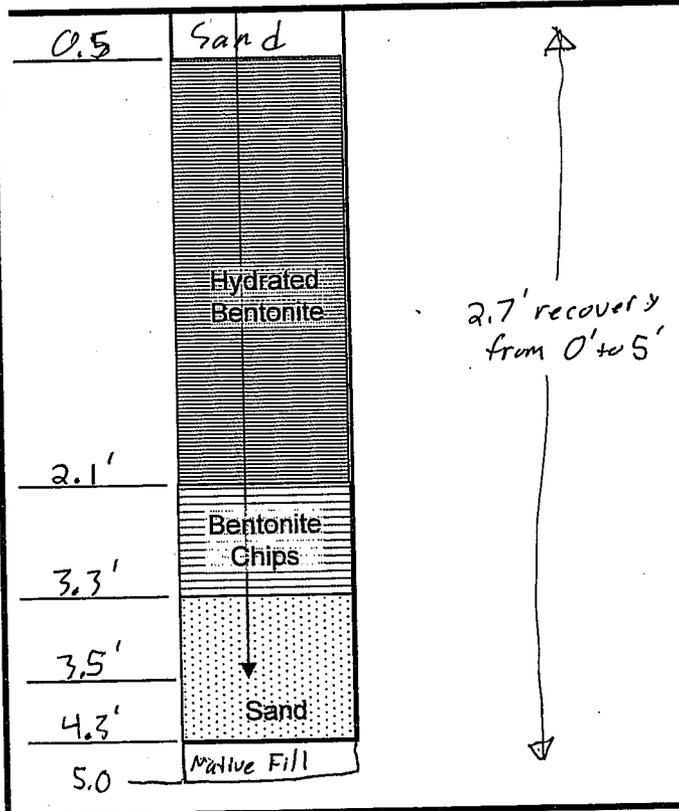
Implant Purge Volume

| | |
|--------------------------------------|--------------|
| Tubing Diameter (in) | <u>3/40</u> |
| Length of Tubing (ft) | <u>5</u> |
| Borehole Diameter (in) | <u>2 3/8</u> |
| Height of Sand (in) | <u>12</u> |
| Purge Volume of Tubing (ml) | <u>476</u> |
| Purge Volume of Sandpack (ml) | <u>871</u> |
| Purge Volume of Tubing+Sandpack (ml) | <u>917</u> |

Implant As-Built Diagram

Depth of Materials

Land Surface



Soil Borehole Log

Unified Soil Classification System

○ Sandy silty clay (CL) 5YR 3/4 Dark reddish Brown, Damp, well graded Sand Fine to coarse, 15% sand 85% silt/clay.

~ 3' Gravelly lense > 1" ^(MIR) sub rounded to angular

~ 4' Trash ~ 15% plastic, cloth, glass
Sandy silt w/ Gravel, well graded
60% fines 15% Sand 10% Gravel

5-TD

Soil Gas Implant ID BSL-2013-002

Northing 3564540.90

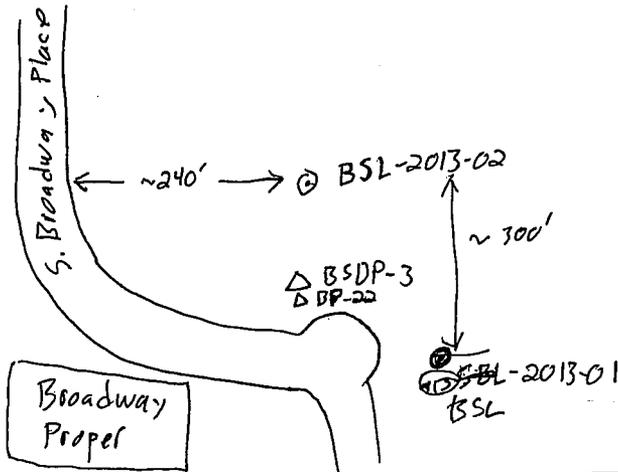
Logged By M. Busby
 Drilling Contractor Geo Mechanics

Easting 516003.01

Date/Time Installed 2/21 15:10

Implant Location Map

Not to Scale



Purge Volume Calculation

$$\text{Volume Tubing} = ((D_{\text{tube}}/2)^2 * 3.14 * (L_{\text{tube}} * 12)) * 16.3866$$

$$\text{Volume of Sandpack} = (D_{\text{bore}}/2)^2 * 3.14 * H_{\text{sandpack}} * 0.3 * 16.3866$$

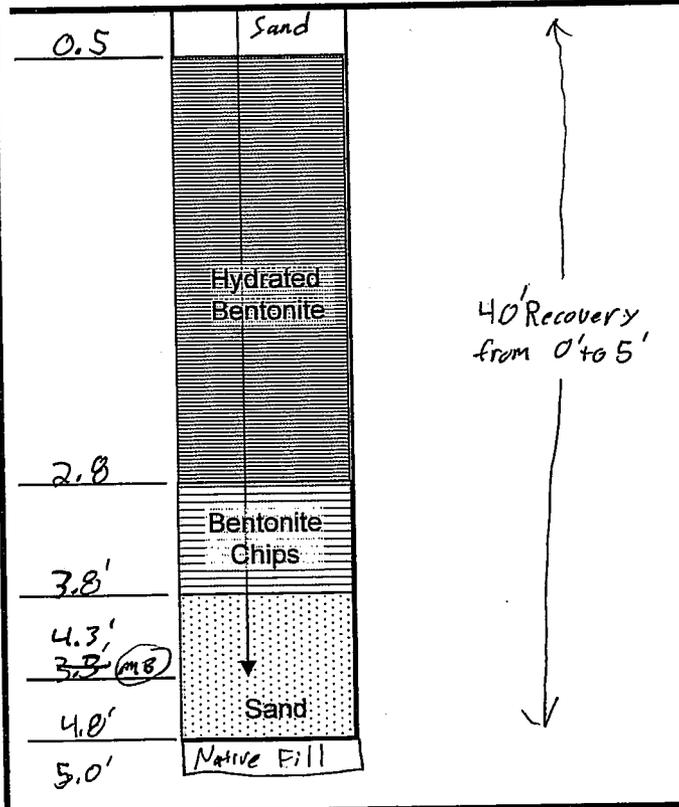
Implant Purge Volume

| | |
|--------------------------------------|--------------|
| Tubing Diameter (in) | <u>3/16</u> |
| Length of Tubing (ft) | <u>5</u> |
| Borehole Diameter (in) | <u>2 3/8</u> |
| Height of Sand (in) | <u>12</u> |
| Purge Volume of Tubing (ml) | <u>46</u> |
| Purge Volume of Sandpack (ml) | <u>871</u> |
| Purge Volume of Tubing+Sandpack (ml) | <u>917</u> |

Implant As-Built Diagram

Depth of Materials

Land Surface



Soil Borehole Log

Unified Soil Classification System

ft
bls

Gravelly sand w/ lenses of clay (SW) 5YR 4/4 Reddish brown, Moist throughout from 0-5' gravel up to 1" sand is moderately graded, loose, sub-angular to sub-rounded 85% sand, 10% gravel 5% claysilt, No trash observed

TO = 5

Soil Gas Implant ID BSL SBL-2013-03

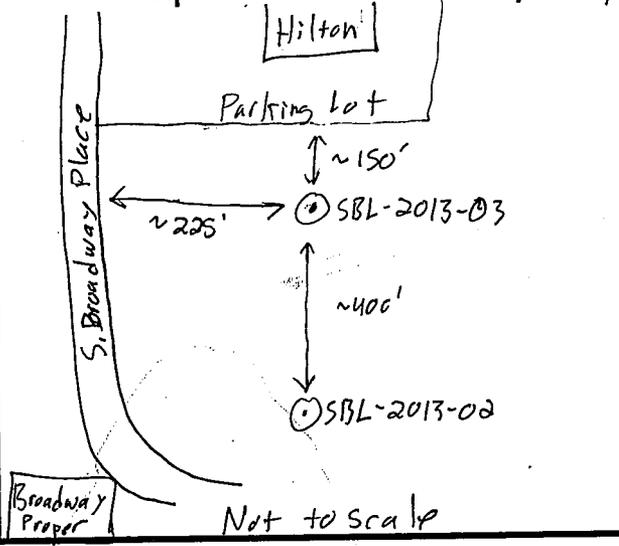
Northing 3564643.60

Logged By M. Busby
 Drilling Contractor Geo mechanics

Easting 516004.43

Date/Time Installed 2/21/13

Implant Location Map



Purge Volume Calculation

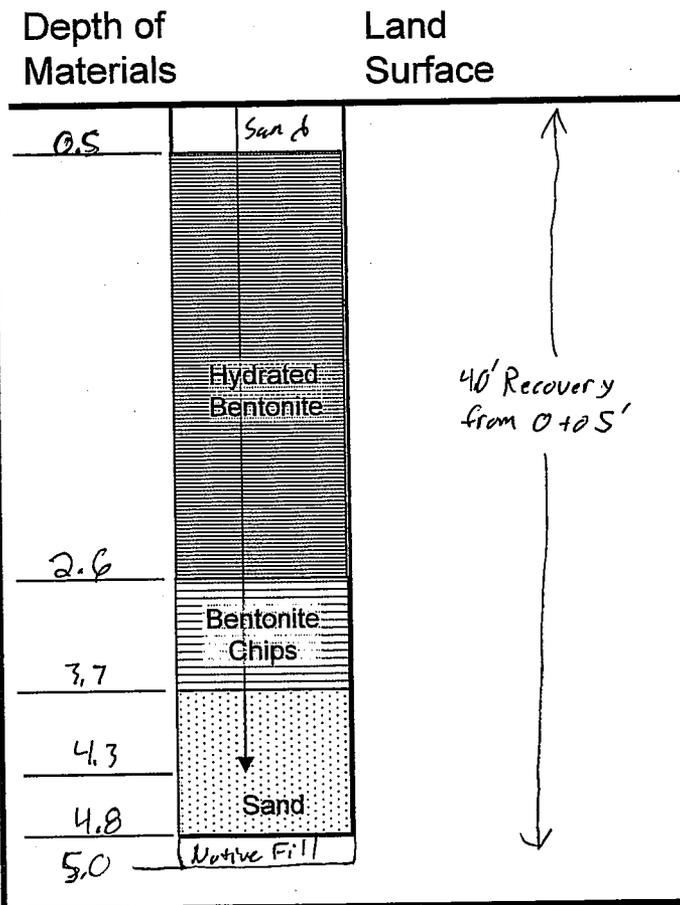
Volume Tubing = $((D_{tube}/2)^2 * 3.14 * (L_{tube} * 12) * 16.3866$

Volume of Sandpack = $(D_{bore}/2)^2 * 3.14 * H_{sandpack} * 0.3 * 16.3866$

Implant Purge Volume

| | |
|--------------------------------------|--------------|
| Tubing Diameter (in) | <u>3/16</u> |
| Length of Tubing (ft) | <u>5</u> |
| Borehole Diameter (in) | <u>2 3/8</u> |
| Height of Sand (in) | <u>12</u> |
| Purge Volume of Tubing (ml) | <u>46</u> |
| Purge Volume of Sandpack (ml) | <u>871</u> |
| Purge Volume of Tubing+Sandpack (ml) | <u>917</u> |

Implant As-Built Diagram



Soil Borehole Log

Unified Soil Classification System

Gravelly Sand (SW) SP R 4/4 Reddish brown, Sand is Moderately graded gravel to 1" 80% sand 20% gravel. Increase in gravel content w/ depth, lenses of silt & clay. Moist from 0-5', slight color change w/ depth to darker. No trash observed.

TD=5

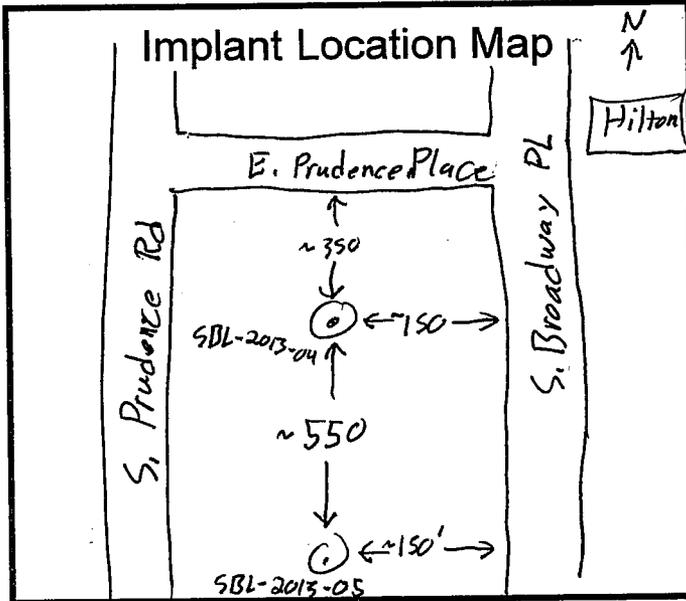
Soil Gas Implant ID BSL SBL-2013-04

Northing 3564729.16

Easting 515865.68

Logged By M. Busby
 Drilling Contractor Geo Mechanics

Date/Time Installed 2/21/13 1550



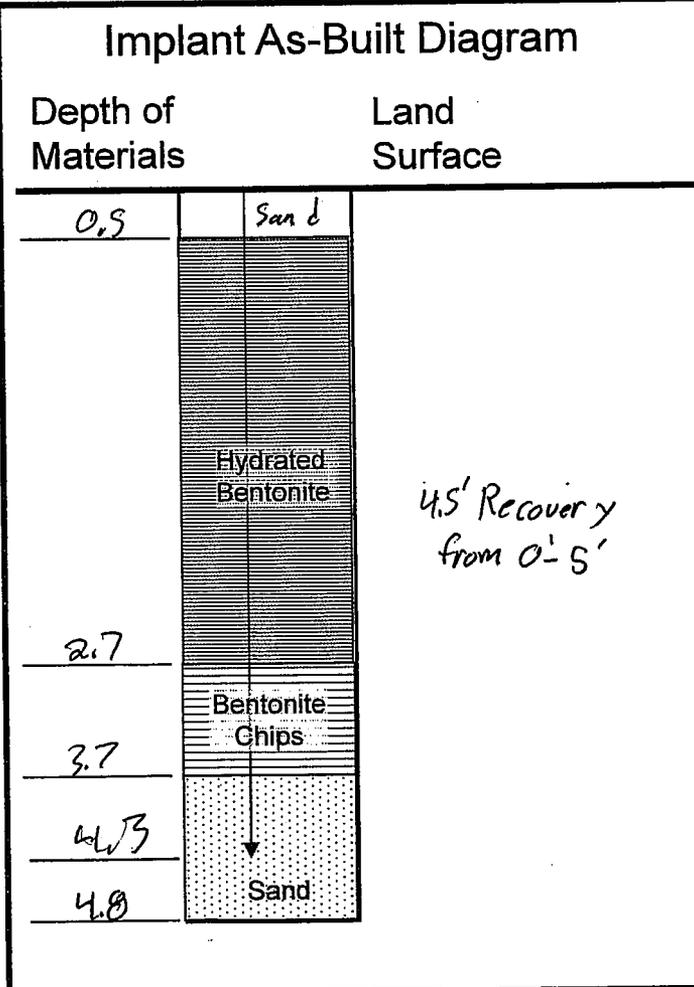
Purge Volume Calculation

Volume Tubing = $((D_{tube}/2)^2 * 3.14 * (L_{tube} * 12) * 16.3866$

Volume of Sandpack = $(D_{bore}/2)^2 * 3.14 * H_{sandpack} * 0.3 * 16.3866$

Implant Purge Volume

| | |
|--------------------------------------|--------------|
| Tubing Diameter (in) | <u>3/16</u> |
| Length of Tubing (ft) | <u>5</u> |
| Borehole Diameter (in) | <u>2 3/8</u> |
| Height of Sand (in) | <u>12</u> |
| Purge Volume of Tubing (ml) | <u>46</u> |
| Purge Volume of Sandpack (ml) | <u>871</u> |
| Purge Volume of Tubing+Sandpack (ml) | <u>917</u> |



Soil Borehole Log

Unified Soil Classification System

ft
bls

0 Silty Sand w/ gravel (SM)
 SYR 4/4 Reddish Brown, Moist
 from 0'-1' gravel to 2cm, low
 plasticity. 70% sand 30% silt/clay

1' - Increased gravel and dry
 below 1' → 5% gravel

No trash observed

TD = 4.8

Soil Gas Implant ID BSL-2013-05

Northing 3504565.85

Logged By M. Busby

Easting 515860.74

Drilling Contractor GeoMechanics

Date/Time Installed 2/21/13

Implant Location Map



Purge Volume Calculation

$$\text{Volume Tubing} = ((D_{\text{tube}}/2)^2 * 3.14 * (L_{\text{tube}} * 12)) * 16.3866$$

$$\text{Volume of Sandpack} = (D_{\text{bore}}/2)^2 * 3.14 * H_{\text{sandpack}} * 0.3 * 16.3866$$

Implant Purge Volume

| | |
|--------------------------------------|--------------|
| Tubing Diameter (in) | <u>3/16</u> |
| Length of Tubing (ft) | <u>5</u> |
| Borehole Diameter (in) | <u>2 3/8</u> |
| Height of Sand (in) | <u>12</u> |
| Purge Volume of Tubing (ml) | <u>46</u> |
| Purge Volume of Sandpack (ml) | <u>871</u> |
| Purge Volume of Tubing+Sandpack (ml) | <u>917</u> |

Implant As-Built Diagram

| Depth of Materials | Land Surface |
|--------------------|--------------------|
| 0.6 | Sand |
| 2.7 | Hydrated Bentonite |
| 3.8' | Bentonite Chips |
| 4.2' | Sand |
| 4.9' | Sand |

4.5' Recovery from 0'-5'

TD = 4.9'

Soil Borehole Log

Unified Soil Classification System

○ Silty Sand (SM) SYR 4/3 Reddish brown, 60% sand 40% silt
 Moist 0-0.5' dry 0.5-4.9'
 Slight increase in gravel w/ depth gravel up to 1cm
 well graded sand, No trash observed.

Soil Gas Implant ID BNL-2013-06

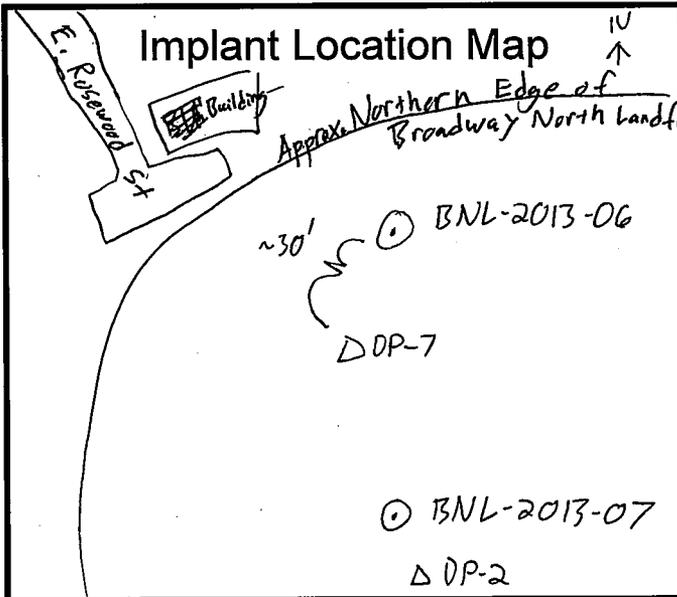
Northing 3566112.78

Logged By M. Busby

Easting 515612.41

Drilling Contractor Geo Mechanics

Date/Time Installed 2/22/13 08:30



Purge Volume Calculation

Volume Tubing = $((D_{tube}/2)^2 * 3.14 * (L_{tube} * 12) * 16.3866$

Volume of Sandpack = $(D_{bore}/2)^2 * 3.14 * H_{sandpack} * 0.3) * 16.3866$

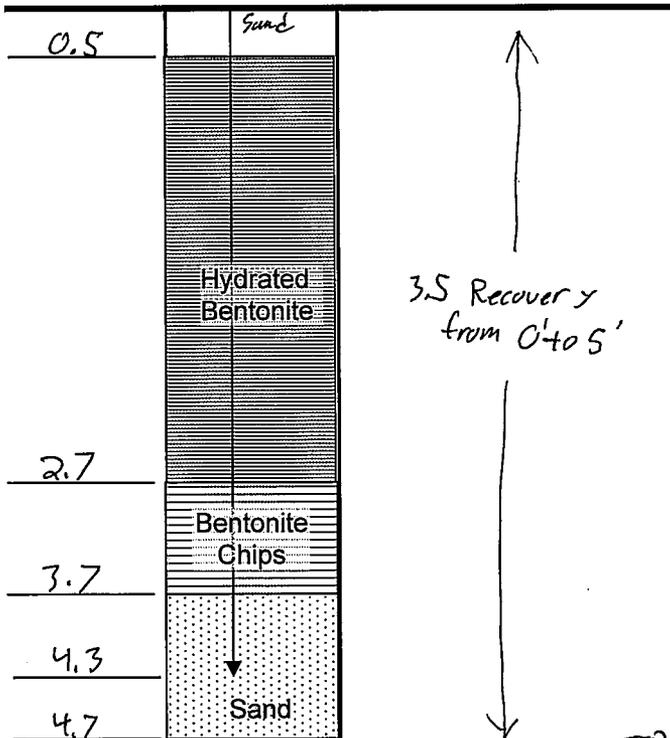
Implant Purge Volume

| | |
|--------------------------------------|--------------|
| Tubing Diameter (in) | <u>3/16</u> |
| Length of Tubing (ft) | <u>5</u> |
| Borehole Diameter (in) | <u>2 3/8</u> |
| Height of Sand (in) | <u>12</u> |
| Purge Volume of Tubing (ml) | <u>416</u> |
| Purge Volume of Sandpack (ml) | <u>871</u> |
| Purge Volume of Tubing+Sandpack (ml) | <u>917</u> |

Implant As-Built Diagram

Depth of Materials

Land Surface



Soil Borehole Log

Unified Soil Classification System

Gravelly Sand (SP) moderately ^{graded} ~~sorted~~ fine sand w/ Gravel > 1" 90% sand 10% gravel, 5YR 5/4 Reddish Brown loose and slightly moist, from 0'-0.5' b/s slightly more moist. Gravel subrounded to Angular NO trash observed

Soil Gas Implant ID BNL-2013-07

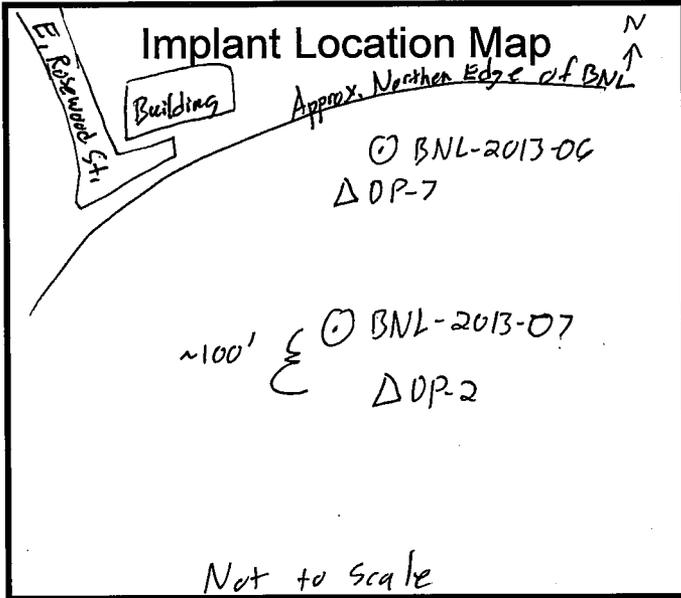
Northing 3565974.43

Logged By M. Busby

Easting 515650.05

Drilling Contractor Geomechanics

Date/Time Installed 2/22/13 0900



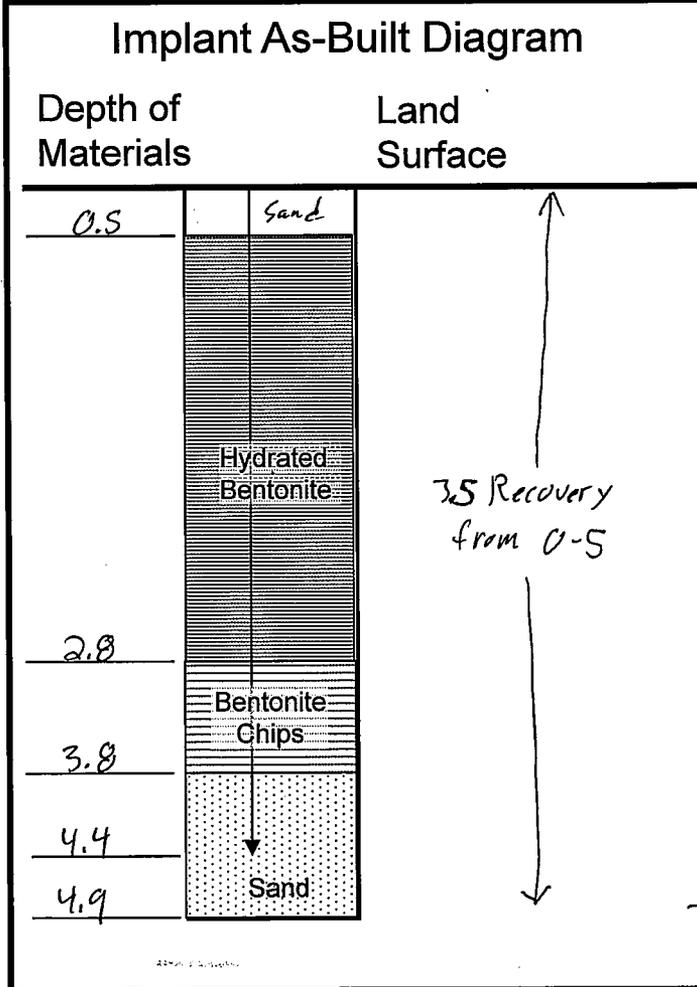
Purge Volume Calculation

Volume Tubing = $((D_{\text{tube}}/2)^2 * 3.14 * (L_{\text{tube}} * 12) * 16.3866$

Volume of Sandpack = $(D_{\text{bore}}/2)^2 * 3.14 * H_{\text{sandpack}} * 0.3 * 16.3866$

Implant Purge Volume

| | |
|--------------------------------------|--------------|
| Tubing Diameter (in) | <u>3/16</u> |
| Length of Tubing (ft) | <u>5</u> |
| Borehole Diameter (in) | <u>2 3/8</u> |
| Height of Sand (in) | <u>12</u> |
| Purge Volume of Tubing (ml) | <u>46</u> |
| Purge Volume of Sandpack (ml) | <u>871</u> |
| Purge Volume of Tubing+Sandpack (ml) | <u>917</u> |



Soil Borehole Log

Unified Soil Classification System

ft
bls
0

Silty Sand w/ Gravel (SM) Moderately Sorted fine sand w/ gravel 1/2 in to 7/8 in. SYR 5/4 reddish brown, loose slightly moist top 0-5" slightly moist, Gravel Angular to sub-rounded 70% Sand 25% silt 5% Gravel, No trash observed

Soil Gas Implant ID BNL-2013-08

Northing 3565851.07

Logged By M. Busby

Easting 515637.88

Drilling Contractor Geomechanics

Date/Time Installed 2/22/13 09:15

Implant Location Map

Not to scale



Electrical Substation

BNL-2013-08

R-069A

Fence



Power lines

Purge Volume Calculation

$$\text{Volume Tubing} = ((D_{\text{tube}}/2)^2 * 3.14 * (L_{\text{tube}} * 12) * 16.3866$$

$$\text{Volume of Sandpack} = (D_{\text{bore}}/2)^2 * 3.14 * H_{\text{sandpack}} * 0.3 * 16.3866$$

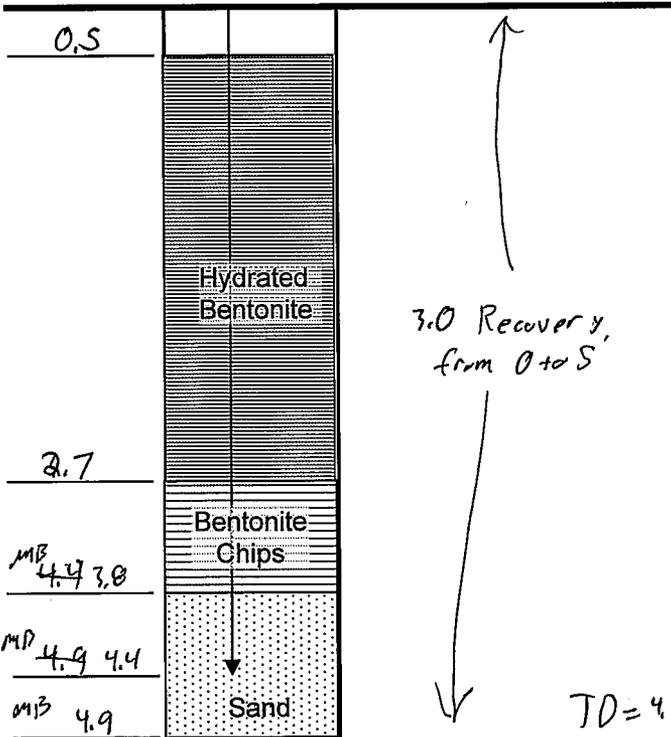
Implant Purge Volume

| | |
|--------------------------------------|--------------|
| Tubing Diameter (in) | <u>3/16</u> |
| Length of Tubing (ft) | <u>5</u> |
| Borehole Diameter (in) | <u>2 3/8</u> |
| Height of Sand (in) | <u>12</u> |
| Purge Volume of Tubing (ml) | <u>46</u> |
| Purge Volume of Sandpack (ml) | <u>871</u> |
| Purge Volume of Tubing+Sandpack (ml) | <u>917</u> |

Implant As-Built Diagram

Depth of Materials

Land Surface



Soil Borehole Log

Unified Soil Classification System

ft
515
0

Silty sand w/ gravel (SM) 70% sand
25% silt 5% gravel. Moderately
sorted fine sand, loose slightly
graded
moist, SYR s/u Reddish Brown

~2 glass

2.5 Trash, 70% trash 30% sand/silt
wood, glass, plastic, lt organic
smell

TD = 4.9

Soil Gas Implant ID BNL-2013-09

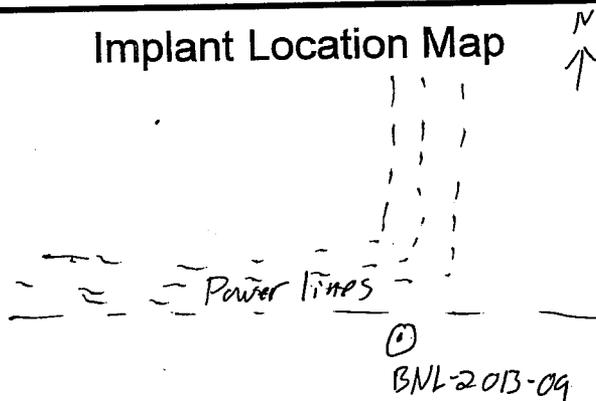
Northing 3565761.53

Easting 515774.80

Logged By M. Busby
 Drilling Contractor Geo mechanics

Date/Time Installed 2/25/13 9:44 1240

Implant Location Map



Not to scale

Purge Volume Calculation

$$\text{Volume Tubing} = ((D_{\text{tube}}/2)^2 * 3.14 * (L_{\text{tube}} * 12)) * 16.3866$$

$$\text{Volume of Sandpack} = (D_{\text{bore}}/2)^2 * 3.14 * H_{\text{sandpack}} * 0.3 * 16.3866$$

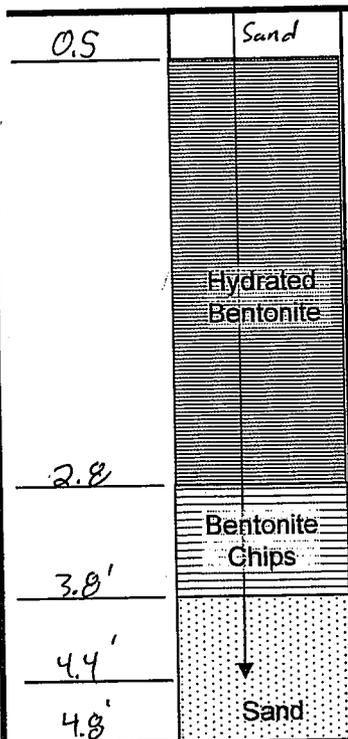
Implant Purge Volume

| | |
|--------------------------------------|--------------|
| Tubing Diameter (in) | <u>3/16</u> |
| Length of Tubing (ft) | <u>5</u> |
| Borehole Diameter (in) | <u>2 3/8</u> |
| Height of Sand (in) | <u>12</u> |
| Purge Volume of Tubing (ml) | <u>410</u> |
| Purge Volume of Sandpack (ml) | <u>871</u> |
| Purge Volume of Tubing+Sandpack (ml) | <u>917</u> |

Implant As-Built Diagram

Depth of Materials

Land Surface



3.0' Recovery from 0-4.5'

Soil Borehole Log

Unified Soil Classification System

fr bls

0 Silty Sand w/ Gravel (SM) 5YR
 4/4 Reddish brown to gl2 pinkish gray
 Moderately graded fine sand w/ gravel up to 1". 50% sand 40% silt 10% Gravel. sub-angular ^(M13) ~~fr~~ clasts

~1.5' Trash - red brick, glass, hard plastic

M - No trash seen below 4ft

TD = 4.8'

Soil Gas Implant ID RNL-2013-10

Northing 3565726.92

Logged By M. Busby

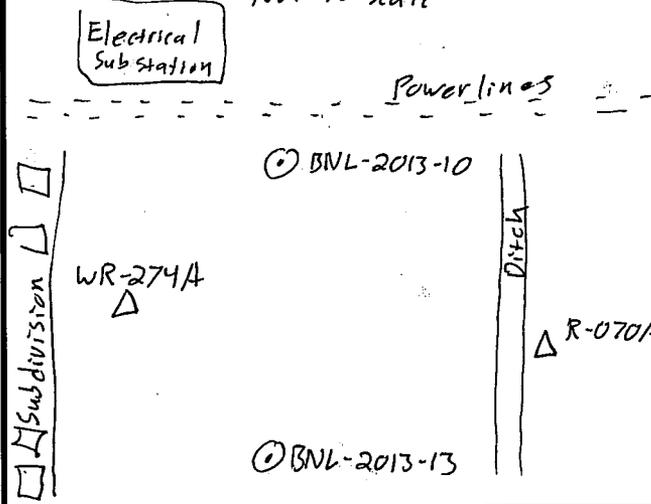
Easting 515342.72

Drilling Contractor Geo mechanics

Date/Time Installed 2/25/13 1300

Implant Location Map

Not to Scale



Purge Volume Calculation

$$\text{Volume Tubing} = ((D_{\text{tube}}/2)^2 * 3.14 * (L_{\text{tube}} * 12) * 16.3866$$

$$\text{Volume of Sandpack} = (D_{\text{bore}}/2)^2 * 3.14 * H_{\text{sandpack}} * 0.3 * 16.3866$$

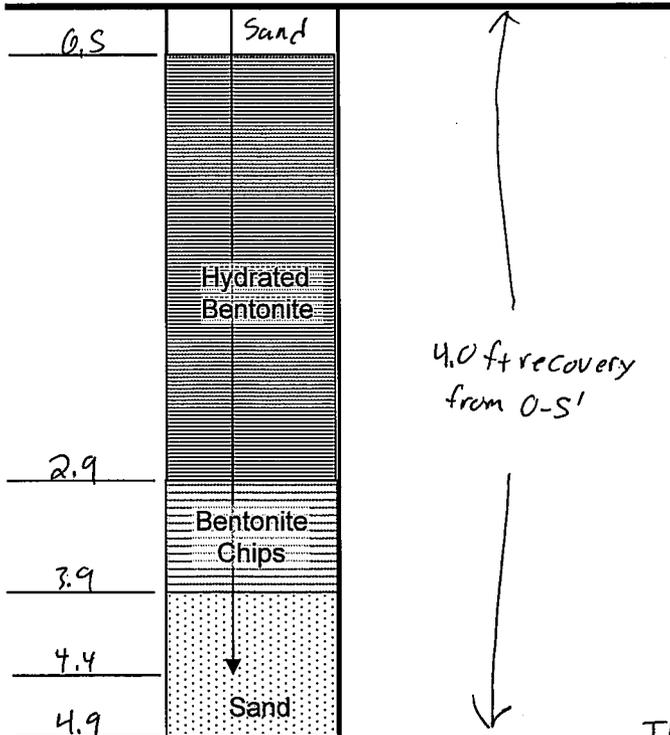
Implant Purge Volume

| | |
|--------------------------------------|--------------|
| Tubing Diameter (in) | <u>3/16</u> |
| Length of Tubing (ft) | <u>5</u> |
| Borehole Diameter (in) | <u>2 3/8</u> |
| Height of Sand (in) | <u>12</u> |
| Purge Volume of Tubing (ml) | <u>46</u> |
| Purge Volume of Sandpack (ml) | <u>871</u> |
| Purge Volume of Tubing+Sandpack (ml) | <u>917</u> |

Implant As-Built Diagram

Depth of Materials

Land Surface



Soil Borehole Log

Unified Soil Classification System

ft
bls

0 Gravelly Sand w/ silt (sw) ^{trace} SPR
 4/6 Yellowish Red (85% Sand, 12% Gravel 3% silt) well graded, sub-angular clasts, gravel to 1cm

~ 4' Grass pieces

TD = 4.9'

Soil Gas Implant ID BNL-2013-11

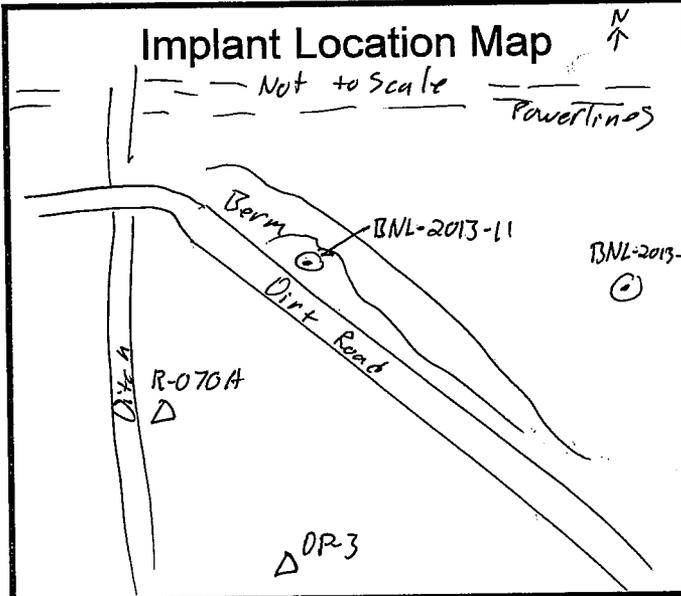
Northing 3565664.86

Logged By M. Busby

Easting 515468.10

Drilling Contractor Geomechanics

Date/Time Installed 2/25/13 1330



Purge Volume Calculation

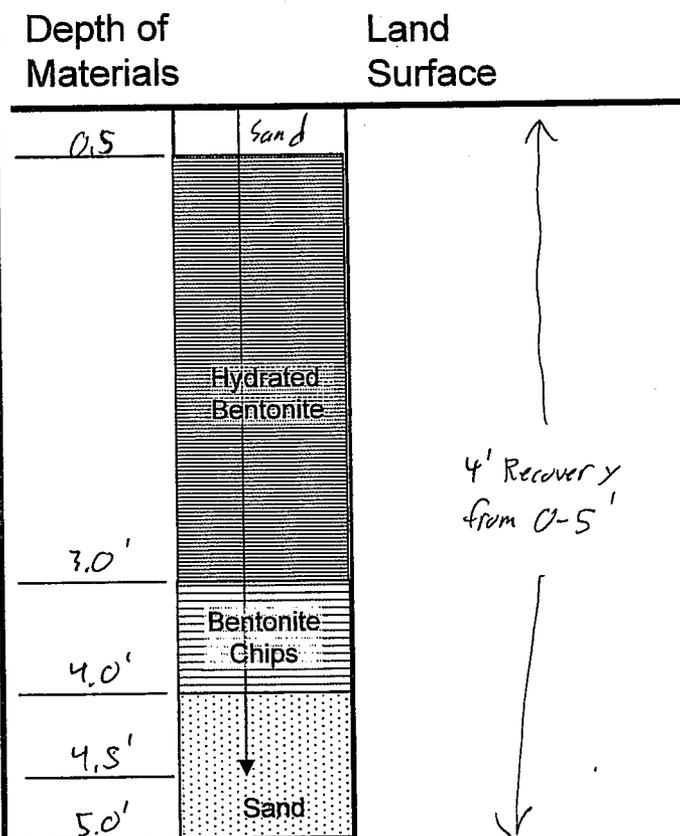
$$\text{Volume Tubing} = ((D_{\text{tube}}/2)^2 * 3.14 * (L_{\text{tube}} * 12) * 16.3866$$

$$\text{Volume of Sandpack} = (D_{\text{bore}}/2)^2 * 3.14 * H_{\text{sandpack}} * 0.3 * 16.3866$$

Implant Purge Volume

| | |
|--------------------------------------|--------------|
| Tubing Diameter (in) | <u>3/16</u> |
| Length of Tubing (ft) | <u>5</u> |
| Borehole Diameter (in) | <u>2 3/8</u> |
| Height of Sand (in) | <u>12</u> |
| Purge Volume of Tubing (ml) | <u>216</u> |
| Purge Volume of Sandpack (ml) | <u>871</u> |
| Purge Volume of Tubing+Sandpack (ml) | <u>917</u> |

Implant As-Built Diagram



Soil Borehole Log

Unified Soil Classification System

ft
bls
0 Sandy silt (ML) SYR slt Yellowish Red
70% silt 30% sand poorly graded fine sand. No trash observed

~3 silt + sand w/ gravel (SM) SYR
5/2 reddish gray, well graded sand fine to coarse 70% sand 15% silt 15% gravel. Gravel up to 1" Angular
No trash observed

T0=5.0

Soil Gas Implant ID BNL-2013-12

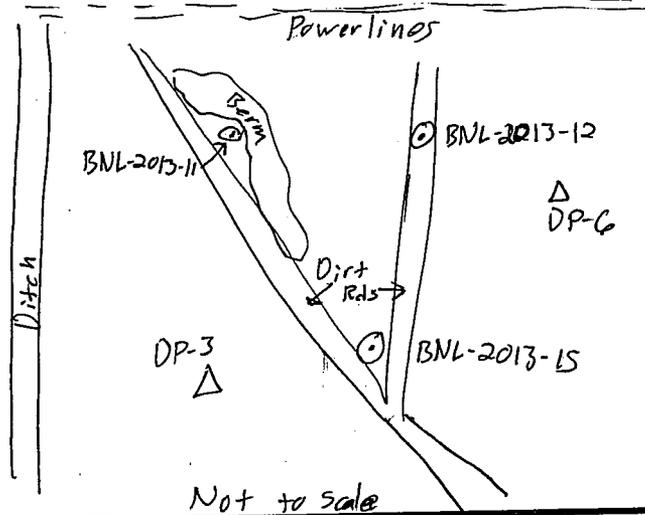
Northing 3565606.14

Easting 515643.38

Logged By M. Busby
 Drilling Contractor Geomechanics

Date/Time Installed 2/25/13 1400

Implant Location Map



Purge Volume Calculation

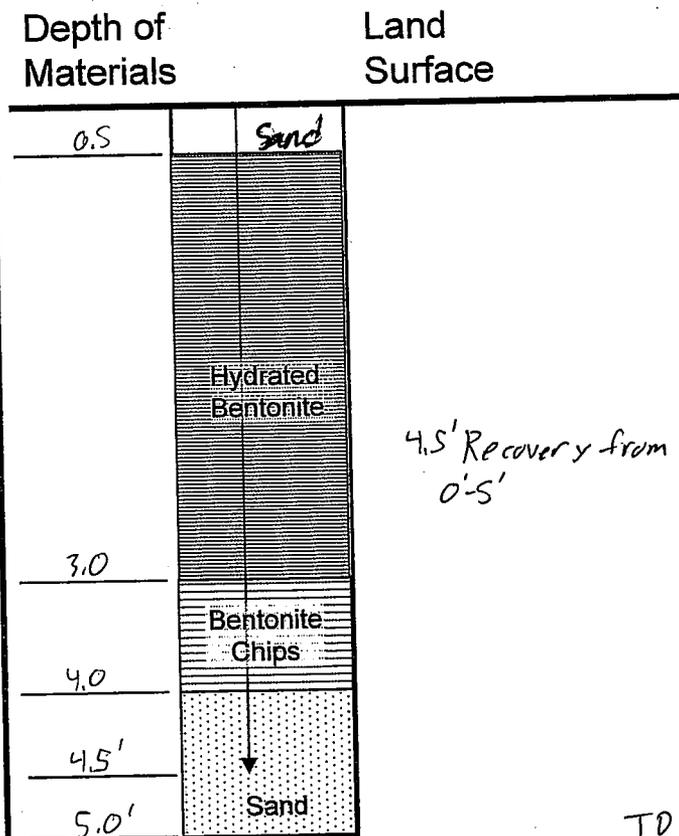
$$\text{Volume Tubing} = ((D_{\text{tube}}/2)^2 * 3.14 * (L_{\text{tube}} * 12) * 16.3866$$

$$\text{Volume of Sandpack} = (D_{\text{bore}}/2)^2 * 3.14 * H_{\text{sandpack}} * 0.3 * 16.3866$$

Implant Purge Volume

| | |
|--------------------------------------|--------------|
| Tubing Diameter (in) | <u>3/16</u> |
| Length of Tubing (ft) | <u>5</u> |
| Borehole Diameter (in) | <u>2 3/8</u> |
| Height of Sand (in) | <u>12</u> |
| Purge Volume of Tubing (ml) | <u>46</u> |
| Purge Volume of Sandpack (ml) | <u>871</u> |
| Purge Volume of Tubing+Sandpack (ml) | <u>917</u> |

Implant As-Built Diagram



Soil Borehole Log

Unified Soil Classification System

ft
bls

0 Silty Sand w/ Gravel (SM)SPR 5/6
 Yellowish Red, well grade sand
 fine to coarse, 70% sand, 15%
 silt, 15% gravel up to 2mm. sub-rod
 to sub-angular. No trash observed

Soil Gas Implant ID BNL-2013-13

Northing 3565574.82

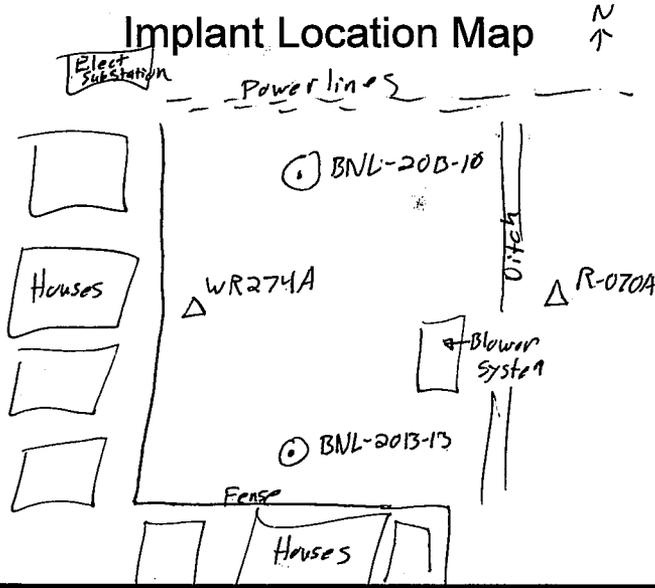
Logged By M. Busby

Easting 515337.59

Drilling Contractor Geomechanics

Date/Time Installed 2/25/13 13:15

Implant Location Map



Purge Volume Calculation

$$\text{Volume Tubing} = ((D_{\text{tube}}/2)^2 * 3.14 * (L_{\text{tube}} * 12) * 16.3866$$

$$\text{Volume of Sandpack} = (D_{\text{bore}}/2)^2 * 3.14 * H_{\text{sandpack}} * 0.3 * 16.3866$$

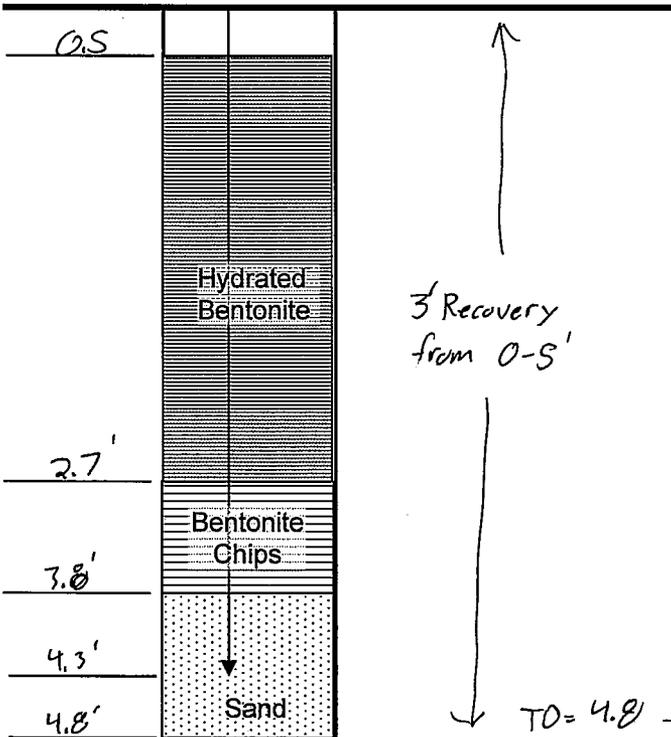
Implant Purge Volume

| | |
|--------------------------------------|--------------|
| Tubing Diameter (in) | <u>3/16</u> |
| Length of Tubing (ft) | <u>5</u> |
| Borehole Diameter (in) | <u>2 3/8</u> |
| Height of Sand (in) | <u>12</u> |
| Purge Volume of Tubing (ml) | <u>46</u> |
| Purge Volume of Sandpack (ml) | <u>871</u> |
| Purge Volume of Tubing+Sandpack (ml) | <u>917</u> |

Implant As-Built Diagram

Depth of Materials

Land Surface



Soil Borehole Log

Unified Soil Classification System

ft
bls
0

Silt Sand w/ Gravel (SM) 5YR 5/6
Yellowish red, well graded sand
fine to v. coarse, gravel to 2cm,
50% sand, 35% silt 15% gravel
sub angular

~ 2 ft plastic bags, rubber w/
tire tread

Soil Gas Implant ID BNL-2013-14

Northing 3565489.06

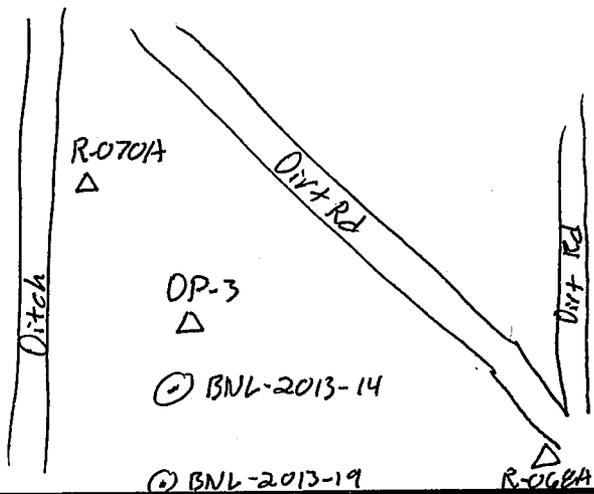
Logged By M. Busby

Easting 515480.95

Drilling Contractor Geo mechanics

Date/Time Installed 2/25/13

Implant Location Map



Purge Volume Calculation

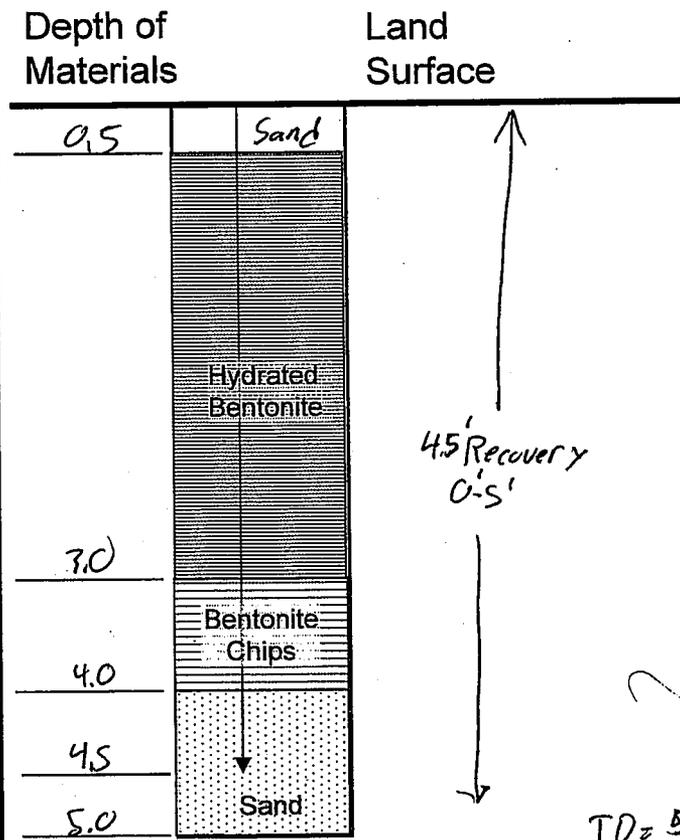
$$\text{Volume Tubing} = ((D_{\text{tube}}/2)^2 * 3.14 * (L_{\text{tube}} * 12)) * 16.3866$$

$$\text{Volume of Sandpack} = (D_{\text{bore}}/2)^2 * 3.14 * H_{\text{sandpack}} * 0.3 * 16.3866$$

Implant Purge Volume

| | |
|--------------------------------------|--------------|
| Tubing Diameter (in) | <u>3/16</u> |
| Length of Tubing (ft) | <u>5</u> |
| Borehole Diameter (in) | <u>2 3/8</u> |
| Height of Sand (in) | <u>12</u> |
| Purge Volume of Tubing (ml) | <u>46</u> |
| Purge Volume of Sandpack (ml) | <u>871</u> |
| Purge Volume of Tubing+Sandpack (ml) | <u>917</u> |

Implant As-Built Diagram



Soil Borehole Log

Unified Soil Classification System

ft
b/s
C

Silty Sand w/ Gravel (SM) SYR
 4/3 Reddish Brown, well graded Sand. fine to coarse. Gravel to 1cm 60% sand 30% silt 10% gravel sub-angular. Percentage of sand and silt fluctuates some from 1'-3'. No trash observed

Soil Gas Implant ID BNL-2013-15

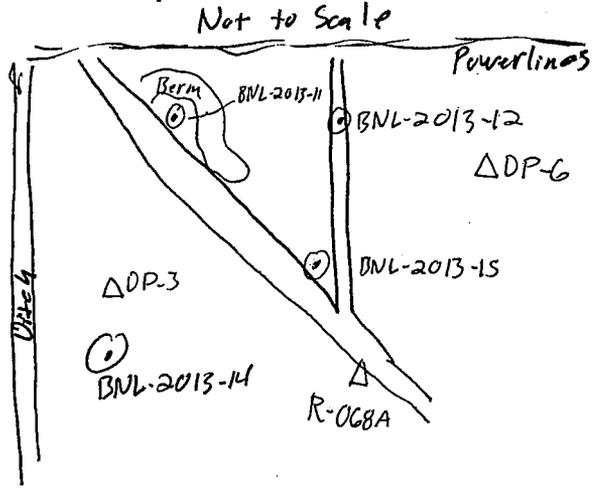
Logged By M. Busby
 Drilling Contractor GeoMechanics

Northing 3565549.67

Easting 515612.60

Date/Time Installed 2/25/13 14:10

Implant Location Map



Purge Volume Calculation

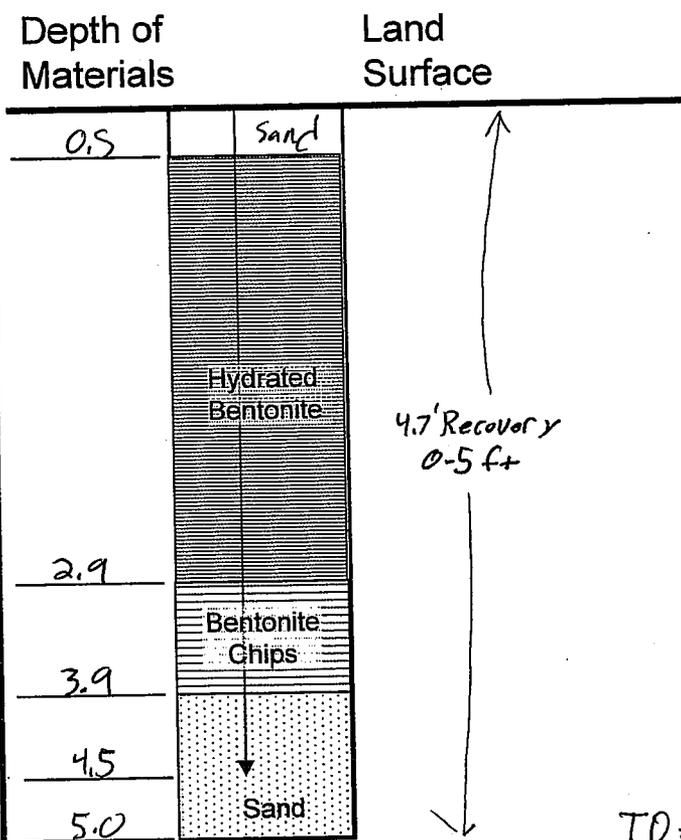
$$\text{Volume Tubing} = ((D_{\text{tube}}/2)^2 * 3.14 * (L_{\text{tube}} * 12) * 16.3866$$

$$\text{Volume of Sandpack} = (D_{\text{bore}}/2)^2 * 3.14 * H_{\text{sandpack}} * 0.3 * 16.3866$$

Implant Purge Volume

| | |
|--------------------------------------|--------------|
| Tubing Diameter (in) | <u>3/16</u> |
| Length of Tubing (ft) | <u>5</u> |
| Borehole Diameter (in) | <u>2 3/8</u> |
| Height of Sand (in) | <u>12</u> |
| Purge Volume of Tubing (ml) | <u>46</u> |
| Purge Volume of Sandpack (ml) | <u>871</u> |
| Purge Volume of Tubing+Sandpack (ml) | <u>917</u> |

Implant As-Built Diagram



Soil Borehole Log

Unified Soil Classification System

ft
bls

0 Silty Sand w/ Gravel (SM) 5YR
 5/6 yellowish Red Moderately sorted
 fine sand 50% sand 40% silt
 10% Gravel to com, sub-angular.

~ 2.5 increase ~~course~~ ^(MMS) grain size
 and gravel content 40% sand
 30% silt 30% gravel up to 2in
 color change to 5YR 5/3 reddish
 brown. No trash observed

TO = 5.0

Soil Gas Implant ID BNL-2013-16

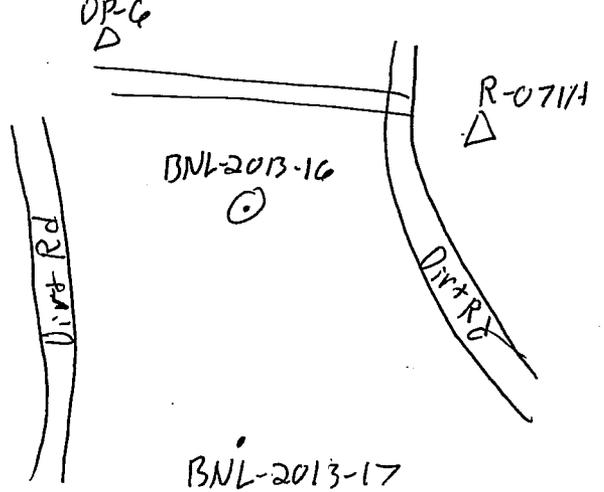
Northing 3565585.08

Logged By M. Busby
 Drilling Contractor Geo mechanics

Easting 515812.40

Date/Time Installed 2/25/13 1530

Implant Location Map



Purge Volume Calculation

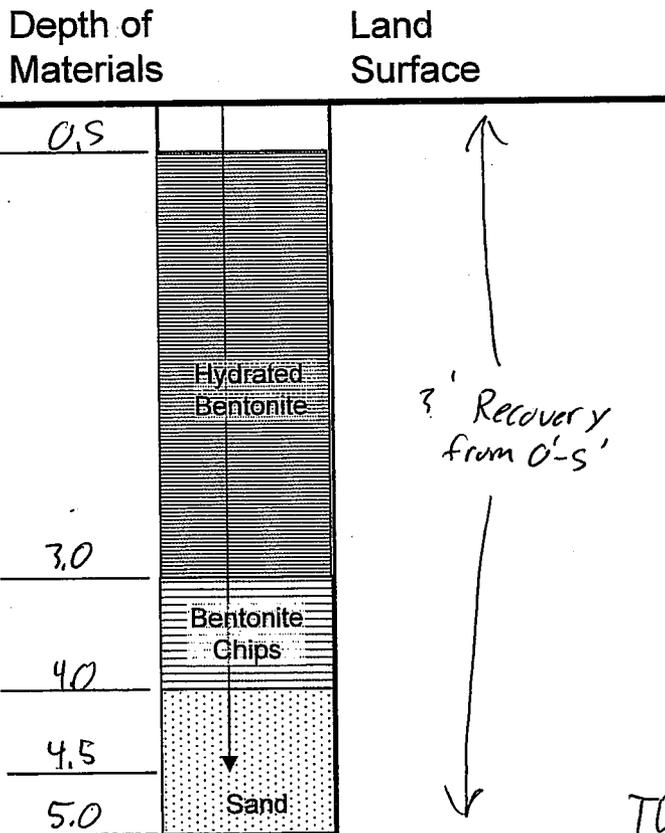
Volume Tubing = $((D_{\text{tube}}/2)^2 * 3.14 * (L_{\text{tube}} * 12) * 16.3866$

Volume of Sandpack = $(D_{\text{bore}}/2)^2 * 3.14 * H_{\text{sandpack}} * 0.3 * 16.3866$

Implant Purge Volume

| | |
|--------------------------------------|--------------|
| Tubing Diameter (in) | <u>3/16</u> |
| Length of Tubing (ft) | <u>5</u> |
| Borehole Diameter (in) | <u>2 3/8</u> |
| Height of Sand (in) | <u>12</u> |
| Purge Volume of Tubing (ml) | <u>46</u> |
| Purge Volume of Sandpack (ml) | <u>871</u> |
| Purge Volume of Tubing+Sandpack (ml) | <u>917</u> |

Implant As-Built Diagram



Soil Borehole Log

Unified Soil Classification System

ft
 bls
 0
 Gravelly Sand w/ trace fines (sw)
 5YR 4/1 Reddish Brown. 80% sand
 15% Gravel 5% silt well graded,
 sub-ang to subround fine to
 coarse sand, gravel to 1cm
 No Trash observed

TD =

Soil Gas Implant ID BNL-2013-17

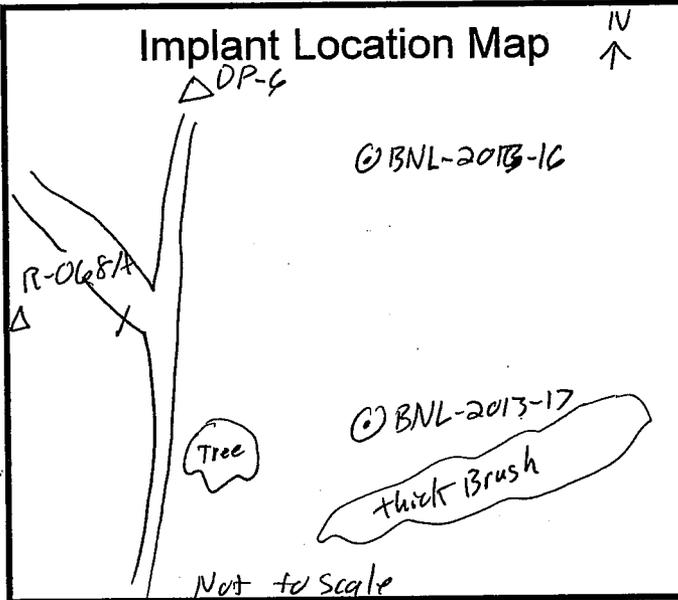
Northing 3565475.49

Logged By M. Busby

Easting 515814.54

Drilling Contractor GeoMechanics

Date/Time Installed 2/25/13 1545

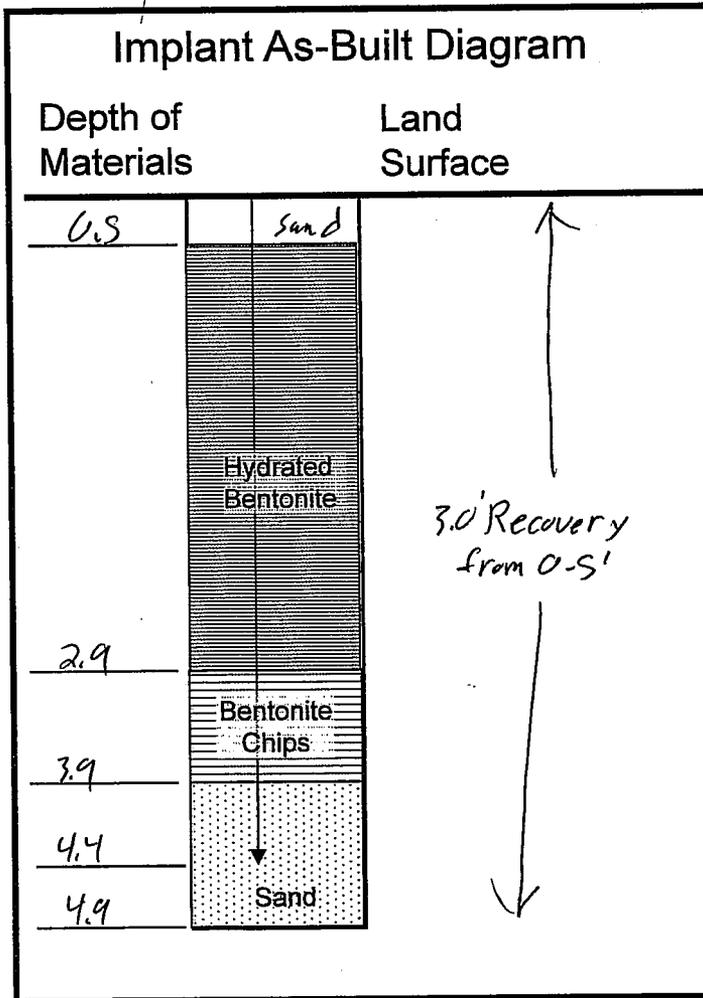


Purge Volume Calculation

Volume Tubing = $((D_{tube}/2)^2 * 3.14 * (L_{tube} * 12) * 16.3866$

Volume of Sandpack = $(D_{bore}/2)^2 * 3.14 * H_{sandpack} * 0.3 * 16.3866$

| Implant Purge Volume | |
|--------------------------------------|--------------|
| Tubing Diameter (in) | <u>3/16</u> |
| Length of Tubing (ft) | <u>5</u> |
| Borehole Diameter (in) | <u>2 3/8</u> |
| Height of Sand (in) | <u>12</u> |
| Purge Volume of Tubing (ml) | <u>46</u> |
| Purge Volume of Sandpack (ml) | <u>871</u> |
| Purge Volume of Tubing+Sandpack (ml) | <u>917</u> |



Soil Borehole Log

Unified Soil Classification System

ft
bls

0' Gravelly Sand (SW) 5YR 4/4
Reddish Brown, 80% sand 20% gravel, well graded, sub-angular gravel to 1cm

3' Trash- wood, rubber, newspapers

TD = 4.9'

Soil Gas Implant ID BNL-2013-18

Northing 3565418.53

Logged By M. Busby

Easting 515654.85

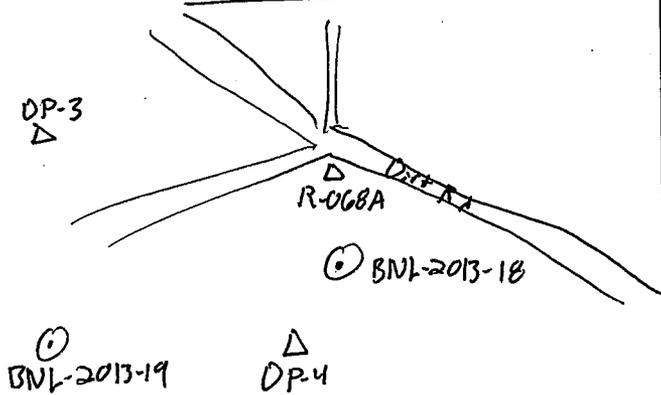
Drilling Contractor Geomechanics

Date/Time Installed 2/25/13 15:00

Implant Location Map



Not to Scale



Purge Volume Calculation

$$\text{Volume Tubing} = ((D_{\text{tube}}/2)^2 * 3.14 * (L_{\text{tube}} * 12) * 16.3866$$

$$\text{Volume of Sandpack} = (D_{\text{bore}}/2)^2 * 3.14 * H_{\text{sandpack}} * 0.3 * 16.3866$$

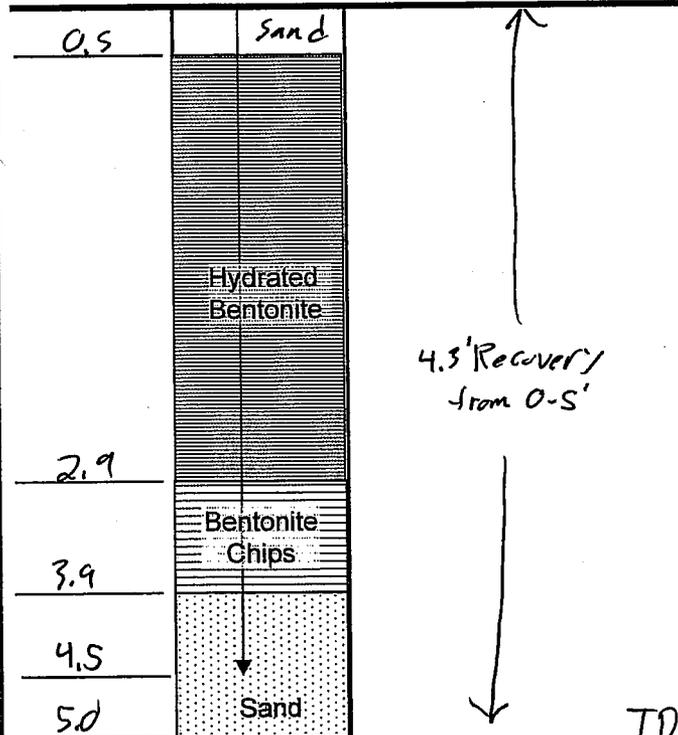
Implant Purge Volume

| | |
|--------------------------------------|--------------|
| Tubing Diameter (in) | <u>3/16</u> |
| Length of Tubing (ft) | <u>5</u> |
| Borehole Diameter (in) | <u>2 3/8</u> |
| Height of Sand (in) | <u>12</u> |
| Purge Volume of Tubing (ml) | <u>46</u> |
| Purge Volume of Sandpack (ml) | <u>871</u> |
| Purge Volume of Tubing+Sandpack (ml) | <u>917</u> |

Implant As-Built Diagram

Depth of Materials

Land Surface



Soil Borehole Log

Unified Soil Classification System

ft
bls

○ Silty Sand w/ Gravel (SM) SYR 4/3
 Reddish Brown 70% Sand 20% silt
 10% Gravel, well graded, gravel to
 2cm, sub-rnd to sub-ang
 No trash observed

Soil Gas Implant ID BNL-2013-19

Northing 3565364.94

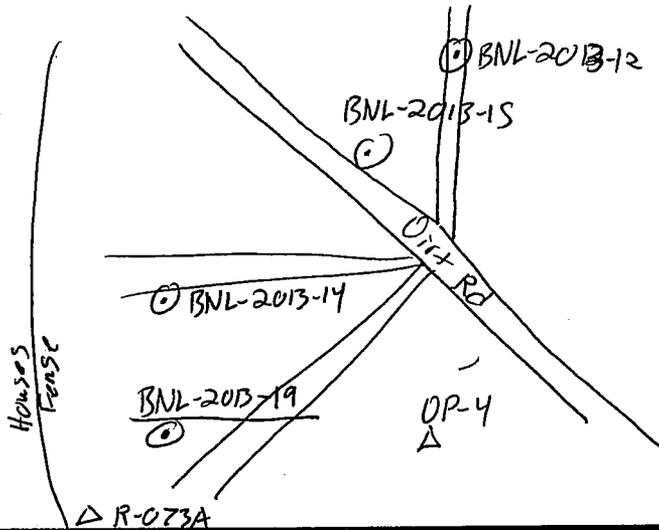
Logged By M. Busby

Easting 515562.25

Drilling Contractor Geo Mechanics

Date/Time Installed 2/25/13 1430

Implant Location Map



Purge Volume Calculation

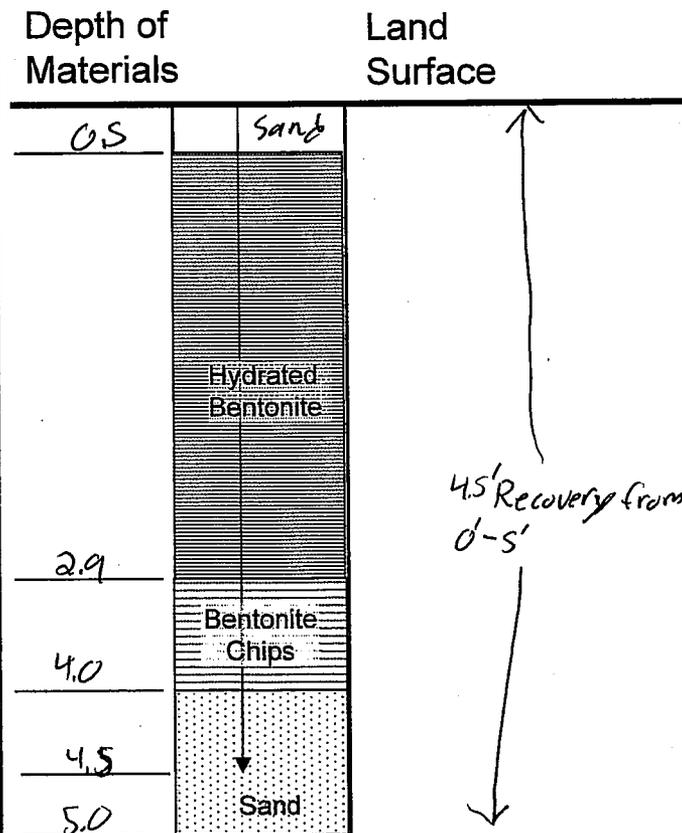
$$\text{Volume Tubing} = ((D_{\text{tube}}/2)^2 * 3.14 * (L_{\text{tube}} * 12) * 16.3866$$

$$\text{Volume of Sandpack} = (D_{\text{bore}}/2)^2 * 3.14 * H_{\text{sandpack}} * 0.3 * 16.3866$$

Implant Purge Volume

| | |
|--------------------------------------|--------------|
| Tubing Diameter (in) | <u>3/16</u> |
| Length of Tubing (ft) | <u>5</u> |
| Borehole Diameter (in) | <u>2 3/8</u> |
| Height of Sand (in) | <u>12</u> |
| Purge Volume of Tubing (ml) | <u>46</u> |
| Purge Volume of Sandpack (ml) | <u>871</u> |
| Purge Volume of Tubing+Sandpack (ml) | <u>917</u> |

Implant As-Built Diagram



Soil Borehole Log

Unified Soil Classification System

ft
bls

○ Gravelly Sand (sw) SYR slc
R. yellowish red. 80% sand 20% gravel, well graded gravel to 2mm. Sub angular, No trash observed.

4.5 - sandy clay (CL) SYR 3/3 Dark Reddish Brown 80% clay 20% sand
TD=5

Soil Gas Implant ID BNL-2013-20

Northing 3565275.63

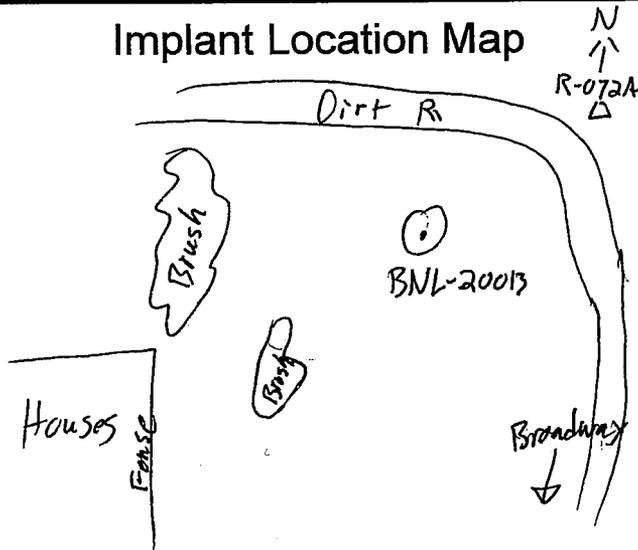
Logged By M. Busby

Easting 515828.09

Drilling Contractor Geomechanics

Date/Time Installed 2/25/13 16:10

Implant Location Map



Purge Volume Calculation

$$\text{Volume Tubing} = ((D_{\text{tube}}/2)^2 * 3.14 * (L_{\text{tube}} * 12)) * 16.3866$$

$$\text{Volume of Sandpack} = (D_{\text{bore}}/2)^2 * 3.14 * H_{\text{sandpack}} * 0.3 * 16.3866$$

Implant Purge Volume

| | |
|--------------------------------------|--------------|
| Tubing Diameter (in) | <u>3/16</u> |
| Length of Tubing (ft) | <u>5</u> |
| Borehole Diameter (in) | <u>2 3/8</u> |
| Height of Sand (in) | <u>12</u> |
| Purge Volume of Tubing (ml) | <u>46</u> |
| Purge Volume of Sandpack (ml) | <u>871</u> |
| Purge Volume of Tubing+Sandpack (ml) | <u>917</u> |

Implant As-Built Diagram

| Depth of Materials | Land Surface |
|--------------------|--------------------|
| 0.5 | Sand |
| 2.9 | Hydrated Bentonite |
| 3.9 | Bentonite Chips |
| 4.4 | Sand |
| 4.9 | Sand |

3.0' Recovery from 0-5'

Soil Borehole Log

Unified Soil Classification System

ft
bls

○ Gravelly Sand w/ trace silt (sw)
 SYR 4/4 Reddish Brown, 80% Sand 15% Gravel, 5% silt.
 well Graded Sand, Gravel to 2cm, sub-md to sub-ang

~3 Trash, glass, newspapers, plastic
 Gravel > 1in

TD = 4.9

ATTACHMENT D2
SOIL VAPOR SAMPLING FORMS
SHALLOW TEMPORARY SOIL GAS PROBES

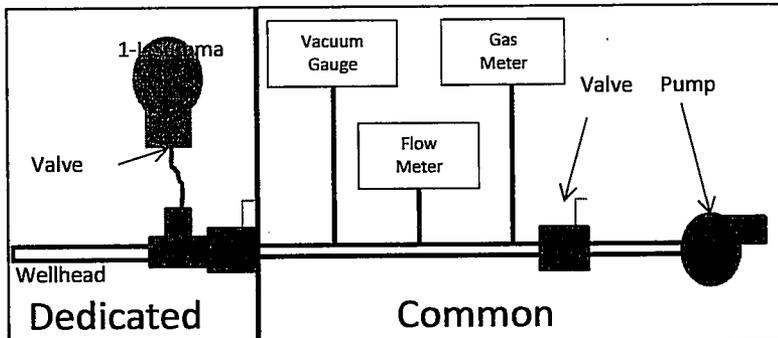
Soil Vapor Sampling Form - Summa Canisters

Well ID (depth): BSC-2013-61
 Site Location: Broadway, South Landfill
 Condition of Well: Good

Date: 3/1/13
 Samplers: MB + VNH
 QA Sample ID: BSC-2013-010

Purge Volume Calculation

Purge Volume (from SAP tables): 2751 mL Volume Purged Prior to Sample Collection: 3100 mL



Well Evacuation

| Time | Elapsed Time (minutes) | Purge Rate (mL/min) | Volume Purged (mL) | Vacuum (in. water) | Landfill Gas Concentrations | | |
|------|------------------------|---------------------|--------------------|--------------------|-----------------------------|-----|------|
| | | | | | CH4 | CO2 | O2 |
| 1231 | 0 | 200 | 0 | 0 | | | |
| 1236 | 5 | 200 | 1000 | 0 | 0.1 | 0.1 | 20.9 |
| 1241 | 10 | 200 | 2000 | 0 | 0.0 | 3.4 | 17.5 |
| 1246 | 15 | 200 | 3000 | 0 | 0.0 | 3.4 | 17.4 |
| | | | | | | | |

Sample Collection

QC Sample Collected: Yes No

| | | |
|--|--------------|--------------|
| Summa Canister Serial Number: | <u>A8741</u> | <u>A8729</u> |
| Summa Canister Lab Number: | <u>1273</u> | <u>1276</u> |
| Flow Regulator and Vacuum Gauge Serial Number: | <u>NA</u> | <u>NA</u> |
| Vacuum Pump Start Time | <u>1231</u> | |
| Vacuum Pump Stop Time | <u>1247</u> | |
| Open Summa Time | <u>1247</u> | <u>1247</u> |
| Close Summa Time | <u>1253</u> | <u>1253</u> |
| Pre-Fill Summa Canister Vacuum (in. Hg): | <u>-28</u> | <u>-28</u> |
| Post-Fill Summa Canister Vacuum (in. Hg): | <u>-1</u> | <u>-1</u> |
| Time Sample Collected | <u>1247</u> | <u>1300</u> |

Notes: Probe 3/16 in Dia X 5 ft (0.005454)((Dia(in))²)(L(ft))(28316.9 $\frac{m^2}{ft^3}$) = Vol
Dead 1/4 in Dia X 2 ft Probe Vol + Dead Vol + Bore Vol = Total Vol
Bore 2 3/8 in Dia X 1 ft Total Vol X 3 = Purge Vol

Sampler's Signature: [Signature]

Date: 3/1/13



Soil Vapor Sampling Form - Summa Canisters

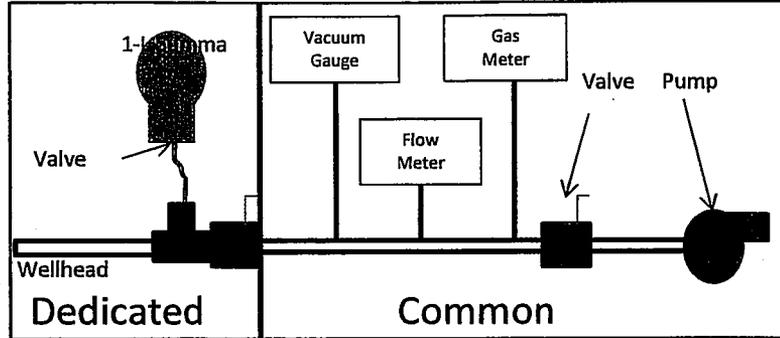
Well ID (depth): BSL-2013-02
 Site Location: Broadway South Milton
 Condition of Well: Good

Date: 2/26/13
 Samplers: MB + VNH
 QA Sample ID: NA

Purge Volume Calculation

Purge Volume (from SAP tables): 275 mL

Volume Purged Prior to Sample Collection: 3000 mL



Well Evacuation

| Time | Elapsed Time (minutes) | Purge Rate (mL/min) | Volume Purged (mL) | Vacuum (in. water) | Landfill Gas Concentrations | | |
|------|------------------------|---------------------|--------------------|--------------------|-----------------------------|-----|------|
| | | | | | CH4 | CO2 | O2 |
| 1155 | 0 | 250 | 0 | 0 | / | / | / |
| 1159 | 4 | 250 mL | 1000 | 0 | 0.1 | 2.4 | 17.6 |
| 1203 | 8 | 250 mL | 2000 | 0 | 0.2 | 2.3 | 17.8 |
| 1207 | 12 | 250 mL | 3000 | 0 | 0.1 | 2.3 | 17.9 |
| | | | | | | | |
| | | | | | | | |

Sample Collection

QC Sample Collected: Yes No

Summa Canister Serial Number: AS726
 Summa Canister Lab Number: 1281
 Flow Regulator and Vacuum Gauge Serial Number: 12
 Vacuum Pump Start Time: 1155
 Vacuum Pump Stop Time: 1207
 Open Summa Time: 1207
 Close Summa Time: 1216
 Pre-Fill Summa Canister Vacuum (in. Hg): -28
 Post-Fill Summa Canister Vacuum (in. Hg): -1
 Time Sample Collected: 1207

Notes: Probe $\frac{3}{16}$ in Dia X 5ft L $(0.005454) \cdot (\text{Dia (in)}^2) \cdot (L(ft)) \cdot (28316.9 \frac{\text{mL}}{\text{ft}^3}) = \text{Vol}$
 Dead Space $\frac{1}{4}$ in Dia X 2ft L Probe Vol + Dead Vol = Bore Vol = Total Vol
 Borehole $2\frac{3}{8}$ in Dia X 1ft L Total Vol X 3 = Purge Vol

Sampler's Signature: [Signature]

Date: 2/26/13



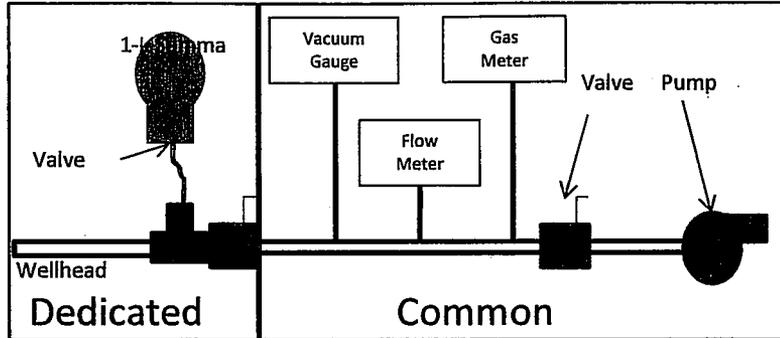
Soil Vapor Sampling Form - Summa Canisters

Well ID (depth): BSL-2013-03
 Site Location: Highway South Hill
 Condition of Well: Good

Date: 2/26/13
 Samplers: MB - VWJ
 QA Sample ID: BSL-2013-030

Purge Volume Calculation

Purge Volume (from SAP tables): 2751 mL Volume Purged Prior to Sample Collection: 3000 mL



Well Evacuation

| Time | Elapsed Time (minutes) | Purge Rate (mL/min) | Volume Purged (mL) | Vacuum (in. water) | Landfill Gas Concentrations | | |
|------|------------------------|---------------------|--------------------|--------------------|-----------------------------|-----|------|
| | | | | | CH4 | CO2 | O2 |
| 1054 | 0 | 250 | 0 | 0 | | | |
| 1058 | 4 | 250 | 1000 | 0 | 0.5 | 1.6 | 16.7 |
| 1102 | 8 | 250 | 2000 | 0 | 0.5 | 1.3 | 17.9 |
| 1106 | 12 | 250 | 3000 | 0 | 0.4 | 1.0 | 19.1 |
| | | | | | | | |
| | | | | | | | |

Sample Collection

QC Sample Collected: Yes No

| | | |
|--|-------------|--------------|
| Summa Canister Serial Number: | <u>2661</u> | <u>A7053</u> |
| Summa Canister Lab Number: | <u>283</u> | <u>954</u> |
| Flow Regulator and Vacuum Gauge Serial Number: | <u>NA</u> | <u>NA</u> |
| Vacuum Pump Start Time | <u>1054</u> | |
| Vacuum Pump Stop Time | <u>1106</u> | |
| Open Summa Time | <u>1106</u> | <u>1106</u> |
| Close Summa Time | <u>1112</u> | <u>1112</u> |
| Pre-Fill Summa Canister Vacuum (in. Hg): | <u>-26</u> | <u>-28</u> |
| Post-Fill Summa Canister Vacuum (in. Hg): | <u>-1</u> | <u>-4</u> |
| Time Sample Collected | <u>1106</u> | <u>1106</u> |

Notes: Probe $\frac{3}{16}$ in dia X 5ft L $(0.005454)(0.1875^2)(5)(28316.9 \frac{mL}{ft^3}) = Vol$
 Dead Space $\frac{1}{4}$ in dia X 2ft L $Vol_{Probe} + Vol_{Dead} + Vol_{Bore} = Vol_{Total}$
 Borehole $2\frac{3}{8}$ in dia X 1ft L $Vol_{Total} \times 3 = \underline{\underline{Purge Vol}}$

Sampler's Signature: [Signature]

Date: 2/26/13



Soil Vapor Sampling Form - Summa Canisters

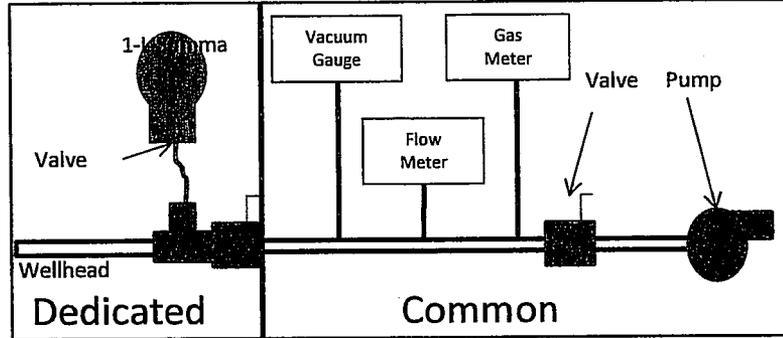
Well ID (depth): BSC-2013-01
 Site Location: BSL - Hilton West
 Condition of Well: Good

Date: 2/22/13
 Samplers: VNH + MB
 QA Sample ID: MA

Purge Volume Calculation

Purge Volume (from SAP tables): 3012 mL

Volume Purged Prior to Sample Collection: 3000 mL



Well Evacuation

| Time | Elapsed Time (minutes) | Purge Rate (mL/min) | Volume Purged (mL) | Vacuum (in. water) | Landfill Gas Concentrations | | |
|------|------------------------|---------------------|--------------------|--------------------|-----------------------------|-----|------|
| | | | | | CH4 | CO2 | O2 |
| 1457 | 0 | 200 | 0 | 0 | | | |
| 1502 | 5 | 200 | 1000 | 0 | 0.3 | 0.2 | 21.8 |
| 1507 | 10 | 200 | 2000 | 0 | 0.3 | 0.1 | 21.9 |
| 1512 | 15 | 200 | 3000 | 0 | 0.3 | 0.1 | 21.9 |
| | | | | | | | |
| | | | | | | | |

Sample Collection

QC Sample Collected: Yes No

Summa Canister Serial Number: A16621
 Summa Canister Lab Number: 744
 Flow Regulator and Vacuum Gauge Serial Number: 1007002119
 Vacuum Pump Start Time: 1457
 Vacuum Pump Stop Time: 1512
 Open Summa Time: 1512
 Close Summa Time: 1519
 Pre-Fill Summa Canister Vacuum (in. Hg): -26
 Post-Fill Summa Canister Vacuum (in. Hg): -1
 Time Sample Collected: 1512

Notes:
 .1875 in = Probe Dia
 5 ft = Probe L
 .25 in = Dead Dia
 2 ft = Dead L
 2.375 in = Borehole Dia
 1.7 ft = Borehole L

$(.005454)(\text{Dia})^2(L)(28316.9) = \text{Volume}$
 $(\text{Probe Vol} + \text{Dead Vol} + \text{Borehole Vol}) = \text{Total Vol}$
 $\text{Total Vol} \times 3 = \text{Purge Vol}$

Stemmler 2/22/13

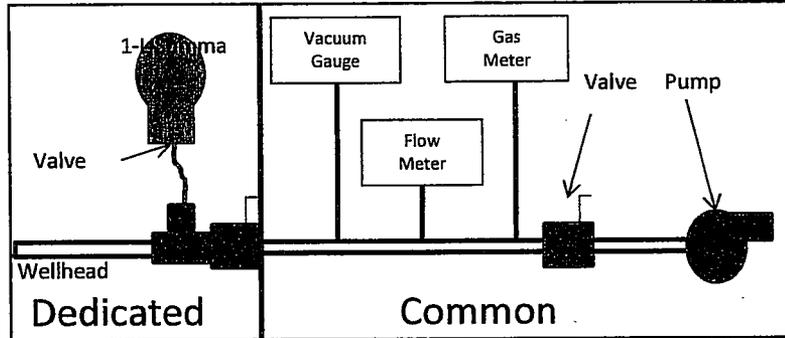
Soil Vapor Sampling Form - Summa Canisters

Well ID (depth): BSL-2013-05
 Site Location: BSL - Hilton West
 Condition of Well: Good

Date: 2/22/13
 Samplers: AB/VNT
 QA Sample ID: BSL-2013-050

Purge Volume Calculation

Purge Volume (from SAP tables): 3012 mL Volume Purged Prior to Sample Collection: 3000 mL



Well Evacuation

| Time | Elapsed Time (minutes) | Purge Rate (mL/min) | Volume Purged (mL) | Vacuum (in. water) | Landfill Gas Concentrations | | |
|------|------------------------|---------------------|--------------------|--------------------|-----------------------------|-----|------|
| | | | | | CH4 | CO2 | O2 |
| 1550 | 0 | 200 | 0 | 0 | / | / | / |
| 1555 | 5 | 200 | 1000 | 0 | 0.2 | 1.1 | 20.5 |
| 1600 | 10 | 200 | 2000 | 0 | 0.1 | 1.1 | 20.3 |
| 1605 | 15 | 200 | 3000 | 0 | 0.1 | 1.1 | 20.3 |
| | | | | | | | |
| | | | | | | | |

Sample Collection

QC Sample Collected: Yes No

| | | | |
|--|--------------|--------------|--|
| Summa Canister Serial Number: | <u>A8604</u> | <u>A8574</u> | |
| Summa Canister Lab Number: | <u>1212</u> | <u>1224</u> | |
| Flow Regulator and Vacuum Gauge Serial Number: | <u>NA</u> | <u>NA</u> | |
| Vacuum Pump Start Time | <u>1550</u> | | |
| Vacuum Pump Stop Time | <u>1605</u> | | |
| Open Summa Time | <u>1605</u> | <u>1605</u> | |
| Close Summa Time | <u>1612</u> | <u>1612</u> | |
| Pre-Fill Summa Canister Vacuum (in. Hg): | <u>-27</u> | <u>-27</u> | |
| Post-Fill Summa Canister Vacuum (in. Hg): | <u>-4</u> | <u>0</u> | |
| Time Sample Collected | <u>1605</u> | <u>1605</u> | |

Notes:

| | |
|--------------------------------|---|
| <u>0.1875 in = Probe Dia</u> | <u>$(0.005454) (Dia)^2 (L) (28316.9) = Vol$</u> |
| <u>5 ft = Probe L</u> | <u>$(Probe Vol + Dead Vol + Borehole Vol) = Total Vol$</u> |
| <u>0.25 in = Dead Dia</u> | <u>$Total Vol \times 3 = Purge Vol$</u> |
| <u>2 ft = Dead L</u> | |
| <u>2.375 in = Borehole Dia</u> | |
| <u>1.1 ft = Borehole L</u> | |

[Signature] 2/22/13

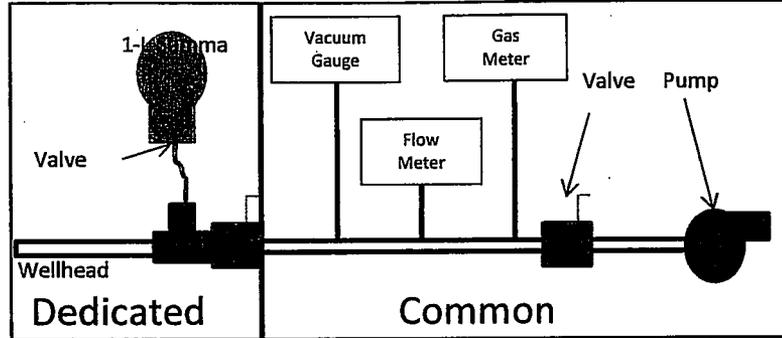
Soil Vapor Sampling Form - Summa Canisters

Well ID (depth): BNL-2013-06 (54)
 Site Location: Broadway North Landfill
 Condition of Well: Good

Date: 2/27/13
 Samplers: VNT + MB
 QA Sample ID: NA

Purge Volume Calculation

Purge Volume (from SAP tables): 2751 mL Volume Purged Prior to Sample Collection: 3000 mL



Well Evacuation

| Time | Elapsed Time (minutes) | Purge Rate (mL/min) | Volume Purged (mL) | Vacuum (in. water) | Landfill Gas Concentrations | | |
|------|------------------------|---------------------|--------------------|--------------------|-----------------------------|-----|------|
| | | | | | CH4 | CO2 | O2 |
| 0907 | 0 | 250 | 0 | 0 | / | / | / |
| 0911 | 4 | 250 | 1000 | 0 | 0.1 | 3.4 | 18.0 |
| 0915 | 8 | 250 | 2000 | 0 | 0.0 | 3.9 | 16.8 |
| 0919 | 12 | 250 | 3000 | 0 | 0.0 | 3.6 | 17.9 |
| | | | | | | | |
| | | | | | | | |

Sample Collection

QC Sample Collected: Yes No

Summa Canister Serial Number: A8719
 Summa Canister Lab Number: 1269
 Flow Regulator and Vacuum Gauge Serial Number: NA
 Vacuum Pump Start Time: 0907
 Vacuum Pump Stop Time: 0919
 Open Summa Time: 0920
 Close Summa Time: 0929
 Pre-Fill Summa Canister Vacuum (in. Hg): -27
 Post-Fill Summa Canister Vacuum (in. Hg): -1
 Time Sample Collected: 0920

Notes: Probe $\frac{3}{16}$ " Dia X 5' L $(0.005454)(\text{Dia}(\text{in})^2)(L(\text{ft}))(28316.9 \frac{\text{mL}}{\text{ft}^3}) = \text{Vol}$
 Dead $\frac{1}{4}$ " Dia X 2' L ProbeVol \times DeadVol + BoreVol = TotalVol
 Bore $\frac{23}{8}$ " Dia X 1' L TotalVol \times 3 = PurgeVol

Sampler's Signature: [Signature]

Date: 2/27/13



Soil Vapor Sampling Form - Summa Canisters

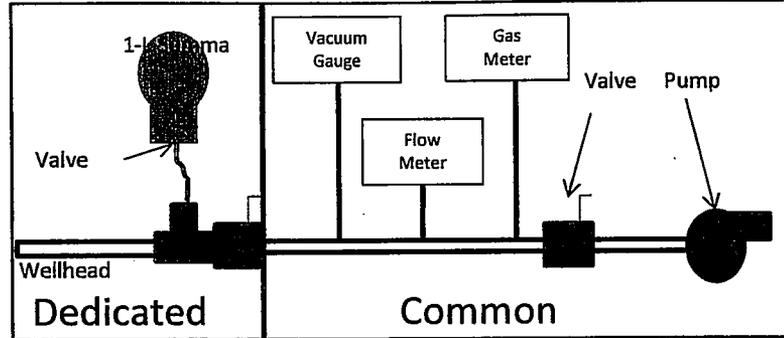
Well ID (depth): BNL-2013-07 5ft
 Site Location Broadway North Landfill
 Condition of Well: Good

Date: 3/1/13
 Samplers: VNA + MB
 QA Sample ID: NA

Purge Volume Calculation

Purge Volume (from SAP tables): 2751 mL

Volume Purged Prior to Sample Collection: 3000 mL



Well Evacuation

| Time | Elapsed Time (minutes) | Purge Rate (mL/min) | Volume Purged (mL) | Vacuum (in. water) | Landfill Gas Concentrations | | |
|------|------------------------|---------------------|--------------------|--------------------|-----------------------------|-----|------|
| | | | | | CH4 | CO2 | O2 |
| 0741 | 0 | 250 | 0 | 0 | / | / | / |
| 0745 | 4 | 250 | 1000 | 0 | 0.1 | 2.0 | 20.6 |
| 0749 | 8 | 250 | 2000 | 0 | 0.2 | 2.0 | 20.8 |
| 0753 | 12 | 250 | 3000 | 0 | 0.2 | 1.9 | 21.0 |
| | | | | | | | |
| | | | | | | | |

Sample Collection

QC Sample Collected: Yes No

Summa Canister Serial Number: A8710
 Summa Canister Lab Number: 1205
 Flow Regulator and Vacuum Gauge Serial Number: 1007002095
 Vacuum Pump Start Time: 0741
 Vacuum Pump Stop Time: 0753
 Open Summa Time: 0753
 Close Summa Time: 0759
 Pre-Fill Summa Canister Vacuum (in. Hg): -27
 Post-Fill Summa Canister Vacuum (in. Hg): -1
 Time Sample Collected: 0753

Notes: Probe $\frac{3}{16}$ in Dia X 5 ft L $(0.0054154)(\text{Dia (in)})^2(L(ft))(28316.9 \frac{\text{mL}}{\text{ft}^3})$
 Dead $\frac{1}{4}$ in Dia X 2 ft L Probe Vol + Dead Vol + Bore Vol = Total Vol
 Bore $2\frac{3}{8}$ in Dia X 1 ft L Total Vol X 3 = Purge Vol

Sampler's Signature: [Signature]

Date: 3/1/13



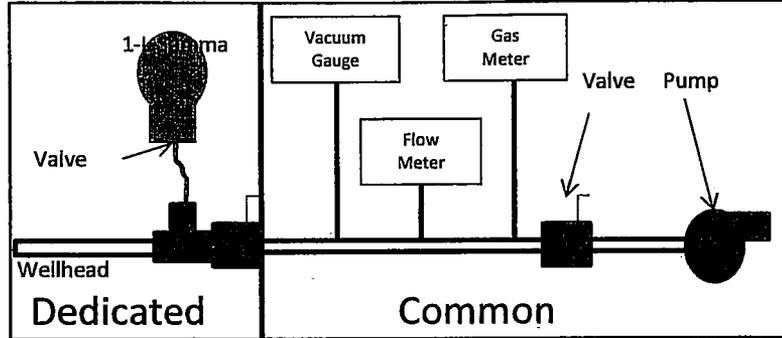
Soil Vapor Sampling Form - Summa Canisters

Well ID (depth): BNL-2013-078 (5ft)
 Site Location: Broadway North Landfill
 Condition of Well: Good

Date: 3/1/13
 Samplers: MB + VNT
 QA Sample ID: NA

Purge Volume Calculation

Purge Volume (from SAP tables): 2751 mL Volume Purged Prior to Sample Collection: 3000 mL



Well Evacuation

| Time | Elapsed Time (minutes) | Purge Rate (mL/min) | Volume Purged (mL) | Vacuum (in. water) | Landfill Gas Concentrations | | |
|------|------------------------|---------------------|--------------------|--------------------|-----------------------------|-----|------|
| | | | | | CH4 | CO2 | O2 |
| 0818 | 0 | 250 mL | 0 | 0 | / | / | / |
| 0822 | 4 | 250 | 1000 | 0 | 0.5 | 5.9 | 15.7 |
| 0826 | 8 | 250 | 2000 | 0 | 0.5 | 5.8 | 15.8 |
| 0830 | 12 | 250 | 3000 | 0 | 0.4 | 5.9 | 15.6 |
| | | | | | | | |
| | | | | | | | |

Sample Collection

QC Sample Collected: Yes No

Summa Canister Serial Number: A8737
 Summa Canister Lab Number: 1270
 Flow Regulator and Vacuum Gauge Serial Number: NA
 Vacuum Pump Start Time: 0818
 Vacuum Pump Stop Time: 0830
 Open Summa Time: 0830
 Close Summa Time: 0837
 Pre-Fill Summa Canister Vacuum (in. Hg): -27
 Post-Fill Summa Canister Vacuum (in. Hg): -1
 Time Sample Collected: 0830

Notes: Probe $\frac{3}{16}$ in Dia \times 5 ft $(0.005454)(\text{Dia (in)}^2)(L(\text{ft}))(28316.9 \frac{\text{mL}}{\text{ft}^3}) = \text{Vol}$
 Dead $\frac{1}{4}$ in Dia \times 2 ft $\text{Probe Vol} + \text{Dead Vol} + \text{Bore Vol} = \text{Total Vol}$
 Bore $2\frac{3}{8}$ in Dia \times 1 ft $\text{Total Vol} \times 3 = \text{Purge Vol}$

Sampler's Signature: [Signature]

Date: 3/1/13



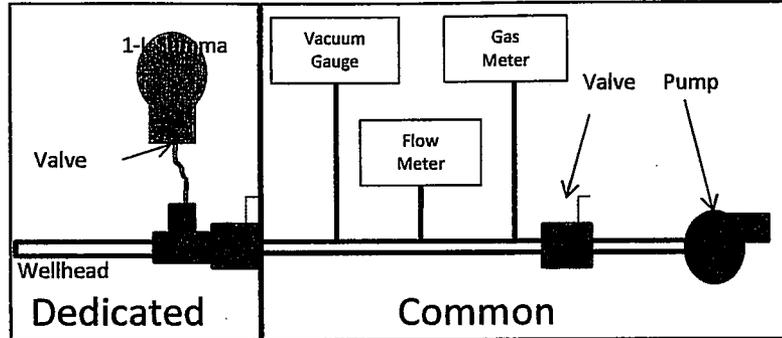
Soil Vapor Sampling Form - Summa Canisters

Well ID (depth): BNL-2013-10 (5ft)
 Site Location: Broadway North Landfill
 Condition of Well: Good

Date: 3/1/13
 Samplers: MB+VNT
 QA Sample ID: BNL-2013-100

Purge Volume Calculation

Purge Volume (from SAP tables): 2751 mL Volume Purged Prior to Sample Collection: 3000 mL



Well Evacuation

| Time | Elapsed Time (minutes) | Purge Rate (mL/min) | Volume Purged (mL) | Vacuum (in. water) | Landfill Gas Concentrations | | |
|-----------------|------------------------|---------------------|--------------------|--------------------|-----------------------------|-----|------|
| | | | | | CH4 | CO2 | O2 |
| 0900 | 0 | 250 | 0 | 0 | / | / | / |
| 0904 | 4 | 250 | 1000 | 0 | 0.1 | 3.8 | 18.2 |
| 0910 | 9 | 200 | 2000 | 0 | 0.1 | 2.4 | 19.8 |
| 0915 | 14 | 200 | 3000 | 0 | 0.1 | 2.4 | 19.5 |
| | | | | | | | |
| | | | | | | | |

Sample Collection

QC Sample Collected: Yes No

Summa Canister Serial Number: A8740 A6609
 Summa Canister Lab Number: 1268 731
 Flow Regulator and Vacuum Gauge Serial Number: NA NA
 Vacuum Pump Start Time: 0900
 Vacuum Pump Stop Time: 0915
 Open Summa Time: 0915 0915
 Close Summa Time: 0922 0922
 Pre-Fill Summa Canister Vacuum (in. Hg): -27 -28
 Post-Fill Summa Canister Vacuum (in. Hg): -1 -1
 Time Sample Collected: 0915 0915

Notes: Probe $\frac{3}{16}$ in Dia X 5 ft $(0.005454)(\text{Dia (in)})^2(L \text{ ft})(28316.9 \frac{\text{mL}}{\text{ft}^3}) = \text{Vol}$
 Dead $\frac{1}{4}$ in Dia X 2 ft Probe Vol + Dead Vol + Bore Vol = Total Vol
 Bore $\frac{23}{8}$ in Dia X 1 ft Total Vol X 3 = Purge Vol

Sampler's Signature: [Signature]

Date: 3/1/13



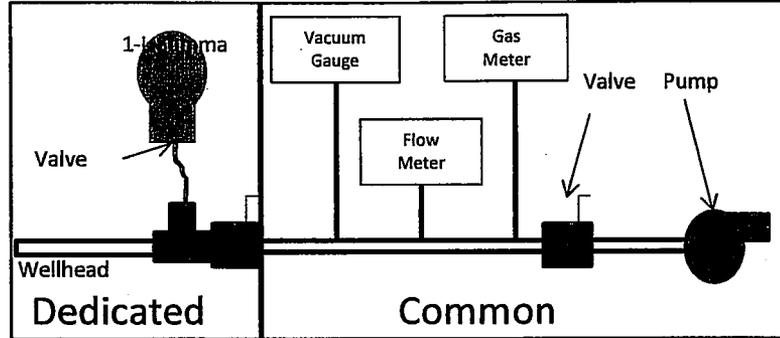
Soil Vapor Sampling Form - Summa Canisters

Well ID (depth): BNL-2013-11 (5A)
 Site Location: Broadway North Landfill
 Condition of Well: Good

Date: 2/26/13
 Samplers: MB + UNH
 QA Sample ID: NA

Purge Volume Calculation

Purge Volume (from SAP tables): 2751 mL Volume Purged Prior to Sample Collection: 3000 mL



Well Evacuation

| Time | Elapsed Time (minutes) | Purge Rate (mL/min) | Volume Purged (mL) | Vacuum (in. water) | Landfill Gas Concentrations | | |
|------|------------------------|---------------------|--------------------|--------------------|-----------------------------|-----|------|
| | | | | | CH4 | CO2 | O2 |
| 1340 | 0 | 250 | 0 | 0 | / | / | / |
| 1344 | 4 | 250 | 1000 | 0 | 5.4 | 4.4 | 14.7 |
| 1348 | 8 | 250 | 2000 | 0 | 4.8 | 4.1 | 15.3 |
| 1352 | 12 | 250 | 3000 | 0 | 4.6 | 3.9 | 15.6 |
| | | | | | | | |
| | | | | | | | |

Sample Collection

QC Sample Collected: Yes No

Summa Canister Serial Number: A7981
 Summa Canister Lab Number: 927
 Flow Regulator and Vacuum Gauge Serial Number: 1007002157
 Vacuum Pump Start Time: 1340
 Vacuum Pump Stop Time: 1352
 Open Summa Time: 1353
 Close Summa Time: 1401
 Pre-Fill Summa Canister Vacuum (in. Hg): -27
 Post-Fill Summa Canister Vacuum (in. Hg): -1
 Time Sample Collected: 1353

Notes: Probe $\frac{3}{16}$ " Dia X 5ft L $(0.005454)((\text{Dia in})^2)(L(ft))(28316.9 \frac{\text{mL}}{\text{ft}^3}) = \text{Vol}$
 Dead $\frac{1}{4}$ " Dia X 2ft L ProbeVol + DeadVol + BoreVol = Total Vol
 Bore $2\frac{3}{16}$ " Dia X 1ft L TotalVol X 3 = PurgeVol

Sampler's Signature: [Signature]

Date: 2/26/13



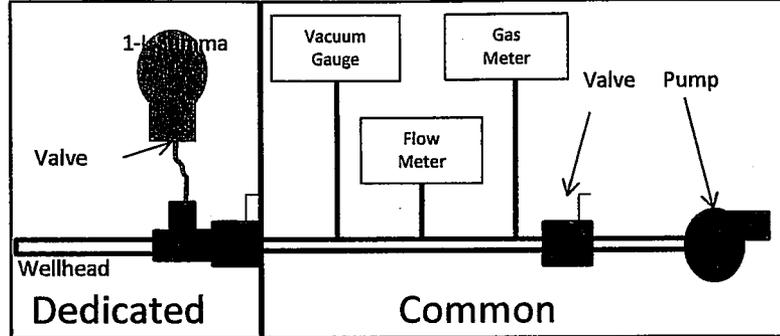
Soil Vapor Sampling Form - Summa Canisters

Well ID (depth): BNL-2013-12 (5ft)
 Site Location: Broadway North Landfill
 Condition of Well: Good

Date: 2/26/13
 Samplers: MB + VNH
 QA Sample ID: NA

Purge Volume Calculation

Purge Volume (from SAP tables): 2751 mL Volume Purged Prior to Sample Collection: 3000 mL



Well Evacuation

| Time | Elapsed Time (minutes) | Purge Rate (mL/min) | Volume Purged (mL) | Vacuum (in. water) | Landfill Gas Concentrations | | |
|------|------------------------|---------------------|--------------------|--------------------|-----------------------------|-----|------|
| | | | | | CH4 | CO2 | O2 |
| 1255 | 0 | 250 | 0 | 0 | / | / | / |
| 1259 | 4 | 250 | 1000 | 0 | 0.2 | 2.2 | 18.8 |
| 1303 | 8 | 250 | 2000 | 0 | 0.3 | 2.2 | 18.7 |
| 1307 | 12 | 250 | 3000 | 0 | 0.3 | 2.2 | 18.7 |
| | | | | | | | |
| | | | | | | | |

Sample Collection

QC Sample Collected: Yes No

Summa Canister Serial Number: A8738
 Summa Canister Lab Number: 1274
 Flow Regulator and Vacuum Gauge Serial Number: 1004606313
 Vacuum Pump Start Time: 1255
 Vacuum Pump Stop Time: 1307
 Open Summa Time: 1307
 Close Summa Time: 1319
 Pre-Fill Summa Canister Vacuum (in. Hg): -30
 Post-Fill Summa Canister Vacuum (in. Hg): -1
 Time Sample Collected: 1307

Notes: Probe $\frac{3}{16}$ " Dia X 5 ft L $(0.005454)(\text{Dia (in)}^2)(L(\text{ft}))(28316.9 \frac{\text{mL}}{\text{ft}^3}) = \text{Vol}$
 Dead $\frac{1}{4}$ " Dia X 2 ft L Probe Vol + Dead Vol + Bore Vol = Total Vol
 Bore $2\frac{3}{8}$ " Dia X 1 ft L Total Vol X 3 = Purge Vol

Sampler's Signature: [Signature]

Date: 2/26/13



Soil Vapor Sampling Form - Summa Canisters

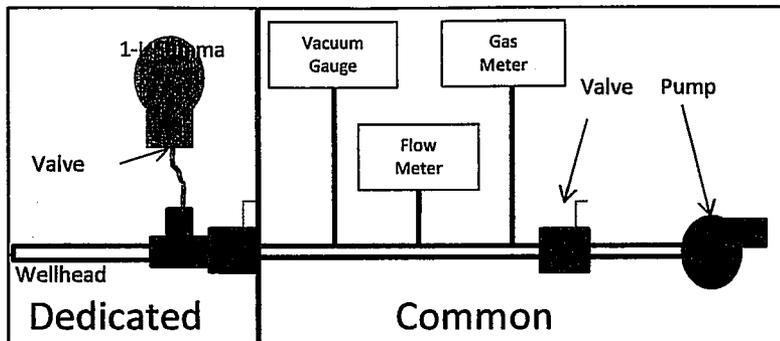
Well ID (depth): BNL-2013-13
 Site Location: Broadway North Landfill
 Condition of Well: Good

Date: 3/1/13
 Samplers: MB + VU4
 QA Sample ID: NA

Purge Volume Calculation

Purge Volume (from SAP tables): 2751 mL

Volume Purged Prior to Sample Collection: 3000 mL



Well Evacuation

| Time | Elapsed Time (minutes) | Purge Rate (mL/min) | Volume Purged (mL) | Vacuum (in. water) | Landfill Gas Concentrations | | |
|------|------------------------|---------------------|--------------------|--------------------|-----------------------------|-----|------|
| | | | | | CH4 | CO2 | O2 |
| 0938 | 0 | 200 | 0 | 0 | / | / | / |
| 0943 | 5 | 200 | 1000 | 0 | 0.1 | 0.5 | 20.8 |
| 0948 | 10 | 200 | 2000 | 0 | 0.1 | 0.5 | 20.4 |
| 0953 | 15 | 200 | 3000 | 0 | 0.1 | 0.5 | 19.8 |
| | | | | | | | |
| | | | | | | | |

Sample Collection

QC Sample Collected: Yes No

Summa Canister Serial Number: 2641
 Summa Canister Lab Number: 311
 Flow Regulator and Vacuum Gauge Serial Number: NA
 Vacuum Pump Start Time: 0938
 Vacuum Pump Stop Time: 0954
 Open Summa Time: 0954
 Close Summa Time: 1000
 Pre-Fill Summa Canister Vacuum (in. Hg): -28
 Post-Fill Summa Canister Vacuum (in. Hg): -1
 Time Sample Collected: 0954

Notes: Probe $\frac{3}{16}$ " Dia X 5 ft L $(0.005454)(\text{Dia}(\text{in})^2)(L(\text{ft}))(28316.9 \frac{\text{mL}}{\text{ft}^3}) = \text{Vol}$
 Dead $\frac{1}{4}$ " Dia X 2 ft L Probe Vol + Dead Vol + Bore Vol = Total Vol
 Bore $\frac{23}{8}$ " Dia X 1 ft L Total Vol X 3 = Purge Vol

Sampler's Signature: [Signature]

Date: 3/1/13



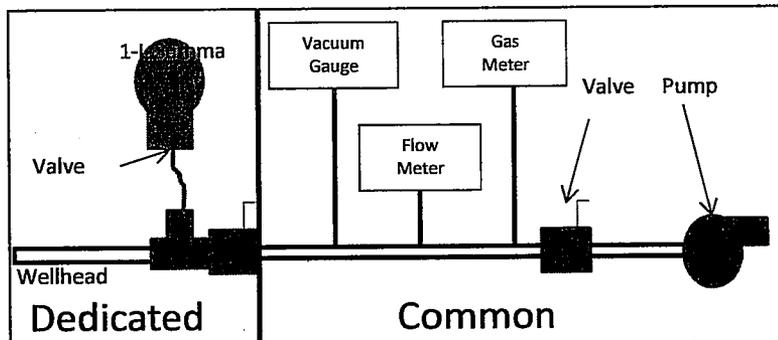
Soil Vapor Sampling Form - Summa Canisters

Well ID (depth): BNL-203-14 (5ft)
 Site Location: Broadway North Landfill
 Condition of Well: Good

Date: 3/1/13
 Samplers: MB + VWT
 QA Sample ID: NA

Purge Volume Calculation

Purge Volume (from SAP tables): 2751 mL Volume Purged Prior to Sample Collection: 3000 mL



Well Evacuation

| Time | Elapsed Time (minutes) | Purge Rate (mL/min) | Volume Purged (mL) | Vacuum (in. water) | Landfill Gas Concentrations | | |
|------|------------------------|---------------------|--------------------|--------------------|-----------------------------|-----|------|
| | | | | | CH4 | CO2 | O2 |
| 1017 | 0 | 200 | 0 | 0 | | | |
| 1022 | 5 | 200 | 1000 | 0 | 1.1 | 0.9 | 19.8 |
| 1027 | 10 | 200 | 2000 | 0 | 1.5 | 1.2 | 19.3 |
| 1032 | 15 | 200 | 3000 | 0 | 1.7 | 1.4 | 19.2 |
| | | | | | | | |

Sample Collection

QC Sample Collected: Yes No

Summa Canister Serial Number: A8725
 Summa Canister Lab Number: 1277
 Flow Regulator and Vacuum Gauge Serial Number: NA
 Vacuum Pump Start Time: 1017
 Vacuum Pump Stop Time: 1032
 Open Summa Time: 1032
 Close Summa Time: 1038
 Pre-Fill Summa Canister Vacuum (in. Hg): -27
 Post-Fill Summa Canister Vacuum (in. Hg): -1
 Time Sample Collected: 1032

Notes: Probe $\frac{3}{16}$ " Dia X 5ft L $(0.005454)(\text{Dia}(\text{in})^2)(L(\text{ft}))(\frac{\text{mL}}{\text{ft}^3}) = \text{Vol}$
 Dead $\frac{1}{4}$ " Dia X 2ft L $\text{Probe Vol} + \text{Dead Vol} + \text{Bore Vol} = \text{Total Vol}$
 Bore $2\frac{3}{8}$ " Dia X 1ft L $\text{Total Vol} \times 3 = \text{Purge Vol}$

Sampler's Signature: [Signature]

Date: 3/1/13



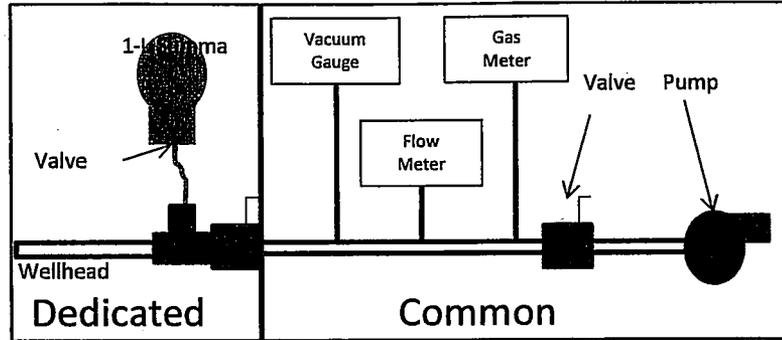
Soil Vapor Sampling Form - Summa Canisters

Well ID (depth): BNL-2013-15 (5ft)
 Site Location: Broadway North Lan Gill
 Condition of Well: Good

Date: 2/26/13
 Samplers: MR + WJ
 QA Sample ID: NA

Purge Volume Calculation

Purge Volume (from SAP tables): 2751 mL Volume Purged Prior to Sample Collection: 3000 mL



Well Evacuation

| Time | Elapsed Time (minutes) | Purge Rate (mL/min) | Volume Purged (mL) | Vacuum (in. water) | Landfill Gas Concentrations | | |
|------|------------------------|---------------------|--------------------|--------------------|-----------------------------|-----|------|
| | | | | | CH4 | CO2 | O2 |
| 1421 | 0 | 250 mL | 0 | 0 | / | / | / |
| 1425 | 4 | 250 | 1000 | 0 | 0.3 | 0.9 | 20.4 |
| 1429 | 8 | 250 | 2000 | 0 | 0.3 | 0.9 | 20.5 |
| 1433 | 12 | 250 | 3000 | 0 | 0.3 | 0.9 | 20.6 |
| | | | | | | | |
| | | | | | | | |

Sample Collection

QC Sample Collected: Yes No

Summa Canister Serial Number: A16603
 Summa Canister Lab Number: 734
 Flow Regulator and Vacuum Gauge Serial Number: NA
 Vacuum Pump Start Time: 1421
 Vacuum Pump Stop Time: 1433
 Open Summa Time: 1433
 Close Summa Time: 1440
 Pre-Fill Summa Canister Vacuum (in. Hg): -27
 Post-Fill Summa Canister Vacuum (in. Hg): -1
 Time Sample Collected: 1433

Notes: Probe $\frac{3}{16}$ " Dia \times 5 ft L $(0.005454) \cdot (\text{Dia (in)}^2) \cdot (\text{L (ft)}) \cdot (28316.9 \frac{\text{mL}}{\text{ft}^3}) = \text{Vol}$
 Dead $\frac{1}{4}$ " Dia \times 2 ft L $\text{Probe Vol} + \text{Dead Vol} + \text{Bore Vol} = \text{Total Vol}$
 Bore $\frac{23}{8}$ " Dia \times 1 ft L $\text{Total Vol} \times 3 = \text{Purge Vol}$

Sampler's Signature: [Signature]

Date: 2/26/13



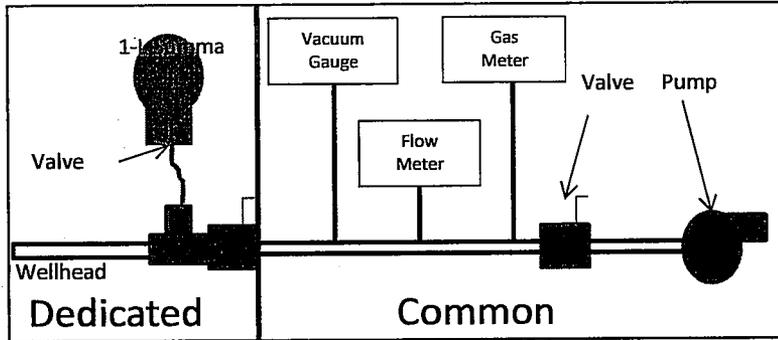
Soil Vapor Sampling Form - Summa Canisters

Well ID (depth): BNL-2013-16
 Site Location: Broadway North Landfill
 Condition of Well: Good

Date: 3/1/13
 Samplers: UB+VNT
 QA Sample ID: NA

Purge Volume Calculation

Purge Volume (from SAP tables): 2751 mL Volume Purged Prior to Sample Collection: 3000 mL



Well Evacuation

| Time | Elapsed Time (minutes) | Purge Rate (mL/min) | Volume Purged (mL) | Vacuum (in. water) | Landfill Gas Concentrations | | |
|------|------------------------|---------------------|--------------------|--------------------|-----------------------------|-----|------|
| | | | | | CH4 | CO2 | O2 |
| 1139 | 0 | 200 | 0 | 0 | / | / | / |
| 1144 | 5 | 200 | 1000 | 0 | 0.1 | 2.0 | 19.7 |
| 1149 | 10 | 200 | 2000 | 0 | 0.0 | 2.0 | 19.7 |
| 1154 | 15 | 200 | 3000 | 0 | 0.0 | 2.0 | 19.5 |
| | | | | | | | |

Sample Collection

QC Sample Collected: Yes No

Summa Canister Serial Number: A8708
 Summa Canister Lab Number: 1275
 Flow Regulator and Vacuum Gauge Serial Number: NA
 Vacuum Pump Start Time: 1139
 Vacuum Pump Stop Time: 1154
 Open Summa Time: 1154
 Close Summa Time: 1202
 Pre-Fill Summa Canister Vacuum (in. Hg): -27
 Post-Fill Summa Canister Vacuum (in. Hg): -1
 Time Sample Collected: 1154

Notes: Probe $\frac{3}{16}$ in Dia X 15 ft $(0.005454)(\text{Dia/in})^2(L/ft)(28316.9 \frac{\text{mL}}{\text{ft}^3}) = \text{Vol}$
 Dead $\frac{1}{4}$ in Dia X 2 ft $-\text{Probe Vol} + \text{Dead Vol} + \text{Pore Vol} = \text{Total Vol}$
 Pore $2\frac{3}{8}$ in Dia X 1 ft $\text{Total Vol} \times 3 = \text{Purge Vol}$

Sampler's Signature: [Signature]

Date: 3/1/13



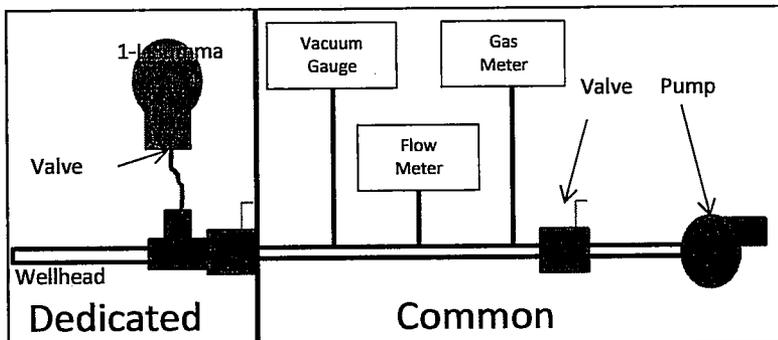
Soil Vapor Sampling Form - Summa Canisters

Well ID (depth): BNL-2013-17
 Site Location: Broadway North Landfill
 Condition of Well: Good

Date: 3/1/13
 Samplers: MS + VMT
 QA Sample ID: NA

Purge Volume Calculation

Purge Volume (from SAP tables): 2751 mL Volume Purged Prior to Sample Collection: 3000 mL



Well Evacuation

| Time | Elapsed Time (minutes) | Purge Rate (mL/min) | Volume Purged (mL) | Vacuum (in. water) | Landfill Gas Concentrations | | |
|------|------------------------|---------------------|--------------------|--------------------|-----------------------------|-----|------|
| | | | | | CH4 | CO2 | O2 |
| 1058 | 0 | 200 | 0 | 0 | / | / | / |
| 1103 | 5 | 200 | 1000 | 0 | 0.3 | 3.6 | 17.8 |
| 1108 | 10 | 200 | 2000 | 0 | 0.3 | 3.7 | 17.4 |
| 1113 | 15 | 200 | 3000 | 0 | 0.3 | 3.4 | 17.4 |
| | | | | | | | |

Sample Collection

QC Sample Collected: Yes No

Summa Canister Serial Number: A8722
 Summa Canister Lab Number: 1266
 Flow Regulator and Vacuum Gauge Serial Number: NA
 Vacuum Pump Start Time: 1058
 Vacuum Pump Stop Time: 1113
 Open Summa Time: 1113
 Close Summa Time: 1120
 Pre-Fill Summa Canister Vacuum (in. Hg): -28
 Post-Fill Summa Canister Vacuum (in. Hg): -1
 Time Sample Collected: 1113

Notes: Probe $\frac{3}{16}$ in Dia X 5 ft $(0.005454) \cdot ((\text{Dia}(\text{in}))^2 \cdot L(\text{ft})) \cdot (8316.9 \frac{\text{m}^3}{\text{ft}^3}) = \text{Vol}$
 Dead $\frac{1}{4}$ in Dia X 2 ft $\text{Probe Vol} + \text{Dead Vol} + \text{Bore Vol} = \text{Total Vol}$
 Bore $\frac{23}{8}$ in Dia X 1 ft $\text{Total Vol} \times 3 = \text{Purge Vol}$

Sampler's Signature: [Signature]

Date: 3/1/13



Soil Vapor Sampling Form - Summa Canisters

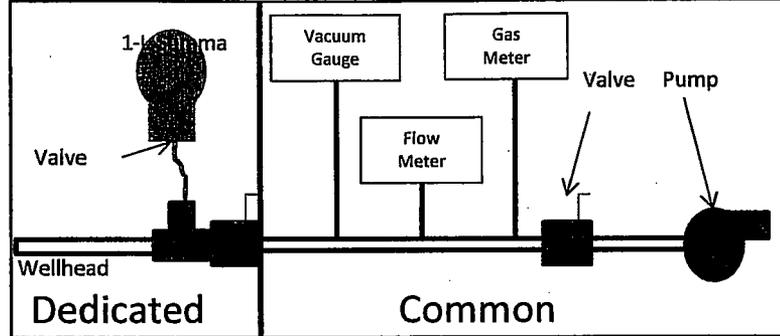
Well ID (depth): BNL-2013-18 (5ft)
 Site Location: Broadway North Landfill
 Condition of Well: Good

Date: 2/26/13
 Samplers: MB-VN-1
 QA Sample ID: NA

Purge Volume Calculation

Purge Volume (from SAP tables): 2751ml

Volume Purged Prior to Sample Collection: 3000ml



Well Evacuation

| Time | Elapsed Time (minutes) | Purge Rate (ml/min) | Volume Purged (mL) | Vacuum (in. water) | Landfill Gas Concentrations | | |
|------|------------------------|---------------------|--------------------|--------------------|-----------------------------|-----|------|
| | | | | | CH4 | CO2 | O2 |
| 1458 | 0 | 250 | 0 | 0 | | | |
| 1502 | 4 | 250 | 1000 | 0 | 0.2 | 3.1 | 17.7 |
| 1506 | 8 | 250 | 2000 | 0 | 0.2 | 3.1 | 17.7 |
| 1510 | 12 | 250 | 3000 | 0 | 0.2 | 3.1 | 17.8 |
| | | | | | | | |
| | | | | | | | |

Sample Collection

QC Sample Collected: Yes No

Summa Canister Serial Number: A8211
 Summa Canister Lab Number: 1063
 Flow Regulator and Vacuum Gauge Serial Number: 3
 Vacuum Pump Start Time: 1458
 Vacuum Pump Stop Time: 1510
 Open Summa Time: 1510
 Close Summa Time: 1516
 Pre-Fill Summa Canister Vacuum (in. Hg): -27
 Post-Fill Summa Canister Vacuum (in. Hg): -1
 Time Sample Collected: 1510

Notes: Probe $\frac{3}{16}$ " Dia X 5 ft L $(0.005454)((\text{Dia}(\text{in}))^2)(L(\text{ft}))(28316.9 \frac{\text{m}^3}{\text{ft}^3}) = \text{Vol}$
 Dead $\frac{1}{4}$ " Dia X 2 ft L Probe Vol + Dead Vol + Bore Vol = Total Vol
 Bore $2\frac{3}{8}$ " Dia X 1 ft L Total Vol X 3 = Purge Vol

Sampler's Signature: [Signature]

Date: 2/26/13



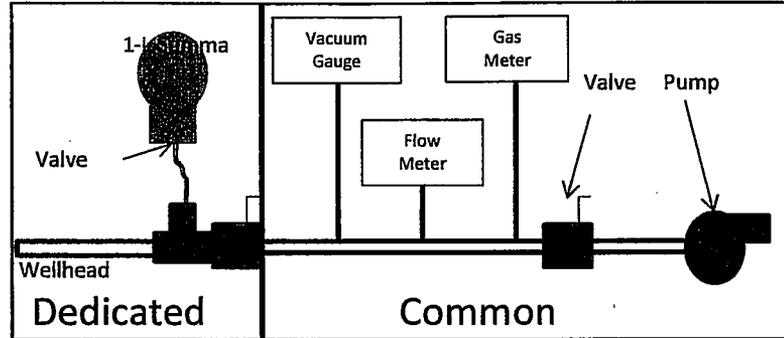
Soil Vapor Sampling Form - Summa Canisters

Well ID (depth): BNL-2013-19 (5ft)
 Site Location: Broadway North Landfill
 Condition of Well: Good

Date: 2/26/13
 Samplers: WT + MB
 QA Sample ID: NA

Purge Volume Calculation

Purge Volume (from SAP tables): 2751 mL Volume Purged Prior to Sample Collection: 5000 mL



Well Evacuation

| Time | Elapsed Time (minutes) | Purge Rate (mL/min) | Volume Purged (mL) | Vacuum (in. water) | Landfill Gas Concentrations | | |
|------|------------------------|---------------------|--------------------|--------------------|-----------------------------|-----|------|
| | | | | | CH4 | CO2 | O2 |
| 1615 | 0 | 250 | 0 | 0 | / | / | / |
| 1619 | 4 | 250 | 1000 | 0 | 1.4 | 5.5 | 14.7 |
| 1623 | 8 | 250 | 2000 | 0 | 1.4 | 5.5 | 14.5 |
| 1627 | 12 | 250 | 3000 | 0 | 1.4 | 5.4 | 14.8 |
| 1645 | 0 | 250 | 4500 | 0 | 1.1 | 4.1 | 16.5 |

Sample Collection

"- LOW "

QC Sample Collected: Yes No

| | | | |
|--|-------------|--------------|--|
| Summa Canister Serial Number: | <u>NA</u> | <u>A7955</u> | |
| Summa Canister Lab Number: | <u>359</u> | <u>931</u> | |
| Flow Regulator and Vacuum Gauge Serial Number: | <u>NA</u> | <u>NA</u> | |
| Vacuum Pump Start Time | <u>1615</u> | <u>1639</u> | |
| Vacuum Pump Stop Time | <u>1627</u> | <u>1647</u> | |
| Open Summa Time | <u>1628</u> | <u>1647</u> | |
| Close Summa Time | <u>1631</u> | <u>1653</u> | |
| Pre-Fill Summa Canister Vacuum (in. Hg): | <u>-16</u> | <u>-27</u> | |
| Post-Fill Summa Canister Vacuum (in. Hg): | <u>-1</u> | <u>-1</u> | |
| Time Sample Collected | <u>1628</u> | <u>1647</u> | |

Notes: Probe $\frac{3}{16}$ " Dia x 5 ft L $(0.005454)(\text{Dia}(\text{in}))^2(L(\text{ft}))(28316.9 \frac{\text{mL}}{\text{ft}^3}) = \text{Vol}$
 Dead $\frac{1}{4}$ " Dia x 2 ft L $\text{Vol}_{\text{probe}} + \text{Vol}_{\text{dead}} + \text{Vol}_{\text{bore}} = \text{Vol Total}$
 Bore $2\frac{3}{8}$ " Dia x 1 ft L $\text{Vol Total} \times 3 = \text{Purge Vol}$

Sampler's Signature: [Signature]

Date: 2/26/13



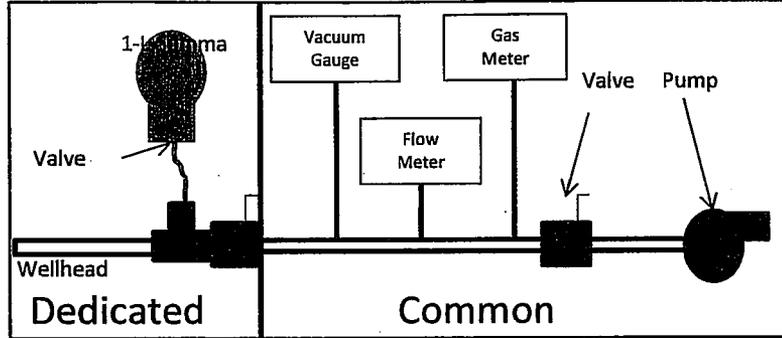
Soil Vapor Sampling Form - Summa Canisters

Well ID (depth): BNL-2013-20 (5ft)
 Site Location: Broadway Landfill North
 Condition of Well: Good

Date: 2/26/13
 Samplers: VJH & MB
 QA Sample ID: NA

Purge Volume Calculation

Purge Volume (from SAP tables): 2751 mL Volume Purged Prior to Sample Collection: 3000 mL



Well Evacuation

| Time | Elapsed Time (minutes) | Purge Rate (mL/min) | Volume Purged (mL) | Vacuum (in. water) | Landfill Gas Concentrations | | |
|------|------------------------|---------------------|--------------------|--------------------|-----------------------------|-----|------|
| | | | | | CH4 | CO2 | O2 |
| 1533 | 0 | 250 | 0 | 0 | | | |
| 1537 | 4 | 250 | 1000 | 0 | 0.2 | 6.1 | 14.5 |
| 1541 | 8 | 250 | 2000 | 0 | 0.2 | 6.0 | 14.7 |
| 1545 | 12 | 250 | 3000 | 0 | 0.3 | 6.0 | 14.6 |
| | | | | | | | |
| | | | | | | | |

Sample Collection

QC Sample Collected: Yes No

Summa Canister Serial Number: AG582
 Summa Canister Lab Number: 1220
 Flow Regulator and Vacuum Gauge Serial Number: NA
 Vacuum Pump Start Time: 1533
 Vacuum Pump Stop Time: 1545
 Open Summa Time: 1545
 Close Summa Time: 1552
 Pre-Fill Summa Canister Vacuum (in. Hg): -27
 Post-Fill Summa Canister Vacuum (in. Hg): -1
 Time Sample Collected: 1545

Notes: Probe $\frac{3}{16}$ " Dia X 5 ft L $(0.005454)(\text{Dia (in)}^2)(L(ft))(28816.9 \frac{\text{mL}}{\text{ft}^3}) = \text{Vol}$
 Dead $\frac{1}{4}$ " Dia X 2 ft L Probe Vol + Dead Vol + Bore Vol = Total Vol
 Bore $2\frac{3}{8}$ " Dia X 1 ft L Total Vol X 3 = Purge Vol

Sampler's Signature: [Signature]

Date: 2/26/13



ATTACHMENT D3
PHOTOGRAPHS
SHALLOW TEMPORARY SOIL GAS PROBE
INSTALLATION AND SAMPLING

Attachment D3 - Photographs Shallow Temporary Soil Gas Probes

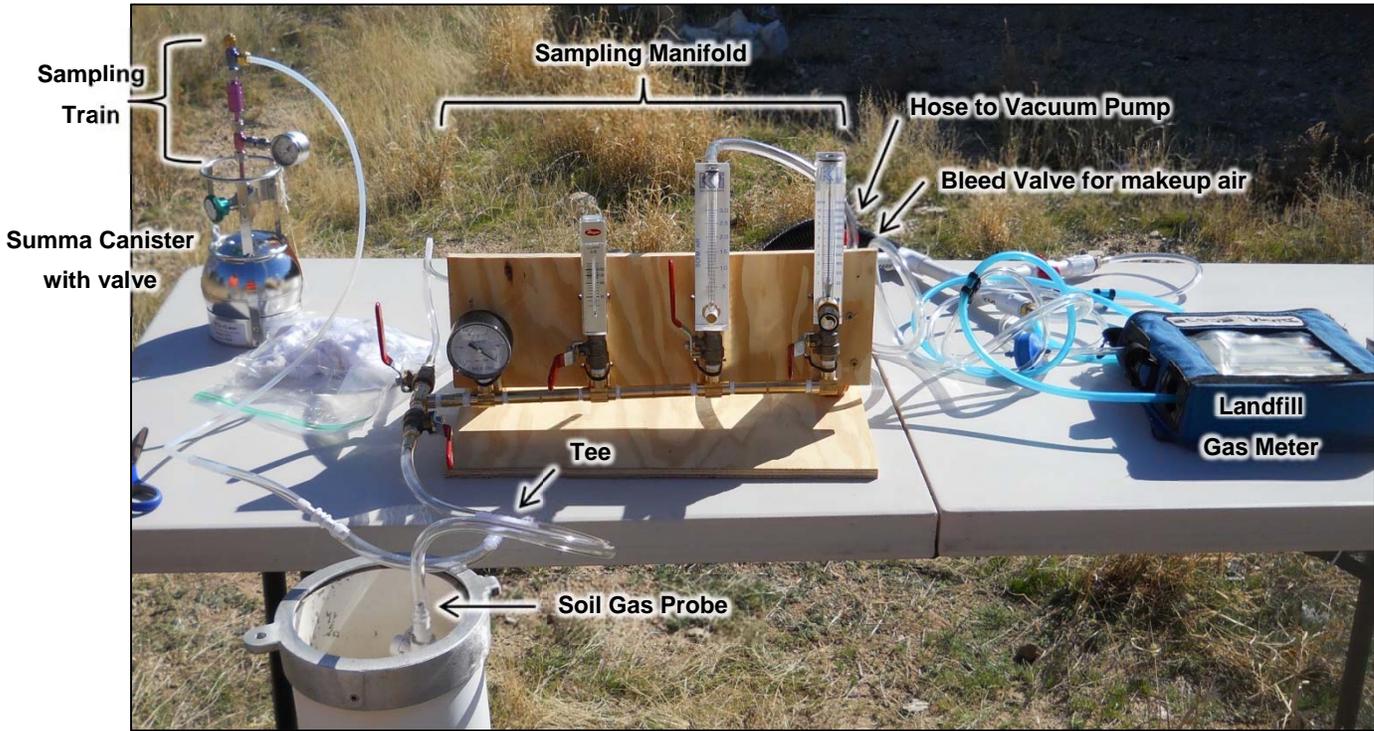
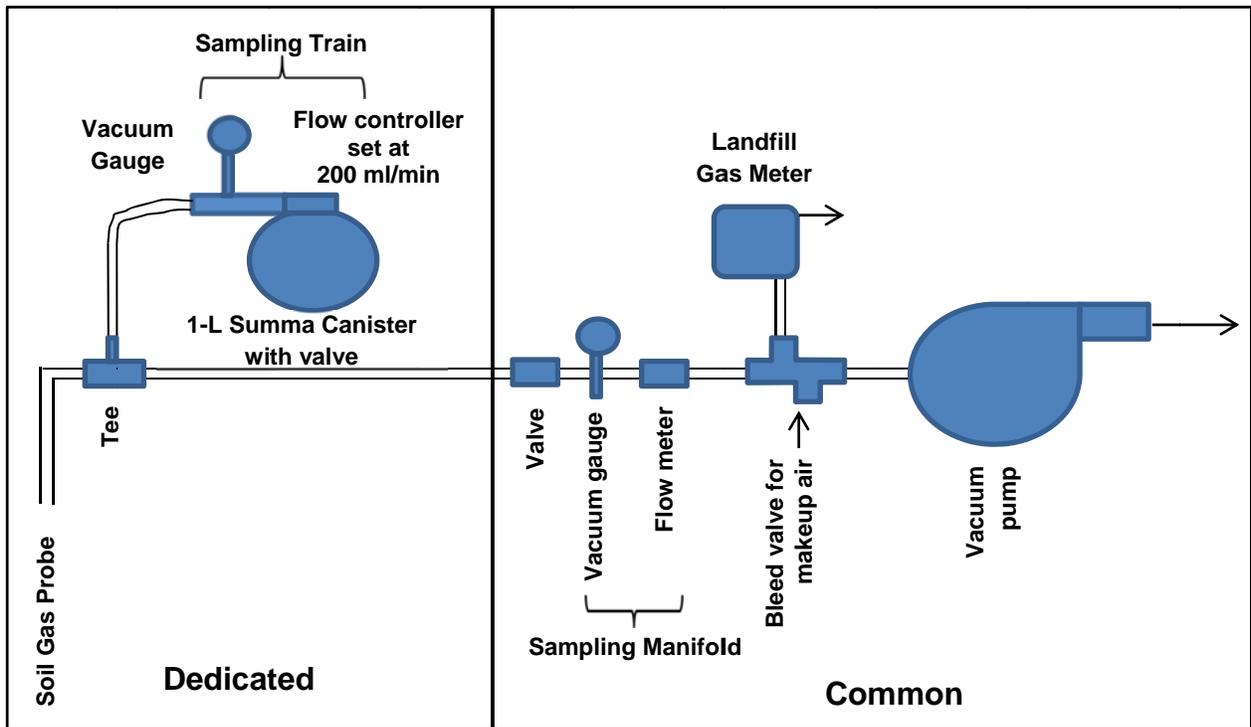


Photo of Soil Gas Sampling System



Schematic Drawing of Soil Gas Sampling System

Attachment D3 - Photographs Shallow Temporary Soil Gas Probes



Shallow temporary soil gas probe installation (February 21, 2013)



Acrylic liners with material removed during probe installation (February 21, 2013)

Attachment F3 - Photographs Shallow Temporary Soil Gas Probe Installation and Sampling



BNL-2013-16 (Feb 26, 2013)



BNL-2013-10 (Feb 26, 2013)



BNL-2013-18 (Feb 26, 2013)



BSL-2013-02 (Feb 26, 2013)



BSL-2013-03 (Feb 26, 2013)



BNL-2013-09 (Feb 26, 2013)