APPENDIX C

METHANE PROBE MONITORING REPORT, BROADWAY SOUTH LANDFILL BROADWAY-PANTANO WQARF SITE, LANDFILL OPERABLE UNIT TUCSON, ARIZONA

APPENDIX C

METHANE PROBE MONITORING REPORT

Broadway South Landfill Broadway-Pantano WQARF Site Landfill Operable Unit Tucson, Arizona

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ATTACHMENTS

- Attachment C1 Soil Vapor Sampling Forms Methane Probes 2013
- Attachment C2 Photographs Methane Probe Sampling

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 document the collection and analyses of soil gas samples from shallow methane probes. The methane probes are located at the former Broadway South Landfill (BSL). The objectives of the soil gas monitoring were:

- To evaluate potential vapor intrusion risk to offsite receptors at Broadway Proper Retirement Community, the YMCA, Kenyon Terrace, and onsite vapor exposure at Gollob Park.
- To evaluate whether soil equivalent concentrations¹ of volatile organic compounds (VOCs) exceed Arizona Soil Remediation Levels (SRLs) (ADEQ, 2007).
- To compare soil equivalent concentrations with minimum Groundwater Protection Levels (GPLs) (ADEQ, 1996, revised 2008) to evaluate risk to groundwater.

VOC concentrations in soil gas at BSL (and associated VOC concentrations in groundwater below BSL) have generally been lower than those at Broadway North Landfill (BNL). Shallow landfill gas (LFG) mitigation systems operate at the site to mitigate offsite migration and possible intrusion of methane into buildings. Additional background information can be found in the main text of this RI report.

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 soil gas purging and sampling from methane probes located at BSL. Field activities were performed by Clear Creek and documented in field notebooks (Appendix J of this RI report) and Soil Vapor Sampling Forms (Attachment C1).

2.1 SITE AND SAMPLING LOCATIONS

Soil gas samples were collected from the following probes at BSL:

- MW-5 monitoring probe at 14.6 feet below land surface (bls)²
- MW-6 monitoring probe (depth of screen interval unknown)
- MW-7 monitoring probe at 18.5 feet bls²
- MW-8 monitoring probe at 18.5 feet bls²
- MW-9 monitoring probe at 19.4 feet bls²
- PRUD-1 monitoring probe (depth of screen interval unknown)
- PRUD-2 monitoring probe (depth of screen interval unknown)
- PRUD-3 monitoring probe (depth of screen interval unknown)
- PRUD-4 monitoring probe at 9.8 feet bls²
- PRUD-5 monitoring probe at 30.5 feet bls²
- PRUD-6 monitoring probe at 29.7 feet bls²
- PRUD-16 monitoring probes at 15 and 25 feet bls
- PRUD-17 monitoring probes at 10 and 25 feet bls
- PRUD-18 monitoring probes at 10 and 25 feet bls
- PRUD-19 monitoring probes at 10 and 25 feet bls
- PRUD-20 monitoring probes at 10 and 25 feet bls

The locations of these probes are shown on Figure C1. Construction information is provided in Appendix B of this RI report.

2.2 ACCESS

ADEQ contacted the property owners and obtained access to the monitoring probes.

² Depth was measured on May 10, 2013 by Clear Creek and ADEQ. Possible obstructions may have been present, causing inaccurate measurements.

2.3 **PERMITTING**

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 gas probes. PDEQ said that, based on the very small volume of effluent, there were no permitting or treatment requirements.

2.4 SAMPLING METHODOLOGY

The methane probes at BSL were purged and sampled using the methodology described in the RI Work Plan (Clear Creek, 2013). Photographs and a schematic drawing of the sampling systems are included in Attachment C2.

2.4.1 Soil Gas Purging

The methane probes at BSL were purged using a Stinger® 2.5 gallon wet/dry vacuum pump (Model WD20250) capable of pumping 48 cubic feet per minute (ft³/min). During purging, the vacuum, flow rate, estimated purge volume, and other pertinent field observations were monitored and recorded on the Soil Vapor Sampling Forms (Attachment C1). In addition, 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. 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 C1 shows the LFG concentrations measured prior to 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. Because of the large purge volume of these probes, the default purging rate of 200 milliliters per minute (ml/min), as recommended by the ADEQ Soil Vapor Sampling Guidance document (2011), would result in excessive (longer than one hour) purge times. Therefore, these probes were purged at higher flow rates, which is permitted according to the guidance document in such cases. In accordance with Section 5.4.1 of the guidance document, three to five internal volumes³ of the sample system were purged prior to collection of the soil gas sample.

³ 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.

2.4.2 Soil Gas Sample Collection

After purging, the pump was turned off and 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 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 SummaTM canister was connected to a tee and valve that was used to isolate the dedicated SummaTM canister and sampling train from the common (non-dedicated) 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 diagram of the sampling system are included in the Attachment C2.

The valve to the sampling manifold was closed prior to the collection of the sample, and the valve on the SummaTM 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 SummaTM canister was measured and documented after sampling was complete.

Leak testing was conducted as soil gas samples were collected. A leak detection compound, 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 were tight, samples were also analyzed for the leak test compound. If the concentration of 2-propanol was greater than or equal to 10 micrograms per liter (μ g/L), the results were discussed with the ADEQ Project Manager, and the usability of the data were evaluated during data validation. The 10 μ 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). The total number of duplicate soil gas samples collected from the 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 group sent to the lab.

The SummaTM canisters containing soil gas samples were shipped to the ESC Lab Sciences for analysis. Sample shipments were accompanied by a chain-of-custody record. Self-adhesive custody seals were placed across the lid of each box that was shipped to the lab.

2.4.3 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.

3.0 SUMMARY OF INVESTIGATION RESULTS

3.1 LANDFILL GAS

Concentrations of LFG measured prior to sample collection are provided in Tables C1. The oxygen concentrations in the methane probes ranged from 0.0% to 20.2%. The methane concentrations ranged from 0.0% to 7.4%. The carbon dioxide concentrations ranged for 0.9% to 15.5%. The highest concentration of methane and carbon dioxide, and the lowest concentration of oxygen were measured from the same probe, MW-5. This probe is located east of Broadway Proper Retirement Community near the middle of the BSL (Figure C1).

3.2 VOCS

Twenty-two samples were collected from methane probes in the BSL, including one duplicate sample. A complete list of parameters analyzed (along with the analytical results) is presented in Table C2. The maximum concentration detected for each analyte, the equivalent soil concentration (calculated according to the soil vapor sampling guidance [ADEQ, 2011]), the SRLs, and minimum GPLs are presented at the end of Table C2. A Detection Summary is presented in Table C3.

In Table C2, 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. Figure C2 is a map of the methane probes with select soil gas results. Discussions of selected compounds are provided in the sections below. Risk-based chemicals of potential concern are identified in Section 4.1.3 of the RI report and in the Health Risk Assessment (Appendix L of this RI report).

3.2.1 PCE

PCE was detected in 14 of the 22 methane probe samples at concentrations above the laboratory reporting limits. The highest soil gas PCE concentration was 0.05 milligrams per meter cubed (mg/m³) (or micrograms per liter [μ g/L]) in PRUD-16 from a depth of 15 feet bls. Using the dimensionless Henry's Law conversion, the soil equivalent concentration of the highest soil gas PCE concentration is 0.000078 milligrams 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.

3.2.2 TCE

TCE was detected in one of the 22 methane probe samples at concentrations above the laboratory reporting limits. The detected concentration of soil gas TCE (0.0024 mg/m^3 or μ g/L) was from methane probe PRUD-19 at a depth of 25 feet bls. The soil equivalent concentration of the detected soil gas TCE concentration is 0.000007 mg/kg. This is below the minimum GPL of 0.76 mg/kg and the most stringent SRL of 3.0 mg/kg.

3.2.3 Vinyl Chloride

VC was not detected at concentrations above the laboratory reporting limits in the 22 soil gas samples collected from the methane probes.

4.0 RESULTS OF DATA VALIDATION

Clear Creek contracted Innovative Technical Solutions, Inc. (ITSI) to conduct third party data validation according to USEPA guidance (USEPA, 2008) and according to the QAPP 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 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 methane probe analyses are:

- Field staff noted moisture in the sampling system during collection of samples from PRUD-1, MW-5, MW-6, and PRUD-20 (from 25 feet). Because VOCs can partition into water, a low bias was possibly introduced into these samples. The associated results have been qualified as "J-" or "UJ-" for an estimated value or reporting limit with a low bias due to poor sample integrity. The data validator considered the results useable as flagged, because the moisture was an unavoidable and unpredictable condition in the field environment.
- The laboratory control sample duplicate percent recoveries for 1,2-dichloroethane and trichlorofluoromethane were out of criteria for the batch including MW-5 and MW-6. The associated results have been qualified as "J-" or "UJ-" for an estimated value or reporting limit with a low bias.
- The relative percent difference between the laboratory control sample and the laboratory control sample duplicate for 1,2-dichloroethane, trans-1,3-dichloropropene, and trichlorofluoromethane were out of criteria for the batch including MW-5 and MW-6. The associated positive results in this batch for trichlorofluoromethane were qualified with a "J". Non-detect results did not require an additional qualifier.
- Detections of the leak detection compound, 2-propanol, were less than the 4069 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 their intended purposes for assessment of vapor intrusion risk and soil quality relative to SRLs and GPLs.

5.0 REFERENCES

- Arizona Department of Environmental Quality (ADEQ), 1996, 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.
- Stantec, 2008, Fifth Rebound Test Report, Broadway North Landfill Operable Unit, Soil Vapor Extraction and Air Injection System, Broadway-Pantano Water Quality Assurance Revolving Fund Site, Tucson, Arizona, August 21, 2008, 505 pp.
- Stantec, 2012, Remedial Investigation Report, Groundwater Operable Unit, Arizona Department of Environmental Quality Broadway-Pantano Water Quality Assurance Revolving Fund Registry Site, Tucson, Arizona, June 1, 2012.

APPENDIX C FIGURES



Legend

- Methane Probe
- Extent of Refuse*
- Estimated Extent of Refuse Removed**





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).

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

Figure C1 **Methane Probe Locations Broadway South Landfill**

Revision: A

Document Path: \\PHX-FILE1\Tucson\Data\Projects\ADEQ\BP LOU RI\GIS Files\FigC1 BSL LocationMap, MethaneProbes 11x17p.mxd



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APPENDIX C TABLES

Table C1 Landfill Gas Concentrations Methane Probes Broadway South Landfill 2013

Sample Point ID	Date	Methane (% by volume)	Carbon Dioxide (% by volume)	Oxygen (% by volume)
MW-5	02/21/2013	7.4	15.5	0.0
MW-6	02/21/2013	0.0	5.5	14.4
MW-7	03/04/2013	6.8	14.0	0.0
MW-8	03/04/2013	0.2	4.0	15.3
MW-9	03/11/2013	0.5	11.7	4.4
PRUD-01	02/19/2013	0.5	7.3	11.5
PRUD-02	02/19/2013	0.3	2.4	18.1
PRUD-03	02/19/2013	0.3	3.1	17.5
PRUD-04	02/19/2013	0.2	5.9	13.8
PRUD-05	02/19/2013	0.1	2.7	18.3
PRUD-06	02/19/2013	0.0	0.9	20.2
PRUD-16-15	02/19/2013	0.5	10.5	6.6
PRUD-16-25	02/19/2013	0.4	9.9	7.5
PRUD-17-10	02/19/2013	0.5	5.6	14.7
PRUD-17-25	02/19/2013	0.5	4.3	16.3
PRUD-18-10	02/19/2013	0.4	4.6	17.1
PRUD-18-25	02/19/2013	0.3	6.7	15.3
PRUD-19-10	02/19/2013	0.3	4.2	17.0
PRUD-19-25	03/04/2013	0.1	6.1	15.4
PRUD-20-10	03/04/2013	0.1	1.3	19.6
PRUD-20-25	03/04/2013	0.1	2.9	18.0

Notes:

% - percentage by volume measured during soil gas purge.

Sample ID (PRUD-16-15) = probe ID (PRUD-16) dash sample depth (typically the bottom of the screen interval; 15 feet below land surface).



Location	ID			MW-	5	MW-6	;	MW-7	7	MW-8	3	MW-9	PRUD)-1	PRUD)-2	PRUD	-3	PRUD	4	PRUD	-5	PRUD-	6	PRUD-16-15	PRUD-1	6-25
Sample	D ₁			MW-5-L	/W-5-UNK		NK	MW-7-U	JNK	MW-8-U	NK	MW-9-UNK	PRUD-1-	-UNK	PRUD-2	-UNK	PRUD-3-	UNK	PRUD-4-	JNK	PRUD-5-	UNK PI	RUD-6-L	JNK	PRUD-16-15	PRUD-1	6-25
Latitude	(Degrees)			32°12'58	32"N	32°12'59.	32"N	32°13'1.	.05"N	32°13'1.8	37"N	32°13'1.81"N	32°12'50	.53"N	32°12'49).41"N	32°12'49	.30"N	32°12'49.	27"N	32°12'49.	23"N 32	°12'48.	51"N	32°12	50.91"N	
Longitue	le (Degrees)		110°49'48	.84"W	110°49'50.	54"W	110°49'51	.97"W	110°49'53.	05"W	110°49'55.05"W	110°49'50	.46"W	110°49'51	.08"W	110°49'50	.12"W	110°49'49.02"W		110°49'47	'47.60"W 110°49'46		81"W	110°49	/50.39"W	
Collect I	Date			2/21/20	013	2/21/20	13	3/4/20	13	3/4/201	13	3/11/2013	2/19/20	013	2/19/20	013	2/19/20)13	2/19/20	13	2/19/20	13	2/19/201	13	2/19/2013	2/19/20)13
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 V	alue	Qual	Value Qual	Value	Qual
TO-15	71-43-2	Benzene	mg/m ³	0.017	J-	<0.00128	UJ-	0.013		0.0019		0.0023	<0.00128	UJ-	<0.00128		<0.00128		<0.00128		<0.00128	<0.	00128		<0.00128	<0.00128	
TO-15	74-83-9	Bromomethane (Methyl Bromide)	mg/m ³	<0.00776	UJ-	<0.00155	UJ-	<0.00155		<0.00155		<0.00155	<0.00155	UJ-	<0.00155		<0.00155		<0.00155		<0.00155	<0.	00155		<0.00155	<0.00155	
TO-15	56-23-5	Carbon tetrachloride	mg/m ³	<0.0126	UJ-	<0.00252	UJ-	<0.00252		<0.00252		<0.00252	<0.00252	UJ-	<0.00252		<0.00252		<0.00252		<0.00252	<0.	00252		<0.00252	<0.00252	
TO-15	108-90-7	Chlorobenzene	mg/m ³	< 0.00924	UJ-	<0.00185	UJ-	<0.00185		<0.00185		<0.00185	<0.00185	UJ-	<0.00185		<0.00185		<0.00185		<0.00185	<0.	00185		<0.00185	<0.00185	
TO-15	75-00-3	Chloroethane	mg/m ³	<0.00528	UJ-	< 0.00106	UJ-	< 0.00106		<0.00106		<0.00106	<0.00106	UJ-	<0.00106		<0.00106		< 0.00106		<0.00106	<0.	00106		<0.00106	< 0.00106	
TO-15	67-66-3	Chloroform	mg/m ³	<0.00973	UJ-	0.0022	J-	0.0054		0.018		0.026	0.0037	J-	0.002		0.0049		<0.00195		<0.00195	<0.	00195		0.015	0.0073	
TO-15	74-87-3	Chloromethane	mg/m ³	< 0.00413	UJ-	< 0.000826	UJ-	0.037		<0.000826		<0.000826	<0.000826	6 UJ-	< 0.000826	6	<0.000826		< 0.000826		<0.000826	<0.0	00826		<0.000826	<0.000826	;
TO-15	106-93-4	1,2-Dibromoethane (1,2-EDB)	mg/m ³	<0.0154	UJ-	< 0.00308	UJ-	<0.00308		<0.00308		<0.00308	<0.00308	UJ-	<0.00308		<0.00308		<0.00308		<0.00308	<0.	00308		<0.00308	< 0.00308	
TO-15	95-50-1	1,2-Dichlorobenzene	mg/m ³	<0.0120	UJ-	<0.00240	UJ-	<0.00240		<0.00240		<0.00240	<0.00240	UJ-	<0.00240		<0.00240		<0.00240		<0.00240	<0.	00240		<0.00240	<0.00240	
TO-15	541-73-1	1,3-Dichlorobenzene	mg/m ³	<0.0120	UJ-	<0.00240	UJ-	<0.00240		<0.00240		<0.00240	<0.00240	UJ-	<0.00240		<0.00240		<0.00240		<0.00240	<0.	00240		<0.00240	<0.00240	
TO-15	106-46-7	1,4-Dichlorobenzene	mg/m ³	<0.0120	UJ-	<0.00240	UJ-	0.0043		<0.00240		0.0051	< 0.00240	UJ-	< 0.00240		<0.00240		< 0.00240		<0.00240	<0.	00240		<0.00240	< 0.00240	
TO-15	107-06-2	1,2-Dichloroethane (1,2-DCA)	mg/m ³	< 0.00810	UJ-	< 0.00162	UJ-	< 0.00162		<0.00162		< 0.00162	< 0.00162	UJ-	< 0.00162		< 0.00162		< 0.00162		< 0.00162	<0.	00162		<0.00162	< 0.00162	
TO-15	75-34-3	1,1-Dichloroethane	mg/m ³	< 0.00802	UJ-	< 0.00160	UJ-	< 0.00160		<0.00160		<0.00160	< 0.00160	UJ-	< 0.00160		<0.00160		< 0.00160		< 0.00160	<0.	00160		<0.00160	< 0.00160	
TO-15	75-35-4	1,1-Dichloroethene (1,1-DCE)	mg/m ³	< 0.00793	UJ-	< 0.00159	UJ-	< 0.00159		<0.00159		<0.00159	< 0.00159	UJ-	<0.00159		<0.00159		< 0.00159		<0.00159	<0.	00159		<0.00159	< 0.00159	
TO-15	156-59-2	cis-1,2-Dichloroethene (cDCE)	mg/m ³	< 0.00793	UJ-	< 0.00159	UJ-	0.063		<0.00159		<0.00159	< 0.00159	UJ-	<0.00159		<0.00159		<0.00159		<0.00159	<0.	00159		<0.00159	< 0.00159	
TO-15	156-60-5	trans-1,2-Dichloroethene (tDCE)	mg/m ³	< 0.00793	UJ-	< 0.00159	UJ-	0.0033		<0.00159		<0.00159	< 0.00159	UJ-	<0.00159		<0.00159		<0.00159		<0.00159	<0.	00159		<0.00159	< 0.00159	
TO-15	78-87-5	1,2-Dichloropropane	mg/m ³	< 0.00924	UJ-	< 0.00185	UJ-	< 0.00185		<0.00185		< 0.00185	< 0.00185	UJ-	<0.00185		<0.00185		< 0.00185		<0.00185	<0.	00185		<0.00185	< 0.00185	
TO-15	10061-01-5	cis-1,3-Dichloropropene	mg/m ³	< 0.00908	UJ-	< 0.00182	UJ-	< 0.00182		<0.00182		<0.00182	< 0.00182	UJ-	<0.00182		<0.00182		< 0.00182		<0.00182	<0.	00182		<0.00182	< 0.00182	
TO-15	10061-02-6	trans-1,3-Dichloropropene	mg/m ³	< 0.00908	UJ-	< 0.00182	UJ-	<0.00182		<0.00182		< 0.00182	< 0.00182	UJ-	<0.00182		<0.00182		< 0.00182		<0.00182	<0.	00182		<0.00182	< 0.00182	
TO-15	100-41-4	Ethylbenzene	mg/m ³	0.01	J-	< 0.00173	UJ-	0.0043		0.0023		0.0029	0.0048	J-	0.0043		0.0038		0.0042		0.0037	0.	0026		0.0027	0.0056	
TO-15	76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	mg/m ³	< 0.0153	UJ-	< 0.00307	UJ-	< 0.00307		< 0.00307		< 0.00307	< 0.00307	UJ-	< 0.00307		<0.00307		< 0.00307		< 0.00307	<0.	00307		<0.00307	< 0.00307	
TO-15	75-69-4	Trichlorofluoromethane (Freon 11)	mg/m ³	< 0.0112	UJ-	< 0.00225	UJ-	<0.00225		<0.00225		<0.00225	<0.00225	UJ-	<0.00225		<0.00225		<0.00225		<0.00225	0.	0046		<0.00225	<0.00225	
TO-15	75-71-8	Dichlorodifluoromethane (Freon 12)	mg/m ³	0.02	J-	< 0.00198	UJ-	<0.00198		0.042		0.049	0.013	J-	0.01		0.0074		0.018		0.017	0.	0036		<0.00198	0.0054	
TO-15	76-14-2	1,2-Dichlorotetrafluoroethane (Freon 114)	mg/m ³	0.11	J-	< 0.00280	UJ-	0.22		0.084		0.015	<0.00280	UJ-	0.005		0.0091		0.0031		0.0034	<0.	00280		<0.00280	<0.00280	
TO-15	87-68-3	Hexachloro-1,3-butadiene	mg/m ³	< 0.0673	UJ-	< 0.0135	UJ-	< 0.0135		<0.0135		<0.0135	< 0.0135	UJ-	< 0.0135		<0.0135		<0.0135		<0.0135	<0	0135		<0.0135	<0.0135	
TO-15	75-09-2	Methylene Chloride	mg/m ³	< 0.00694	UJ-	0.0042	J-	< 0.00139		<0.00139		< 0.00139	< 0.00139	UJ-	< 0.00139		<0.00139		< 0.00139		< 0.00139	<0.	00139		0.0017	0.0018	
TO-15	100-42-5	Styrene	mg/m ³	< 0.00851	UJ-	< 0.00170	UJ-	0.0043		0.0085		0.0024	0.0085	J-	0.0072		0.0068		0.0081		0.0068	0.	0028		0.003	0.0094	
TO-15	79-34-5	1,1,2,2-Tetrachloroethane	mg/m ³	< 0.0137	UJ-	< 0.00275	UJ-	<0.00275		<0.00275		<0.00275	<0.00275	UJ-	<0.00275		<0.00275		<0.00275		<0.00275	<0.	00275		<0.00275	<0.00275	
TO-15	127-18-4	Tetrachloroethylene (PCE)	mg/m ³	0.031	J-	< 0.00272	UJ-	< 0.00272		0.0058		< 0.00272	0.041	J-	0.015		0.0088		< 0.00272		0.013	<0.	00272		0.05	0.04	
TO-15	108-88-3	Toluene	mg/m ³	< 0.00753	UJ-	0.0018	J-	0.006		0.006		0.01	0.0087	J-	0.011		0.0087		0.0087		0.0083	0.	0079		0.0083	0.012	
TO-15	120-82-1	1.2.4-Trichlorobenzene	ma/m ³	< 0.0466	UJ-	< 0.00933	UJ-	< 0.00933		<0.00933		< 0.00933	< 0.00933	UJ-	< 0.00933		<0.00933		<0.00933		<0.00933	<0.	00933		<0.00933	< 0.00933	-
TO-15	71-55-6	1.1.1-Trichloroethane (TCA)	ma/m ³	< 0.0109	UJ-	< 0.00218	UJ-	< 0.00218		< 0.00218		< 0.00218	< 0.00218	UJ-	< 0.00218		< 0.00218		< 0.00218		< 0.00218	<0.	00218		<0.00218	< 0.00218	
TO-15	79-00-5	1.1.2-Trichloroethane	mg/m ³	< 0.0109	UJ-	< 0.00218	UJ-	< 0.00218		<0.00218		<0.00218	< 0.00218	UJ-	<0.00218		<0.00218		< 0.00218		< 0.00218	<0.	00218		<0.00218	< 0.00218	
TO-15	79-01-6	Trichloroethylene (TCE)	ma/m ³	< 0.0107	UJ-	< 0.00214	UJ-	< 0.00214	1 1	< 0.00214		< 0.00214	< 0.00214	UJ-	< 0.00214		< 0.00214	1	< 0.00214		< 0.00214	<0.	00214		<0.00214	< 0.00214	1
TO-15	95-63-6	1.2.4-Trimethylbenzene	ma/m ³	< 0.00982	UJ-	< 0.00196	UJ-	0.0049		0.0029		0.0038	0.0059	J-	0.0093		0.0048		0.0049		0.0049	. 0.	0025		0.0023	0.0054	
TO-15	108-67-8	1.3.5-Trimethylbenzene	ma/m ³	< 0.00982	UJ-	< 0.00196	UJ-	< 0.00196		< 0.00196		< 0.00196	< 0.00196	UJ-	0.0025		< 0.00196		< 0.00196		< 0.00196	<0	00196		< 0.00196	< 0.00196	1
TO-15	75-01-4	Vinyl chloride	ma/m ³	< 0.00511	U.I-	< 0.00102	U.I-	<0.00102		<0.00102		< 0.00102	<0.00102	U.I-	<0.00102		<0.00102	1	<0.00102		< 0.00102	<0.	00102		<0.00102	<0.00102	+
TO-15	1330-20-7	Xylenes, Total	mg/m ³	< 0.0261	UJ-	< 0.00521	UJ-	0.013		0.01		0.011	0.023	J-	0.025		0.018		0.02		0.019	0	012		0.01	0.025	
TO-15	67-63-0	2-Propanol ₅	ma/m ³	< 0.0307		0.01		0.042		0.057		0.0064	< 0.00615	B3	0.012		0.0096		< 0.00615		0.049	B	.13		<0.00615 B3	< 0.00615	B3
Nataa				Notoo contin		0.0.		0.0.2		5.00.			10.00010	. 20	0.0.2		0.0000				0.0.0						

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

There may be a slight discrepancy between the reported value in the aboratory 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 mall and do not result in any substantive difference relative to SRLs.

Sample ID (PRUD-17-10) = probe ID (PRUD-17) dash sample depth (typically the bottom of the screen interval; 10 feet below land surface). 1

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). 2 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. 3

Groundwater Protection Levels, Arizona Department of Environmental Quality, A Screening Method to Determine Soil Concentrations Protective of Groundwater Quality, September 1996, VOCs revised 2008. 4

- 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, 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.



Table C2 Soil Gas Analytical Results **Methane Probes Broadway South Landfill 2013**

Location	ID			PRUD	-17-10	PRUD-17-10DUF	PRUD-1	7-25	PRUD-1	8-10 PRL	D-18-25	PRUD-19-10	PRUD-1	9-25	PRUD-20	0-10	PRUD-20-25					Soi	Remediation Level	e .	
Sample I	D ₁			PRUD	-17-10	PRUD-17-100	PRUD-1	17-25	PRUD-1	8-10 PRL	ID-18-25	PRUD-19-10	PRUD-1	9-25	PRUD-20	0-10	PRUD-20-25		Soil		_	301		53	
Latitude	Degrees)					32°12'51.54"N				32°12'51.99"N		32°12	52.62"N		:	32°12'52	2.85"N	Max Soi	Max Soil Gas	Equivalent of		Resident	tial SRL		
Longitud	e (Degrees)				110°49'50		10°49'50.41"W			110°49'50.43"W		110°49	'50.40"W		1	10°49'5	51.16"W	Gas	Result	Max Soil Gas			1	Non-Residential	Minimum GPL ₄
Collect D	ate			2/19/	2013	2/19/2013	2/19/20	013	2/19/20	013 2/1	9/2013	2/19/2013	3/4/20	13	3/4/201	13	3/4/2013	Result	Location	Result ₂	Carci	nogen		SRL	(mg/kg)
Method	CAS No.	Parameter	Units	Value	Qual	Value Qual	Value	Qual	Value	Qual Valu	ie Qual	Value Qual	Value	Qual	Value	Qual	Value Qua	(mg/m°) I		(mg/kg)	10 ⁻⁶ Risk (mg/kg)	10 ⁻⁵ Risk (mg/kg)	Non-Carcinogen (mg/kg)	(mg/kg)	
TO-15	71-43-2	Benzene	mg/m ³	< 0.0012	28	<0.00128	<0.00128		<0.00128	<0.00	128	<0.00128	<0.00128		<0.00128		<0.00128 UJ-	0.017	MW-5	0.000037	0.65	NA		1.4	0.70
TO-15	74-83-9	Bromomethane (Methyl Bromide)	mg/m ³	<0.0015	55	<0.00155	<0.00155		<0.00155	<0.00	155	<0.00155	<0.00155		<0.00155		<0.00155 UJ	ND					3.9	13	
TO-15	56-23-5	Carbon tetrachloride	mg/m ³	< 0.0025	52	<0.00252	< 0.00252		<0.00252	< 0.00	252	<0.00252	< 0.00252		<0.00252		<0.00252 UJ-	ND			0.25	2.5	2.2	5.5	0.95
TO-15	108-90-7	Chlorobenzene	mg/m ³	<0.0018	35	<0.00185	<0.00185		<0.00185	<0.00	185	<0.00185	<0.00185		<0.00185		<0.00185 UJ-	ND					150	530	16.5
TO-15	75-00-3	Chloroethane	mg/m ³	<0.0010	6	<0.00106	< 0.00106		< 0.00106	<0.00	106	<0.00106	< 0.00106		< 0.00106		<0.00106 UJ-	ND			3	30		65	
TO-15	67-66-3	Chloroform	mg/m ³	0.0047	·	0.0041	0.0048		<0.00195	0.004	43	0.0031	0.0058		<0.00195		<0.00195 UJ-	0.026	MW-9	0.000064	0.94	9.4		20	
TO-15	74-87-3	Chloromethane	mg/m ³	<0.00082	26	<0.000826	<0.000826	6	<0.000826	< 0.000	826	0.0015	<0.000826	6	0.0012		<0.000826 UJ-	0.037	MW-7	0.000025			48	160	
TO-15	106-93-4	1,2-Dibromoethane (1,2-EDB)	mg/m ³	< 0.0030	8	<0.00308	<0.00308		<0.00308	< 0.00	308	<0.00308	<0.00308		<0.00308		<0.00308 UJ-	ND			0.029	0.29		0.63	
TO-15	95-50-1	1,2-Dichlorobenzene	mg/m ³	<0.0024	10	<0.00240	<0.00240		<0.00240	< 0.00	240	<0.00240	<0.00240		<0.00240		<0.00240 UJ-	ND					600*	600*	116***
TO-15	541-73-1	1,3-Dichlorobenzene	mg/m ³	<0.0024	10	<0.00240	<0.00240		<0.00240	< 0.00	240	<0.00240	<0.00240		<0.00240		<0.00240 UJ-	ND					530	600*	
TO-15	106-46-7	1,4-Dichlorobenzene	mg/m ³	<0.0024	10	<0.00240	<0.00240		<0.00240	< 0.00	240	<0.00240	<0.00240		<0.00240		<0.00240 UJ-	0.0051	MW-9	0.000123	3.5	35		79	27
TO-15	107-06-2	1,2-Dichloroethane (1,2-DCA)	mg/m ³	< 0.0016	62	< 0.00162	< 0.00162		< 0.00162	<0.00	162	< 0.00162	< 0.00162		< 0.00162		<0.00162 UJ-	ND			0.28	2.8		6	0.23
TO-15	75-34-3	1,1-Dichloroethane	mg/m ³	<0.0016	60	< 0.00160	<0.00160		< 0.00160	<0.00	160	< 0.00160	< 0.00160		< 0.00160		<0.00160 UJ-	ND					510	1,700*	0.85
TO-15	75-35-4	1,1-Dichloroethene (1,1-DCE)	mg/m ³	< 0.0015	59	< 0.00159	<0.00159		< 0.00159	<0.00	159	< 0.00159	< 0.00159		<0.00159		<0.00159 UJ-	ND					120	410	
TO-15	156-59-2	cis-1,2-Dichloroethene (cDCE)	mg/m ³	<0.0015	59	< 0.00159	<0.00159		< 0.00159	<0.00	159	< 0.00159	< 0.00159		<0.00159		<0.00159 UJ-	0.063	MW-7	0.000130			43	150	5.3
TO-15	156-60-5	trans-1,2-Dichloroethene (tDCE)	mg/m ³	< 0.0015	59	< 0.00159	<0.00159		< 0.00159	<0.00	159	< 0.00159	< 0.00159		<0.00159		<0.00159 UJ-	0.0033	MW-7	0.000004			69	230	9.2
TO-15	78-87-5	1,2-Dichloropropane	mg/m ³	<0.0018	35	< 0.00185	<0.00185		<0.00185	<0.00	185	<0.00185	<0.00185		<0.00185		<0.00185 UJ-	ND			0.34	3.4		7.4	0.36
TO-15	10061-01-5	cis-1,3-Dichloropropene	mg/m ³	<0.0018	32	< 0.00182	<0.00182		<0.00182	<0.00	182	< 0.00182	<0.00182		<0.00182		<0.00182 UJ-	ND			0 70**	7.0**		10**	
TO-15	10061-02-6	trans-1,3-Dichloropropene	mg/m ³	<0.0018	32	<0.00182	<0.00182		<0.00182	<0.00	182	<0.00182	<0.00182		<0.00182		<0.00182 UJ-	ND			0.79	7.9		10	
TO-15	100-41-4	Ethylbenzene	mg/m ³	0.0039)	0.0043	0.0048		0.0035	0.00	4	<0.00173	0.0031		0.0028		0.0032 J-	0.01	MW-5	0.000072			400*	400*	82***
TO-15	76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	mg/m ³	<0.0030)7	< 0.00307	<0.00307		< 0.00307	< 0.00	307	< 0.00307	< 0.00307		< 0.00307		<0.00307 UJ-	ND					5,600*	5,600*	
TO-15	75-69-4	Trichlorofluoromethane (Freon 11)	mg/m ³	<0.0022	25	<0.00225	<0.00225		<0.00225	< 0.00	225	<0.00225	<0.00225		<0.00225		<0.00225 UJ-	0.0046	PRUD-6	0.000001			390	1,300	
TO-15	75-71-8	Dichlorodifluoromethane (Freon 12)	mg/m ³	<0.0019	8	0.0034	0.0034		0.0029	0.00	28	0.003	0.0045		0.0054		0.0034 J-	0.049	MW-9	0.000010			94	310	
TO-15	76-14-2	1,2-Dichlorotetrafluoroethane (Freon 114)	mg/m ³	<0.0028	80	<0.00280	<0.00280		<0.00280	< 0.00	280	<0.00280	0.0039		<0.00280		<0.00280 UJ-	0.22	MW-7	0.000051					
TO-15	87-68-3	Hexachloro-1,3-butadiene	mg/m ³	< 0.013	5	<0.0135	<0.0135		<0.0135	<0.01	35	<0.0135	<0.0135		<0.0135		<0.0135 UJ-	ND			7	70	18	180	
TO-15	75-09-2	Methylene Chloride	mg/m ³	< 0.0013	89	0.0023	< 0.00139		< 0.00139	<0.00	139	<0.00139	< 0.00139		< 0.00139		<0.00139 UJ	0.0042	MW-6	0.000009	9.3	93		210	
TO-15	100-42-5	Styrene	mg/m ³	0.0068	3	0.0077	0.0089		0.0077	0.00	77	<0.00170	0.0081		0.0072		0.0081 J-	0.0094	PRUD-16-25	0.000397			1,500*	1,500*	45
TO-15	79-34-5	1,1,2,2-Tetrachloroethane	mg/m ³	<0.0027	'5	< 0.00275	<0.00275		<0.00275	< 0.00	275	<0.00275	<0.00275		<0.00275		<0.00275 UJ-	ND			0.42	4.2		9.3	
TO-15	127-18-4	Tetrachloroethylene (PCE)	mg/m ³	0.014		0.012	0.018		<0.00272	< 0.00	272	<0.00272	0.01		0.0067		0.0061 J-	0.05	PRUD-16-15	0.000078	0.51	5.1		13	0.8
TO-15	108-88-3	Toluene	mg/m ³	0.0098	3	0.012	0.013		0.0094	0.01	1	0.0049	0.0079		0.0068		0.0075 J-	0.013	PRUD-17-25	0.000059			650*	650*	159***
TO-15	120-82-1	1,2,4-Trichlorobenzene	mg/m ³	< 0.0093	33	< 0.00933	< 0.00933		< 0.00933	< 0.00	933	< 0.00933	< 0.00933		< 0.00933		<0.00933 UJ-	ND					62	220	
TO-15	71-55-6	1,1,1-Trichloroethane (TCA)	mg/m ³	<0.0021	8	<0.00218	<0.00218		<0.00218	< 0.00	218	<0.00218	<0.00218		<0.00218		<0.00218 UJ-	ND					1,200*	1,200*	0.94
TO-15	79-00-5	1,1,2-Trichloroethane	mg/m ³	<0.0021	8	<0.00218	<0.00218		<0.00218	< 0.00	218	<0.00218	<0.00218		<0.00218		<0.00218 UJ-	ND			0.74	7.4		16	
TO-15	79-01-6	Trichloroethylene (TCE)	mg/m ³	<0.0021	4	<0.00214	<0.00214		<0.00214	< 0.00	214	<0.00214	0.0024		<0.00214		<0.00214 UJ-	0.0024	PRUD-19-25	0.000007	3	30	17	65	0.76
TO-15	95-63-6	1,2,4-Trimethylbenzene	mg/m ³	0.0038	3	0.0069	0.0044		0.0035	<0.00	196	0.0025	0.0042		0.0032		0.0035 J-	0.0093	PRUD-2	0.000908			52	170	
TO-15	108-67-8	1,3,5-Trimethylbenzene	mg/m ³	< 0.0019	96	<0.00196	<0.00196		< 0.00196	<0.00	196	<0.00196	< 0.00196		<0.00196		<0.00196 UJ-	0.0025	PRUD-2	0.000040			21	70	
TO-15	75-01-4	Vinyl chloride	mg/m ³	<0.0010)2	< 0.00102	< 0.00102		< 0.00102	< 0.00	102	< 0.00102	< 0.00102		< 0.00102		<0.00102 UJ-	ND			0.085	NA		0.75	
TO-15	1330-20-7	Xylenes, Total	mg/m ³	0.016		0.018	0.02		0.015	0.01	7	0.0056	0.018		0.015		0.017 J-	0.025	PRUD-16-25	0.000224			270	420*	31***
TO-15	67-63-0	2-Propanol₅	mg/m ³	0.0076	5	0.0084	<0.00615		<0.00615	< 0.00	615	<0.00615	0.066		0.079		0.029	0.13	PRUD-6	NA					
Notes:			-	Notos con	tinuod:						-	•													

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 Remed

SRLSoil Remediation LevelGPLGroundwater Protection Level

Qual Qualifier

Qual Qualifier Shaded cell indicates detection

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 conversion of units (from parts per billion to mg/m³). These values are very

conversion of units (from parts per billion to mg/m'). These values are very small and do not result in any substantive difference relative to SRLs.

Notes continued:

1 Sample ID (PRUD-17-10) = probe ID (PRUD-17) dash sample depth (typically the bottom of the screen interval; 10 feet below land surface).

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).
 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, 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.



Table C2 Soil Gas Analytical Results Methane Probes Broadway South Landfill 2013

Table C3 Detection Summary Methane 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	22	4	0.017	MW-5		
Bromomethane	22	0	ND			
Carbon tetrachloride	22	0	ND			
Chlorobenzene	22	0	ND			
Chloroethane	22	0	ND			
Chloroform	22	15	0.026	MW-9		
Chloromethane	22	3	0.037	MW-7		
1,2-Dibromoethane	22	0	ND			
1,2-Dichlorobenzene	22	0	ND			
1,3-Dichlorobenzene	22	0	ND			
1,4-Dichlorobenzene	22	2	0.0051	MW-9		
1,2-Dichloroethane	22	0	ND			
1,1-Dichloroethane	22	0	ND			
1,1-Dichloroethene	22	0	ND			
cis-1,2-Dichloroethene	22	1	0.063	MW-7		
trans-1,2-Dichloroethene	22	1	0.0033	MW-7		
1,2-Dichloropropane	22	0	ND			
cis-1,3-Dichloropropene	22	0	ND			
trans-1,3-Dichloropropene	22	0	ND			
Ethylbenzene	22	20	0.01	MW-5		
1,1,2-Trichlorotrifluoroethane	22	0	ND			
Trichlorofluoromethane	22	1	0.0046	PRUD-6		
Dichlorodifluoromethane	22	18	0.049	MW-9		
1,2-Dichlorotetrafluoroethane	22	9	0.22	MW-7		
Hexachloro-1,3-butadiene	22	0	ND			
Methylene Chloride	22	4	0.0042	MW-6		
2-Propanol	22	13	0.13	PRUD-6		
Styrene	22	19	0.0094	PRUD-16-25		
1,1,2,2-Tetrachloroethane	22	0	ND			
Tetrachloroethylene (PCE)	22	14	0.05	PRUD-16-15		
Toluene	22	21	0.013	PRUD-17-25		
1,2,4-Trichlorobenzene	22	0	ND			
1,1,1-Trichloroethane	22	0	ND			
1,1,2-Trichloroethane	22	0	ND			
Trichloroethylene (TCE)	22	1	0.0024	PRUD-19-25		
1,2,4-Trimethylbenzene	22	19	0.0093	PRUD-2		
1,3,5-Trimethylbenzene	22	1	0.0025	PRUD-2		
Vinyl chloride	22	0	ND			
Xylenes, Total	22	20	0.025	PRUD-16-25		

Notes:

mg/m³ - milligrams per meter cubed

ND - Not detected above reporting limit

RL - Laboratory reporting limits

Sample ID (PRUD-16-25) = probe ID (PRUD-16) dash sample depth (typically the bottom of the screen interval; 25 feet below land surface).



APPENDIX C ATTACHMENTS

Attachment C1 Soil Vapor Sampling Forms – Methane Probes 2013

Attachment C2 Photographs – Methane Probe Sampling

ATTACHMENT C1 SOIL VAPOR SAMPLING FORMS METHANE PROBES 2013

Well ID (depth):	Unknow	\sim \sim	Date:	2/21/13	
Site Location	MW-5	~	Samplers:	UNH	
Condition of Well:	Good		 QA Sample ID:	NR	

Purge Volume Calculation

Purge Volume (from SAP tables):

Unknown

Volume Purged Prior to Sample Collection: 15.3 f



Well Evacuation

Time	Elapsed Time (minutes)	Purge Rate (^{CÇ} /min)	Volume Purged	Vacuum (in. water)	Landfill CH4	Gas Concer CO2	ntrations O2
1404	Ø	0,8	Ø	12			
1409	5	0,9	.4.0	12	6.2	14.0	0.4
14114	10	0,9	8.0	12	7.2	15.2	0.0
1419	15	0,9	12.0	12	7.4	15.5	$\mathcal{O}_{i}O$

Sample Collection		QC Sample Collected: Yes 🗖 No 🏚
Summa Canister Serial Number:	A7993	
Summa Canister Lab Number:	943	
Flow Regulator and Vacuum Gauge Serial Number:	NA	
Vacuum Pump Start Time	1404	
Vacuum Pump Stop Time	1421	
Open Summa Time	1421	
Close Summa Time	1434	
Pre-Fill Summa Canister Vacuum (in. Hg):	-256	<u>.</u>
Post-Fill Summa Canister Vacuum (in. Hg):		
Time Sample Collected	1421	
·		

Moisture in dedicated the Notes:

Date 2/2(/13



	Soli Va	apor Sampli	ng Form - Sumr	na Canister	S				
Well ID (depth):	MW -6			Date:	2/211	13			
Site Location	Broadway	Proper		Samplers:	UNH				
Condition of Well:	Good ()			QA Sample ID:	NA	·			
Purge Volume Calcui	lation								
Purge Volume (from SAP tables):									
i alge volume (nom]				
	1 Valve -		Vacuum Gas Gauge Hete Flow Meter	vaive Pu	mp				
	Wellhead								
	Dedic	ated	Commo	on					
Well Evacuation				· · · · · · · · · · · · · · · · · · ·					
	Elapsed Time	Purge Rate	Volume Purged	Vacuum	Landfill	Gas Conce	ntrations		
Time	(minutes)	(/min)	()	(in. water)	CH4	CO2	02		
1512	Ø	0.9	0	12					
1515	3	0.8	2.4	10	0.0	5.6	14.1		
1518	6	0.8	4.8	10	0.0	5.6	14,3		
1521	9	0.8	7.2	12	0.0	5.5	14.4		
Sample Collection				Q	C Sample C	ollected: Ye	es □ No 日		
Summa Canister Ser	ial Number:		A8579						
Summa Canister Lab	Number:		1230						
Flow Regulator and	Vacuum Gauge Seria	al Number:	NA	_					
Vacuum Pump Start	Time		1512	_					
Vacuum Pump Stop	Time	· .	1521	-					
Open Summa Time			1521	-		<u> </u>			
Close Summa Time (Sてる)									
Pre-Fill Summa Cani	ster Vacuum (in. Hg):	-27	_					
Post-Fill Summa Can	nister Vacuum (in. H	g):	- 1	_					
Time Sample Collect	ted		_1521	-					
Notes: Mois	lure in de	dirated .	ubing						
)						

Sampler's Signature

Date 2/2(1/3



Well ID (depth):	MW-7	[Date:	3/4/13
Site Location F	Toadway Proper		ampiers:	M3-1 VW
Condition of Well: G_{l}	lood / F		QA Sample ID:	NA
Purge Voiume Calculat	ion			
Purge Volume (from SA	NP tables): NA, est	inate 10 of Volum	e Purged Prior	to Sample Collection: <u>10.8cf</u>
	Vaive Weilhead	Vacuum Gauge Flow Meter	Vaive Pur	np
	Dedicated	Commo	n	
Well Evacuation				
			Vacutum	Landfill Gas Concentrations

	Elapsed Time	Purge Rate	Volume Purged	Vacuum	Landfill Gas Concentrations		
Time	(minutes)	(الج /min)	(cf)	(in. water)	CH4	CO2	02
1016	Ø	0.9	Ø	H			
1019	3	0,9	2.7	4	6.5	13.8	0.4
1022	(e	0.9	5,4	4	7.5	14.3	0.0
1025	9	0.9	8.1	- 4	7.1	14.1	0.0
1028	12	0.9	10.8	4	10.8	14.0	0.0

Sample Collection		QC Sample Collected: Yes 🗆 No 🖉
Summa Canister Serial Number	A8727	
Summa Canister Lah Number:	1263	
Summa Canister and Vacuum Gauge Serial Number	NA	· · · · · · · · · · · · · · · · · · ·
	1016	· ·
	1078	
	1029	
Clean Summa Time	1035	· · ·
Close Summa Time	-78	· · · · · · · · · · · · · · · · · · ·
Pre-Fill Summa Canister Vacuum (in: Hø).	<u> </u>	
Time Sample Collected	1029	

Notes:

1 la 92

Date 3/4/13



Well ID (depth): Site Location Condition of Well: Purge Volume Calcu Purge Volume (from	<u>MW-</u> <u>Brodo</u> D ulation sAP tabl	8 ly es): 1 Valve -	Proper	va G	Volur acuum Gas Meter Fiow Meter	Date: Samplers: QA Sample ID: ne Purged Prior	3/4/1 MB + V N A to Sample (3 NH Collection:	<u>io, 4 c</u> f
		Wellhead				-			
		Dedica	ated		Commo	on			
Well Evacuation	Elap	sed Time	Purge Ra	ite	Volume Purged	Vacuum	Landfill	Gas Conce	ntrations
Time	(m	inutes)	(cf /m	in)	(cf)	(in. water)	CH4	<u>CO2</u>	02
1048.	(7	0.8		Ø	10			
1052		4	0.8		3.2	10	6.1	3,2	17.2
1056		8	6.8		6.4	10	0.1	3.4	15.8
1100		2~ .	0,8		9.0	10	0.2	4.0	15.3
			ļ						
		<u> </u>			<u> </u>		1	<u> </u>	
Sample Collection					al rol	Q	C Sample C	oliected: Y	es 🗆 No 🛱
Summa Canister Se	erial Num	ber:			<u> </u>	-			
Summa Canister La	ab Numbe	er:			<u> </u>	 .			
Flow Regulator and	d Vacuum	n Gauge Seri	al Number:						
Vacuum Pump Sta	rt Time				1046	-			
Vacuum Pump Sto	ip Time					_			
Open Summa Time	e				1101	_			
Close Summa Time	e								
Pre-Fill Summa Ca	Pre-Fill Summa Canister Vacuum (in. Hg):								
Post-Fill Summa C	anister Va	acuum (in. F	lg):			_			
Time Sample Colle	ected					_		<u></u> ,	
Notes:		<u>,</u>							

I la

Date 3/4/13



	Soil Va	nor Samplin	a Form - Sumn	na Canisters	:		
Well ID (depth):	MW -9	ipor sampin	g ronn - Sann	Date:	3/11	13	
Site Location	BSL - Broad	war Proper	Samplers: UNH + MR				
Condition of Well:	GTORD	1		QA Sample ID:	NA		
Purge Volume Calcu	lation		1 of your	- Durand Drian	te Complex	Collection	10.0
ourge Volume (from	SAP tables):	NA, Estima				Jonection.	
• • •	1. Valve -		Gauge Gas Gauge Flow Meter	Valve Pur	np		
	Dedic	ated	Commo	n			
Well Evacuation							
Time	Elapsed Time (minutes)	Purge Rate	Volume Purged	Vacuum (in. water)	Landfill	Gas Conce CO2	ntrations O2
0800	Ø	1.0	Ø	l			
0903	3	1.0	3.0	Ø	0.3	11.0	5,3
0806	10	1.0	6.0	Ø	614	11.7	4.5
0809	<u>ণ</u>	1.0	9.0	Ø	0.5	11.7	4,4
			1				
Sample Collection	· · · · · · · · · · · · · · · · · · ·		A 6583	Q	- Jampie Ci	mecteu. n	
Summa Canister Se			1258	-			s
Summa Canister La	Vacuum Gauge Seri	al Number:	./A	-			
Nocuum Dumo Stor	t Time		0800	-			
Vacuum Pump Star	Time		<u>osio</u>	-			
Open Summa Time			0810	-	•-	•	
Close Summa Time			6816	-			
Pre-Fill Summa Can	ister Vacuum (in. He):	-27	-			
Post-Fill Summa Ca	nister Vacuum (in. H	g):	-1	_			
	•			-			

Notes:

のないです。

mille

Date_3/11/13_



Soil Vapor Sampling Form - Summa Canisters								
Well ID (depth):	PRUD-1/C	NKNOWN		Date:	2 19 13			
Site Location	YMCA Park	linglat	· · ·	Samplers:	MB, RG, VH			
Condition of Well:	Good	<u> </u>		QA Sample ID:	N/A			
Purge Volume Calcul	ation							
Purge Volume (from	SAP tables): 🖈	100,000 ML	= 3.5cf Volur	ne Purged Prior	to Sample Collection: <u>3.67</u>			
			Gas					
	1.		Gauge Meter	r Vaive Pur	np			
			Flow	· / \				
	Vaive -	7	Meter					
	Wellhead							
	Dedica	ated	Commo	on				
Well Evacuation			1		· ·			
	Elapsed Time	Purge Rate	Volume Purged	Vacuum	Landfill Gas Concentrations			
Time	(minutes)	(CF /min)	(cf)	(in. water)	CH4 CO2 O2			
1251	2	0.3	0.4		0.5% 1.4% 11-3%			
1300		0.5	1.5		04 1.5 1.6			
1305		0.5 0.3	3.0		04 15 115			
120.1		0.0						
Sample Collection	1		L	Q	C Sample Collected: Yes 🗆 No 🏹			
Summa Canister Seri	ial Number:		A8222	_	· ·			
Summa Canister Lab	Number:		1085	-	·			
Flow Regulator and	Vacuum Gauge Seria	al Number:	9	_	·			
Vacuum Pump Start	Time		12:55	-				
Vacuum Pump Stop	Time		13:01	-				
Open Summa Time			<u>-13:01</u>	-				
Close Summa Time			15.15	-				
Pre-Fill Summa Cani	ster Vacuum (in. Hg): _).	- 21	-	<u>.</u>			
Time Sample Collect	iister vacuum (in. H	g):	1201	-	······			
A WELL	rashuction	UNYAQUE	<u> </u>	-				
Notes:	$\frac{1}{2}$		ZAFIA A.	Lie UsA				
ILID IUIU	LO (IL VOL D	Catilano	Databe Ar	IN LIPED D	HSPIMNALIMIN			
- LiQI	At-topati	pl d2#	H HOUMEN	MMA CON	Le anxines			
Biothimer	MATUN DI	NP -			av. if when he			
Sampler's Signature	Con vou for	mllo	Date	2/19/13				
12 mation of	tor Open 9	amma VI			ASSOCIATES			
N:\Projects\ADEQ\BP LOU RI\Field	work/Vapor Sampling Form 20	IMA VOIV	l		2 ⁴			

	Soil Va	por Samplin	ig Form - Sumn	na Canisters	5		
Well ID (depth):	PRUD-7/11	rknaum		Date:	219	13	
Site Location	MCA PARI	Cinal of	•	Samplers:	MB,\	IH,R	G
Condition of Well:	EVCELLEA			QA Sample ID:	NA		
Purge Volume Calcul	ation				·	Ţ	nr f
Purge Volume (from	SAP tables): $*100$	000 ml=	3.50F Volur	ne Purged Prior	to Sample (Collection:	<u>4.60</u>
	1. Vaive -		/acuum Gauge Flow Meter	yalve Pur	mp		
	Wellhead			·			
	Dedica	ated	Commo	on		·	
Well Evacuation		I	·····	· · · · · · · · · · · · · · · · · · ·	J		
Time 17:21 12:29 12:30	Elapsed Time (minutes) 2 4 5	Purge Rate (& /min) 0.9 0.9	Volume Purged (CF) 1.8 3.6 4.5	Vacuum (in. water) 4 4 4	Landfill CH4 0.3% 0.4 0.3	Gas Concen CO2 2.1 2.5 2.4	1. 02 17.8 18.0 18.0
							·
Sample Collection	·			Q	C Sample Co	ollected: Ye	
Summa Canister Seri	al Number:		_ <u>A859</u> B	-			
Summa Canister Lab	Number:		12110	_			;
Flow Regulator and V	/acuum Gauge Seria	al Number:	NO IDIF_	-			
Vacuum Pump Start	Time		125	-			
Vacuum Pump Stop	Time		<u>230</u>	-			
Open Summa Time			1250	-			
Close Summa Time			1231	_			
Pre-Fill Summa Canis	ster Vacuum (in. Hg):	-26.5	-			
Post-Fill Summa Can	ister Vacuum (in. H	g):		-			
Time Sample Collect	onstruction 1	nknaun Opp25	00.70fr	L, Øin. H	<u>20 V2C</u>	·	
<u>Stoppfi</u>	2 Vac Dump	0 120					
<u> </u>	<u>ISIMMALE</u> SIMMA	HVP. ON I	50 121				
Sampler's Signature	Hum	lh	Date	2/19/13		CLEA CREE ASSO	

Well ID (depth): Site Location Condition of Well: Purge Volume Calcul Purge Volume (from	Soil Va PRUD-3 Kenyon Ne GOOD ation SAP tables): 100	por Samplin	g Form - Sumn Sd 35CF volum	na Canisters Date: Samplers: QA Sample ID: ne Purged Prior	5 2 19 MB,V NIA to Sample	B 1 <u>H</u> , RG Collection:	 42cf
	1 Vaive -		Gauge Heter	Vaive Pur	np		
	Wellhead	ated	Commo	n v			
Well Evacuation	Deule			///			
Time 11:47 11:49 11:51	Elapsed Time (minutes) 2 4 4	Purge Rate (CF /min) ().7] ().7] ().7]	Volume Purged (CA) 1.4 2.8 4.2	Vacuum (in. water)	Landfill CH4 O·4 O·4 O·3	Gas Concen CO2 3. 9 3. 9 . 9 . 9 . 9 . 9 . 9 . 9 . 9	trations 02 17.60 17.5 17.5
Sample Collection Summa Canister Ser Summa Canister Lab Flow Regulator and Vacuum Pump Stop Open Summa Time Close Summa Time Pre-Fill Summa Cani Post-Fill Summa Cani Time Sample Collect WHI (MAN) Notes: 11:451	ial Number: Number: Vacuum Gauge Seri Time Time ster Vacuum (in. Hg nister Vacuum (in. Hg nister Vacuum (in. Hg ChON UNK NC UM LO ON VA TIM LO ON VA TIM LO ON VA TIM LO ON VA TIM LO ON VA DEA COL SUM	al Number:): g): WN C DUMP AC DUMP MA CANSI MA CONF	A8571 1208 No 1D# 11:45 11:51 11:51 11:57 -27 -27 -27 -1 1151 11:57 -27 -27 -27 -27 -27 -27 -27 -27 -27 -2	Q(C Sample C	ollected: Ye	s 🗆 No 🕅
Sampler's Signature	- ferm	llo	_ Date	2/19/13		CLEA CREE ASSO	

	Soil Va	por Samplin	g Form - Sumn	na Canisters	5	
Well ID (depth):	PRID-4/	UNKNAN)	Date:	21913	
Site Location	Venuon NP	labbonn	h .	Samplers:	MBINH	RG
Condition of Well:	Excellent			QA Sample ID:	NIA	
Rurge Volume Calcul	ation A					
Purge Volume (from	SAP tables): (00)	00 ML = 3	5GF Volum	ne Purged Prior	to Sample Coll	ection: <u>4.2.C</u> f
	1. Valve -		acuum Gauge Gas Meter Flow Meter	Valve Pu	mp	
	Wellhead		C			
Wall Evacuation	Dedica	ated	Commo	<u>n</u>		
	l					
Time	Elapsed Time (minutes)	Purge Rate	Volume Purged	Vacuum (in. water)	Landfill Gas CH4	Concentrations CO2 O2
11:14	1	0.7	01	Ø	0.3%	7.0% 12.3%
11:110	3	0.T	2.1	Ø	0.3 (03 31
11:18	5	6.1	35	Ø	0.3 1	0 13.3
11:19	6	0.17	4.2	Ø	0.2 5	3.9 138
Sample Collection				Q	C Sample Colle	cted: Yes 🗆 No D
Summa Canister Seri	ial Number:		_A8734			
Summa Canister Lab	Number:		1094	-		
Flow Regulator and	Vacuum Gauge Seria	al Number:	NOID	2		
Vacuum Pump Start	Time			5		
Vacuum Pump Stop	Time			0		
Open Summa Time			- 11.70	-		
Close Summa Time		,		-		
Pre-Fill Summa Cani	ster Vacuum (in. Hg): - \-		-		
Post-Fill Summa Can	lister vacuum (in. H	g):	1:10	-		
Notes: TUMLO TUMLO	uction un Knc On VAC PUM CAF VAC PUM	WA PAT 11:130 10:00, 11:2	D 0.1 cfn	-		
Openeo	Summaly	AVEQII	:20			
Clesed	Summa (phe @ 1	1:21p			
Sampler's Signature	Honn	llo	Date	2/19/13	- C	

	Soil Va	apor Samplin	g Form - Sumn	na Canister	S
Well ID (depth):	PRUD-51	UNKNOW	$\mathbf{)}$	Date:	2/19/13
Site Location	Venion Ne	ah barhad	à	Samplers:	MB,VH,RQ
Condition of Well:	Excellent			QA Sample ID:	NA
Purge Volume Calcul	ation				
Purge Volume (from	SAP tables): A	0,000 M= 2	3.5CF Volum	ne Purged Prior	to Sample Collection: <u>L1.2</u> C
					·
	1 Vaive -	-kanna V	Gauge Flow Meter	Valve Pu	mp
	Wellhead				
	Dedic	ated	Commo	on	
Well Evacuation	I		1		······································
Time	Elapsed Time (minutes)	Purge Rate ((升 /min)	Volume Purged	Vacuum (in. water)	Landfill Gas Concentrations CH4 CO2 O2
035		0.1	0.7	12	0.190 2.790 18591
1036	2	0.7	14	12	0.1 27 18.4
1031	3	0.1	2.	12	0.1 2.1 8.4
1029	5	0.1	35	12	01 21 185
1040	6	0.	4:2		0121 183
]			
Sample Collection				Q	C Sample Collected: Yes \Box No \Box^{\vee}
Summa Canister Ser	ial Number:		AGAOL		
Summa Canister Lab	Number:		121		<u></u>
Flow Regulator and	Vacuum Gauge Seri	al Number:	NU LET	•	
Vacuum Pump Start	Time		-10.54	-	
Vacuum Pump Stop	lime		-10.41	-	
Close Summa Time			10:48	-	·····
Pre-Fill Summa Cani	ster Vacuum (in. He):	-22.5	-	
Post-Fill Summa Car	nister Vacuum (in. H	g):	-0.5	-	
Time Sample Collect A WEN CONE Notes: TUMEO	ed 31000hon un K VAC PUMP O	noun Ishopvač	1041)2+ 10:346	20.7cf	ю
Tuned	Vac pump	OHQ10	:41	<u></u>	
<u> </u>	WAIVETOS	<u>àmma ca</u> Svmma (MISTOR	10:48	
Sampler's Signature	Hund	lo	Date	2/19/13	

	Soil Va	por Samplin	g Form - Sumn	na Canisters	5	i.	
Well ID (depth): F	RUD-6/dep	nunknau	n	Date:	2/19	113	
Site Location	Renion	Highborn	XA	Samplers:	MB	VH,K(1 9
Condition of Well:	Gad			QA Sample ID:	_NA		J
Purge Volume Calcul	ation						A 1
Purge Volume (from	SAP tables):	000 M= 3	3.50f Volur	ne Purged Prior	to Sample	Collection:	<u>4et</u>
	1 Valve ~		acuum Gauge Gas Meter Flow Meter	Vaive Pu	np		
	Dedic	ated	Commo	n			
Well Evacuation							
Time 9:40 9:41 0:42 9:43	Elapsed Time (minutes) 1.0 2.0 3.0 4.0	Purge Rate (Of /min)	Volume Purged (C+) 1 2 3 4	Vacuum (in. water) 2-5 2-5 2-5 2-5	Landfill CH4 O.O9 O.O O.O	Gas Concer <u> CO2</u> <u> 0.99</u> <u> 0.9</u> <u> 0.9</u> <u> 0.9</u> <u> 0.9</u> <u> 0.9</u>	ntrations 02 20-396 20-2 20-2 20-2 20-2
Sample Collection	ial Number		A2<178	Q	. sample C	bliectea: re	
Summa Canister Seri	Number:		1213	-			<u></u>
Flow Regulator and	Vacuum Gauge Seri:	al Number:	#3	-			
Vacuum Pump Start	Time		9:39	-			
Vacuum Pump Stop	Time		9:44	-			• •
Open Summa Time			9:45	 _			
Close Summa Time			9:50	-			
Pre-Fill Summa Canis	ster Vacuum (in. Hg):	-27	_		·	<u> </u>
Post-Fill Summa Can	iister Vacuum (in. H	ʒ):		_			<u> </u>
Time Sample Collect A WAI (CASA Notes: 9:39 9:44 9:45 9:45	inchon UNIV TUMED VAC TUMED VAC Open VALVA CLOSED VALVA	an pmpor pmpof tosum tosum	9:45 F NMA	-			
Sampler's Signature	Jour	lla	Date	2/19/13		CLEA CREE ASSO	

Soil Vapor Sampling Form - Summa Canisters								
Well ID (depth): Site Location Condition of Well:	PRUD-11015 YMCA/GDI GOOD	5 (15ft) 106 Brk) - - -	Date: Samplers: QA Sample ID:	2/10 MB,V	IIB H,RG A		
Purge Volume Calcul	ation	100	^				181	
Purge Volume (from	SAP tables): 97,	MPMFI.U	pCF Volur	me Purged Prior	to Sample	Collection:	1. Ort	
·	1. Vaive -		facuum Gauge Flow Meter	r Valve Pur	np			
	Dedica		Commo	n v				
Well Evacuation	Dedica		comme					
Time 1353 1354 1355	Elapsed Time (minutes) 2 3	Purge Rate (C-f /min) (). ((). ((). () (). ()	Volume Purged (Cf) ()- L 1-Z 1.S	Vacuum (in. water) 7.5 7.5 7.5	Landfill CH4 0.5 0.5	Gas Concen CO2 10.5 10.4 10.5	$ \begin{array}{c} \text{trations} \\ \text{O2} \\ \hline 0.8 \\ \hline 0.7 \\ \hline 0.6 \\ $	
•								
Sample Collection				QC	Sample Co	ollected: Ye		
Summa Canister Seri Summa Canister Lab Flow Regulator and V Vacuum Pump Start Vacuum Pump Stop	al Number: Number: /acuum Gauge Seria Time Time	al Number:	AS600 1218 NoID# 1352 1355	- 				

Open Summa Time

Close Summa Time

Pre-Fill Summa Canister Vacuum (in. Hg):

Post-Fill Summa Canister Vacuum (in. Hg):

Time Sample Collected



	Soil Va	por Samplin	ng Form - Sumn	na Canisters	5	
Well ID (depth):	PRUD-110-25	125A)		Date:	219	13
Site Location	MCA GOIL	OB Park	-	Samplers:	MBIL	-1/RG
Condition of Well:	GOOd	•.	-	QA Sample ID:	NA	
Purge Volume Calcui	ation		~ •			
Purge Volume (from	SAP tables): 47	,331M=1	.70£. volur	ne Purged Prior	to Sample	Collection:
			/acuum Gas		•	
			Gauge Mete	r Valve Pur	np	
			Flow	/ \		
	Valve ~		Meter			
	Wellhead		C			
Well Evacuation	Dedica	ated	Commo	on		
	1		<u> </u>			· ··· · · · · · · · · · · · · · · · ·
	Elapsed Time	Purge Rate	Volume Purged	Vacuum	Landfill	Gas Concentrations
Time 1222	(minutes)	(CF /min)		(in. water)		1000 - 500
1334	2		1.7	2	10.4	10.0 7.4
1325	3		18	2	0.4	9975
					4	
						·
Sample Collection				Q	C Sample Co	ollected: Yes 🗆 No 🍂
Summa Canister Seri	ial Number:		A85771			
Summa Canister Lab	Number:		1219	-		
Flow Regulator and V	√acuum Gauge Seria	al Number:	NOID	-		
Vacuum Pump Start	Time			-		
Vacuum Pump Stop	Time		1920	-		
Open Summa Time			13/11	-		· · · · · · · · · · · · · · · · · · ·
Pre-Fill Summa Cani	ster Vacuum (in. Hø).	-27	-		·
Post-Fill Summa Can	ister Vacuum (in. H	י. ב):		-		
Time Sample Collect	ed	_,	13:35	_		· · ·
Notos: 1337-	fumed on V	1 DIMDG	DOL CCAN LI	Din Ha	A VAND	120.
1225 -	TUMEROF	VAC DIMI	Zand Open	SIMMA	. WIN	2 · · · ·
	SAMPHEID	. PRUD-IL	-25, PEUD	125151	neam	e. Well
344	Closed Sir	nma valv	l	•		·
		10.		11		
Sampler's Signature	_ Offer	ulo-	Date	2/19/(3	- ·	
		. •				ASSOCIATES

	Soil Va	por Samplin	g Form - Sumn	na Canisters	5		
Well ID (depth): Site Location Condition of Well:	PRUD-17-1(GOIICH PAR GOOD) (10/t) K, E0876	FINCA	Date: Samplers: QA Sample ID:	2/19/ 1/18, V PRUD	13 141, RG - 17-10	<u> </u>
Purge Volume Calcui	lation ルト	100.1-1	1.00				2-11 f
Purge Volume (from	SAP tables):	HLOMEI	VCF Volum	ne Purged Prior	to Sample	Collection:	Lº4()
	1 Valve - Wellhead		acuum Gas Gauge Flow Meter		np		
	Dedica	ated	Commo	n			
Well Evacuation	· · · · · · · · · · · · · · · · · · ·	A	· · · · · · · · · · · · · · · · · · ·				
Time 4',19 4:20 4:22	Elapsed Time (minutes)] 2 4	Purge Rate (Q+ /min) () P Q Q · Q	Volume Purged (GF) ()·1/ 1·2/ T=82·4	Vacuum (in. water) 1.5 10 10	Landfill CH4 O.5 O.6 O.5	Gas Concen co2 5.6 5.6 5.6	trations 02 147 147 147
Sample Collection Summa Canister Seri Summa Canister Lab Flow Regulator and V	 ial Number: Number: Vacuum Gauge Seria	al Number:	AU02 755 NO ID#	Dupl	: Sample Co	011ected: Ye 	SK № □ 8 3 D#

Vacuum Pump Start Time

Vacuum Pump Stop Time

Open Summa Time

Close Summa Time

Pre-Fill Summa Canister Vacuum (in. Hg):

Post-Fill Summa Canister Vacuum (in. Hg):

Time Sample Collected .

Collecter Notes: MA Q 1428 l. Date <u>2/19/13</u> CLEAR Sampler's Signature CREEK ASSOCIATES

	Soil Va	por Samplin	g Form - Sumn	na Canisters	5		
Well ID (depth): Site Location Condition of Well:	PRUD-17-7 201106 PUR GOOD	5 (25) , fast of	YMCA	Date: Samplers: QA Sample ID:	2/19/ MB, V- N/A	3 H, R9 1	
Purge Volume Calcul	ation	1221461	TAL Value	no Burgad Brian	to Sampla (Collection	1.1.f
Purge Volume (from	SAP tables): <u>7</u> 1 Valve -		acuum Gas Gauge Flow Meter	Valve Pur	np	-onection	
Well Evacuation	Wellhead Dedica	ated	Commo	on			
Time 1439 1440 1441	Elapsed Time (minutes)	Purge Rate (Gr /min) 11 0 1 0 1 0 1 0 1 0	Volume Purged (CF) 0 1.4 2.1	Vacuum (in. water) 0 0	Landfill CH4 ().490 ().490 ().590	Gas Concen CO2 4,790 4,590 4,590	trations 02 58% 160%
Sample Collection Summa Canister Seri Summa Canister Lab Flow Regulator and V	ial Number: Number: Vacuum Gauge Seria	al Number:	A8580 1227 No 10#	Q	C Sample Co	ollected: Yes	

Flow Regulator and Vacuum Gauge Serial Number:

Vacuum Pump Start Time

Vacuum Pump Stop Time

Open Summa Time

Close Summa Time

Pre-Fill Summa Canister Vacuum (in. Hg):

Post-Fill Summa Canister Vacuum (in. Hg):

Time Sample Collected



ASSOCIATES

	Soil Va	por Samplin	g Form - Sumn	na Canisters	5		
Well ID (depth):	PRUD-18-10	(10H)		Date:	2/19	13	
Site Location	GOUCH Par	K	· ·	Samplers:	MB,	RG,VN	TH
Condition of Well:	GOOD			QA Sample ID:	N	JA	
Purge Volume Calcu	lation						
Purge Volume (from	SAP tables): 45	420 n = 1	. Loft 3 Volum	ne Purged Prior	to Sample	Collection:	210f
. .	· 1-						
·	1-	Vilinma V	acuum Gas Sauge Meter	r Nahar Dav			i.
				/ /	np		•
	Vaive -	₹	Flow Meter				
							•
	Wellbead						
·	Dedica	nted	Commo	n			
Well Evacuation							_
		· · · · ·					
Time	Elapsed Time	Purge Rate	Volume Purged	Vacuum (in. water)	Landfill	Gas Concen	trations
IFAG		0.1	0.7		0.4	5.	110.5
1510	1	0.7	1.4	IA IA	0.3	47	169
1511	3	0.1	2	10	0.4	4.10	<u>n.</u>
							· ·
		· · · · · · · · · · · ·					
Sample Collection			ł	Q	: Sample C	ollected: Ye	s 🗆 No 🙀
Summa Canister Se	rial Number:		A8224				
Summa Canister Lal	b Number:		1081				
Flow Regulator and	Vacuum Gauge Seria	l Number:	N/A,	-			. <u></u>
Vacuum Pump Star	Time		508				
Vacuum Pump Stop	Time		1512				
Open Summa Time			·	-			
Close Summa Time							································
Pre-Fill Summa Can	ister Vacuum (in. Hg)	:	-101				
Post-Fill Summa Ca	nister Vacuum (in. Hg):	-1	-			
Time Sample Collec	ted		1512	-			
Notes:	· · · · · · · · · · · · · · · · · · ·						
<u>1508</u> St	JAL VACUUM	PMP					
<u>1512</u> 9	op vacum i	2mp					
CUNISPER	HISSILF (P)	in. Ha. St	WH 1516	×	<u>-</u>		
· · · ·	8011	Ma	_ .	alialia		CLEA	*∽=
Sampler's Signatur	e / Henn		_ Date	2/14/15	-	CREE! ASSO	

	Soil Va	apor Samplin	g Form - Sumn	na Canister	S .
Well ID (depth):	UD-18-75	5(254)	-	Date:	21913
Site Location	Idppy		· ·	Samplers:	MB, RG, MH
Condition of Well:	00d			QA Sample ID:	- KIA
Purge Volume Calculation	ables): 4	7.321(nL+1	7(7 Volur	ne Purged Prior	to Sample Collection:
	1 Valve -		acuum Gas Gauge Flow Meter	r Valve Pu	mp
	Dedic	ated	Commo	on .	
Well Evacuation	·····		F .		· · · · · · · · · · · · · · · · · · ·
Ela Time (1532 1533 1534	apsed Time (minutes) 2. 3	Purge Rate (J /min) () · [5 () · [5 () · [5 () · [6]	Volume Purged (CT) O·(p I: 7.	Vacuum (in. water)	Landfill Gas Concentrations CH4 CO2 O2 0.3 7.8 13.9 0.3 7.1 14.7 0.3 6.71 13.3
					· · · · · · · · · · · · · · · · · · ·
Sample Collection Summa Canister Serial Num Summa Canister Lab Num Flow Regulator and Vacuu Vacuum Pump Start Time Vacuum Pump Stop Time Open Summa Time	mber: ber: Im Gauge Seri:	lal Number:	A8589 1255 10 1531 1534	Q(- - - -	Sample Collected: Yes 🗆 No 🖄

Pre-Fill Summa Canister Vacuum (in. Hg):

Post-Fill Summa Canister Vacuum (in. Hg):

Time Sample Collected



Notes: 1531 Vac PumpStor after 1.8 of purgla

Sampler's Signature

en.

Date 2/19/13



	Soil Va	apor Samplir	ng Form - Sumr	na Canister	S (
Well ID (depth):	PRID-19	710 (10/4)	Date:	2/19/	3
Site Location	Gollad	Park	-	Samplers:	MB, R	G. VNH
Condition of Well:	<u> </u>	\	-	QA Sample ID:	Ň	A
Purge Volume Calcu	lation		1. 0			
Purge Volume (from	SAP tables):	5420 ML	16CF volu	me Purged Prior	to Sample	Collection: 2.4ct
	Valve -		/acuum Gauge Gas Mete Flow Meter	r Valve Pur	mp	
	Dedic	ated	Commo	้วท		
Well Evacuation					J	······································
Time 1552 1554 1554 1554	Elapsed Time (minutes) 2 4 4	Purge Rate (H) /min) ().4 ().4 ().4 ().4 ().4 ().4 ().4	Volume Purged (Cf.) - 0.4 0.8 - 0.8 1.6 - 1.2 2.4	Vacuum (in. water) 5 5 5	Landfill CH4 0.3 0.2	$\begin{array}{c c} \text{Gas Concentrations} \\ \text{CO2} & \text{O2} \\ \hline 14.4 & 17.0 \\ \hline 24.3 & 17.0 \\ \hline 4.2 & 7.0 \\ \hline \end{array}$
						· · ·
Sample Collection	<u> </u>			Q	: Sample C	ollected: Yes 🗆 No 🕅
Summa Canister Seri	ial Number:		5486	-		
Summa Canister Lab	Number:		_575	-	•••	
Flow Regulator and V	Vacuum Gauge Seria	al Number:	_NA	-		
Vacuum Pump Start	Time		1550	-		
Vacuum Pump Stop	Time		1556	-		
Open Summa Time			1556	-		<u> </u>
Close Summa Time			1605	-		
Pre-Fill Summa Canis	ster Vacuum (in. Hg): _\.		-		
Time Sample Collect	ed	3).	1551	-		
Notes: 1550 9	Start, VAC P Stop VAC P Open Sumh Close Sum	UMPQ) DUMPQ) Na #54 Ma	0.40fm, 5 2.4 Cf Di 84/126#5	5in. 1120 Marci 175 Conif	HC	
Sampler's Signature	Aprim	llon	_ Date	2/1a/13	-	

	Soil \	/apor Sampli	ng Form - Summ	a Canisters			
Well ID (depth):	DRUD - 19-	25		Date:	3/4/1	3	
Site Location	Gollob Park	2		Samplers:	M3 + VN	-}	
Condition of Well:	Good			QA Sample ID: _	NA		
		· · · · ·	,				
Purge Volume Calc		115 112011	/ ∪⊐.f Volum	ne Purged Prior	to Sample C	ollection:	1.8 ct
Purge Volume (from	n SAP tables):	<u>434400000</u>					
	Valve	1-i ma	Vacuum Gas Gauge Heter	Vaive Pun	np		
Well Evacuation	Wellhead Ded	icated	Commo	on			
-	Elapsed Time	Purge Rate	Volume Purged	Vacuum	Landfill	Gas Conce	ntrations
Time	(minutes)	(, ¢ /min	$\frac{1}{1}$	(in. water)	CH4		
0755	Ø	0.9		2		()	155
0756		0.9	.0.9	2		6.1	15.4
0757	2	0.9	1.8		O . Litte		
					<u> </u>		
						+	
	· · · · · · · · · · · · · · · · · · ·				C Sample C	oliected: Y	/es 🗆 No 🔎
Sample Collection			A7976		•		
Summa Canister :			938	-			
		Serial Number	/ ()				
	nu vacuum Gauge		0755	_			
Vacuum Pump St	on Time		0757			, , ,	
Open Summa Tin	ne ne		()757				
Close Summa Tin	ne		0804				
Dro-Eill Summa (anister Vacuum (in	. Hg):	-27				
Post_Fill Summa	Canister Vacuum (i	n. Hg):	-1				
Time Sample Cal	lected		0757				
Time pample Col							

Notes:

lle Sampler's Signature m

Date 3/4/13



			~		21.1.	,	
Well ID (depth):	PRUD-20-10	>	[Date:	514113		
iite Location	Gollob Park	<u> </u>		ampiers:	M/A	<u></u>	
Condition of Well:	water just	helow prob	es	QA Sample ID:	- WA		
Purge Volume Calcu	lation			- ·			
Purge Volume (from	SAP tables):	45,420.ml/1.6	cf Volum	ne Purged Prior	to Sample (Collection:	1.6cf
			Gat				
	1- Vaive -		Sauge Meter	Valve Pur	mp		
	Wellhead		C				
	Dedica	ated	Commo	n			
Well Evacuation							
	Elapsed Time	Purge Rate	Volume Purged	Vacuum	Landfill	Gas Conce	ntrations
Time	(minutes)	(나 /min)	(cf)	(in. water)	CH4		02
0820	Ø	0.8	e	2			
1580	ι	0.8	0,8	2	0.1	1.3	19.8
0822	2	0.8	1.6	6	0.1	1.5	19.6
							· · · ·
Comple Collection				Q	C Sample C	oliected: Y	es 🗆 No 🎗
Sample Collection	sial Number		5450		• .		
Summa Canister Se	enal Number.		567	-			
Summa Canister La	id Number. 1 Vacuum Gauge Seri	al Number:					
Flow Regulator and	et Time		0870	-			
Vacuum Pump Sta	n Time		0822	-			
	p mie		0823	-			
Close Summa Time	-		0829	-			
Dro Eill Summa Ca	- nister Vacuum (in Hi	ב <u>ן</u> .	-27	-			
Pre-Fill Summa Ca	anister Vacuum (in. H	19):	-1	-			
Time Sample Colle	aniste, vacadin (i.i.)	·6/·	0823	_			
·							
Notes:			<u> </u>		· · · · · · · · · · · · · · · · · · ·		<u></u>
							<u> </u>
		<u> </u>			······································		
Sampler's Signatı	ire		Dat	ie		CLE	

ASSOCIATES

	Soil Va	por Samplin	g Form - Summ	a Canisters	;		
Well ID (depth):	PRUD-20-	25	I	Date:	3/4/13		
Site Location	Gallob			Samplers:	MB + VI	V 1	
Condition of Well:	water just	- below pro	ikes	QA Sample ID:	NA		
Purge Volume Calcul	ation	17 00 1 1 7	l Volum	ne Purged Prior	to Sample	Collection:	1.8 cf
Purge Volume (from)	SAP tables):	17,35m4 1, m					
	L. Vaive -		acuum Gas Sauge Flow Meter	Vaive Pur	пр	·	
	Wellhead	ated	Commo				
Well Evacuation	Deule				J		
		-					
·	Elapsed Time	Purge Rate	Volume Purged	Vacuum	Landfill	Gas Conce	ntrations
Time	(minutes)	(<u>cf</u> /min)		(in. water)	CH4		
0831	Ø	0.9	0			29	170
0832	<u> l </u>	0.6	0.6		0.1	7.9	18 1
0833	2	0.le	1.2	0	0.1	20	18.00
08 34	í ś	0.6	1.8				1010
		<u> </u>					+
	<u> </u>						<u></u>
Sample Collection				Q	C Sample C	Collected: Y	es 🗆 No
Summa Canister Ser	rial Number:		A8562	-			
Summa Canister Lai	Number:		1249	- ,			
Flow Regulator and	Vacuum Gauge Ser	ial Number:	4	_		<u></u>	
Vacuum Pump Star	t Time		0831	-			
Vacuum Pump Stop	Time		0834				
Open Summa Time			0835	-		<u> </u>	
Close Summa Time			0842	_		<u> </u>	
Pre-Fill Summa Can	ister Vacuum (in. H	g):	- 28	-			
Post-Fill Summa Ca	nister Vacuum (in. I	lg):		_			
Time Sample Collec	ted		0835	_		<u></u>	
Notes: Some	water	in dedic	cated tub	ing - decr	ease	- <u>Slow</u> C	rate
Sampler's Signatur	e film	th	Dat	e <u>3/4/13</u>		CLEA	

ATTACHMENT C2 PHOTOGRAPHS METHANE PROBE SAMPLING

Attachment C2 - Photographs Methane Probe Sampling



Photo of Soil Gas Sampling System



Schematic Drawing of Soil Gas Sampling System

1



MW-05 (May 10, 2013)

Attachment C2 - Photographs Methane Probe Sampling



MW-06 (Feb 21, 2013)



MW-05 (May 10, 2013)



MW-06 (Feb 21, 2013)



MW-08 (Mar 4, 2013)



PRUD-17 (Feb 19, 2013)





PRUD-01 (Feb 19, 2013)

Attachment C2 - Photographs Methane Probe Sampling



PRUD-20 (Mar 4, 2013)



PRUD-04 (Feb 19, 2013)