



TETRA TECH, INC.

May 14, 2013

Dustin Johnson, P.E.
City of Bozeman
P.O. Box 1230
Bozeman, MT 59715

SUBJECT: Progress Report on Soil Gas Probe Installation, Sampling
And Analysis of Soil Gas Samples
Soil Gas Probes BSV-1 through BSV-8
Bozeman Landfill, Bozeman, Montana

Dear Mr. Johnson,

The following progress report summarizes results of soil gas investigative activities conducted between March 20 and April 4, 2013. These activities were conducted as a follow-up on detections of volatile organic compounds (VOCs) in soil gas samples collected from four perimeter methane monitoring wells (BLG-3, 4, 5, and 10) at the Bozeman Landfill in October 2012¹. The activities were conducted in accordance with *Task Order/Proposal Soil Gas Investigation* dated February 13, 2013. This task order was approved by City of Bozeman on March 19, 2013.

Investigative procedures including probe installations, sampling, and laboratory analysis were conducted in accordance with the Montana Vapor Intrusion Guide published by Montana Department of Environmental Quality². Soil gas probes were installed using a Geoprobe[®] operated by Enviro Probe Services located out of Butte, Montana. On March 20 and 21, probes were installed at eight locations at the site.

Subsurface geologic materials consisted of unconsolidated silt with varying amounts of sand and/or clay. Gravel scattered through the silt intervals would be observed, as well as sand intervals. The silt is underlain by sand and gravel that resulted in drilling refusal at probe locations BSV-1 through BSV-4, BSV-6, and BSV-7. Groundwater was not encountered in any of the boreholes although the first borehole at the BSV-7 location appeared to have encountered water coming out of the sand and gravel base material inferred to have been placed for construction of the road.

Probes were installed at *shallow* and *deep* depth intervals at locations BSV-2 through BSV-6 and BSV-8. Locations BSV-1 and BSV-7 are single and shallow probe completions due to drilling refusal at a relatively shallow depth. Probe locations are shown in **Figure 1**. All probe locations were completed with seven-inch long, stainless steel-screened implants connected to ¼-inch ID Nylaflo[®] tubing to surface. The tubing is protected with steel, bolt-down, flush-mount covers secured with concrete grout. The logs of soil gas probes are contained in **Attachment A**.

On March 25, 2013, the soil gas probes were fitted with one-way and three-way polycarbonate (Luer) valves and purged of three pore volumes using a *Gilian BDX Abatement Air Sampler* pump operating at approximately 2 liters per minute. This was conducted to insure the removal of any atmospheric air and allow the entry of 'formation' soil gas. All materials comprising the soil gas probes and completion materials (10-20 silica sand and powdered bentonite) were specified to not sorb VOCs.

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Gas samples were collected from the soil gas probes on April 4, 2013 using 6 liter SUMMA canisters and flow controllers set to 200 milliliters per minute for each probe. Immediately prior to sample collection, the tubing and probe were purged of soil gas using a *Gilian BDX Abatement Air Sampler* pump operating at approximately 2 liters per minute. The duration of this purging varied with the length of tubing to be purged: two seconds of purging for up to 10 feet of tubing and four seconds of purging for up to 20 feet of tubing. Sample equipment was provided by Eurofins Air Toxics (Air Toxics) in Folsom, California. The air sampling field data sheets and atmospheric temperature and barometric pressure logs are contained in **Attachment B**

The SUMMA canister samples were shipped to Air Toxics for laboratory analysis of selected VOCs using the TO-15 Selected Ion Mode (SIM) method. VOC components were selected on the basis of what had been detected or assessed by Tetra Tech to be of particular concern in the October 2012 gas sampling of the BLG- methane monitoring probes. Therefore, the VOC components analyzed include the following:

- Tetrachloroethene
- Trichloroethene
- Benzene
- Ethylbenzene
- Toluene
- Xylenes
- cis 1,2-dichloroethene
- trans 1,2-dichloroethene
- 1,2,4 trimethylbenzene
- Tetrahydrofuran
- Vinyl chloride
- Chloroform

The laboratory report is contained in **Attachment C**. VOC components detected at or above the analytical *Report Limit* include the following:

- Tetrachloroethene
- Trichloroethene
- Benzene
- Ethylbenzene
- Toluene
- Xylenes
- 1,2,4 trimethylbenzene
- Chloroform

The above detections are summarized in **Table 1**. In addition, analytical results in this table are plotted against United States Environmental Protection Agency (EPA) residential indoor air screening levels (RSLs) (for individual VOC components)³. The VOC components that exceed the EPA residential screening level are highlighted in **Table 1**. Therefore, components detected that exceeded EPA RSLs include the following:

- Tetrachloroethene
- Trichloroethene
- Benzene
- Ethylbenzene
- Chloroform

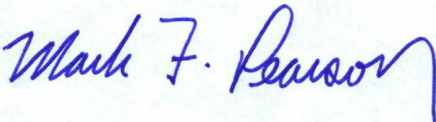
Component concentrations that exceeded EPA RSLs are presented in plan maps of the site (**Figures 2 through 6**). These figures display the concentration differences between individual locations and the shallow and deep probes.

Progress Report on Soil Gas Probe Installation, Sampling
and Analysis of Soil Gas Samples
May 14, 2013

Please contact me with any questions or comments regarding this progress report.

Sincerely,

Tetra Tech Inc.



Mark Pearson
Project Manager/Hydrogeologist

References cited:

- 1 Tetra Tech, 2013. Progress Report on Sampling and Analysis of Soil Gas from Perimeter Methane Monitoring Wells BLG-3, 4, 5, and 10; Bozeman Landfill, Bozeman, Montana. Report submitted to City of Bozeman. January 3.
- 2 Department of Environmental Quality, 2011. *Montana Vapor Intrusion Guide*. <http://deq.mt.gov/statesuperfund/viguide.mcp.x>.
- 3 United States Environmental Protection Agency, November 2012. Regional Screening Levels (formerly PRGs), Screening Levels for Chemical Contaminants. Pacific Southwest, Region 9. <http://www.epa.gov/region9/superfund/prg>

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Table 1
Analysis of Soil Gas Samples

April 4, 2013 Sampling
Bozeman Landfill

SOIL GAS (BSV-) PROBES

CLIENTSAMPID	REPLMT (ug/m3)	UNITS (µg/m3)	SHALLOW RESULTS(µg/m3)	DEEP RESULTS(µg/m3)	EPA SL	COMPOUND NAME
DEPTH (feet below ground surface)			6.3	--		
BSV-1	3.2	µg/m3	ND	--	2,100.00	Tetrahydrofuran
BSV-1	1.1	µg/m3	ND	--	7.30	1,2,4-Trimethylbenzene
BSV-1	0.056	µg/m3	ND	--	0.16	Vinyl Chloride
BSV-1	0.18	µg/m3	ND	--	No SL	cis-1,2-Dichloroethene
BSV-1	0.35	µg/m3	1.2	--	0.31	Benzene
BSV-1	0.24	µg/m3	2.2	--	0.43	Trichloroethene
BSV-1	0.17	µg/m3	0.68	--	5,200.00	Toluene
BSV-1	0.30	µg/m3	90	--	9.40	Tetrachloroethene
BSV-1	0.19	µg/m3	0.24	--	0.97	Ethyl Benzene
BSV-1	0.38	µg/m3	ND	--	100.00	m,p-Xylene
BSV-1	0.19	µg/m3	ND	--	100.00	o-Xylene
BSV-1	0.88	µg/m3	ND	--	63.00	trans-1,2-Dichloroethene
BSV-1	0.22	µg/m3	0.64	--	0.16	Chloroform
DUP	3.2	µg/m3	ND	--	2,100.00	Tetrahydrofuran
DUP	1.1	µg/m3	ND	--	7.30	1,2,4-Trimethylbenzene
DUP	0.056	µg/m3	ND	--	0.16	Vinyl Chloride
DUP	0.18	µg/m3	ND	--	No SL	cis-1,2-Dichloroethene
DUP	0.35	µg/m3	1.2	--	0.31	Benzene
DUP	0.24	µg/m3	2.2	--	0.43	Trichloroethene
DUP	0.17	µg/m3	0.63	--	5,200.00	Toluene
DUP	0.30	µg/m3	96	--	9.40	Tetrachloroethene
DUP	0.19	µg/m3	0.32	--	0.97	Ethyl Benzene
DUP	0.38	µg/m3	0.52	--	100.00	m,p-Xylene
DUP	0.19	µg/m3	0.32	--	100.00	o-Xylene
DUP	0.88	µg/m3	ND	--	63.00	trans-1,2-Dichloroethene
DUP	0.22	µg/m3	0.61	--	0.16	Chloroform

CLIENTSAMPID	REPLMT (ug/m3)	UNITS (µg/m3)	SHALLOW RESULTS(µg/m3)	DEEP RESULTS(µg/m3)	EPA SL	COMPOUND NAME
DEPTH (feet below ground surface)			7.5	15.5		
BSV-2	3.0	µg/m3	ND	ND	2,100.00	Tetrahydrofuran
BSV-2	1.0	µg/m3	2.0	ND	7.30	1,2,4-Trimethylbenzene
BSV-2	0.053	µg/m3	ND	ND	0.16	Vinyl Chloride
BSV-2	0.16	µg/m3	ND	ND	No SL	cis-1,2-Dichloroethene
BSV-2	0.33	µg/m3	3.0	2.6	0.31	Benzene
BSV-2	0.22	µg/m3	ND	ND	0.43	Trichloroethene
BSV-2	0.16	µg/m3	3.9	2.2	5,200.00	Toluene
BSV-2	0.28	µg/m3	28	72	9.40	Tetrachloroethene
BSV-2	0.18	µg/m3	1.5	0.93	0.97	Ethyl Benzene
BSV-2	0.36	µg/m3	3.0	1.9	100.00	m,p-Xylene
BSV-2	0.18	µg/m3	1.3	0.92	100.00	o-Xylene
BSV-2	0.82	µg/m3	ND	ND	63.00	trans-1,2-Dichloroethene
BSV-2	0.20	µg/m3	3.7	1.7	0.16	Chloroform

Table 1
Analysis of Soil Gas Samples
 April 4, 2013 Sampling
 Bozeman Landfill

CLIENTSAMPID	REPLMT (ug/m3)	UNITS (µg/m3)	SHALLOW RESULTS(µg/m3)	DEEP RESULTS(µg/m3)	EPA SL	COMPOUND NAME
DEPTH (feet below ground surface)			7.1	15.1		
BSV-3	3.4	µg/m3	ND	ND	2,100.00	Tetrahydrofuran
BSV-3	1.1	µg/m3	2.4	ND	7.30	1,2,4-Trimethylbenzene
BSV-3	0.058	µg/m3	ND	ND	0.16	Vinyl Chloride
BSV-3	0.18	µg/m3	ND	ND	No SL	cis-1,2-Dichloroethene
BSV-3	0.36	µg/m3	10	3.6	0.31	Benzene
BSV-3	0.24	µg/m3	ND	ND	0.43	Trichloroethene
BSV-3	0.17	µg/m3	18	1.2	5,200.00	Toluene
BSV-3	0.31	µg/m3	0.78	2.2	9.40	Tetrachloroethene
BSV-3	0.20	µg/m3	3.2	0.48	0.97	Ethyl Benzene
BSV-3	0.40	µg/m3	9.0	0.78	100.00	m,p-Xylene
BSV-3	0.20	µg/m3	3.6	0.56	100.00	o-Xylene
BSV-3	0.90	µg/m3	ND	ND	63.00	trans-1,2-Dichloroethene
BSV-3	0.22	µg/m3	75	2.2	0.16	Chloroform

CLIENTSAMPID	APPROX REPLMT (ug/m3)	UNITS (µg/m3)	SHALLOW RESULTS(µg/m3)	DEEP RESULTS(µg/m3)	EPA SL	COMPOUND NAME
DEPTH (feet below ground surface)			7.5	13.5		
BSV-4	3.6	µg/m3	ND	ND	2,100.00	Tetrahydrofuran
BSV-4	1.2	µg/m3	1.4	ND	7.30	1,2,4-Trimethylbenzene
BSV-4	0.062	µg/m3	ND	ND	0.16	Vinyl Chloride
BSV-4	0.19	µg/m3	ND	ND	No SL	cis-1,2-Dichloroethene
BSV-4	0.38	µg/m3	6.3	4.8	0.31	Benzene
BSV-4	0.26	µg/m3	ND	ND	0.43	Trichloroethene
BSV-4	0.18	µg/m3	6.6	1.6	5,200.00	Toluene
BSV-4	0.33	µg/m3	2.7	6.7	9.40	Tetrachloroethene
BSV-4	0.21	µg/m3	1.5	0.53	0.97	Ethyl Benzene
BSV-4	0.42	µg/m3	3.8	0.88	100.00	m,p-Xylene
BSV-4	0.21	µg/m3	1.5	0.57	100.00	o-Xylene
BSV-4	0.96	µg/m3	ND	ND	63.00	trans-1,2-Dichloroethene
BSV-4	0.24	µg/m3	8.3	0.42	0.16	Chloroform

CLIENTSAMPID	APPROX REPLMT (ug/m3)	UNITS (µg/m3)	SHALLOW RESULTS(µg/m3)	DEEP RESULTS(µg/m3)	EPA SL	COMPOUND NAME
DEPTH (feet below ground surface)			8.8	18.8		
BSV-5	3.0	µg/m3	ND	ND	2,100.00	Tetrahydrofuran
BSV-5	1.0	µg/m3	4.0	ND	7.30	1,2,4-Trimethylbenzene
BSV-5	0.053	µg/m3	ND	ND	0.16	Vinyl Chloride
BSV-5	0.16	µg/m3	ND	ND	No SL	cis-1,2-Dichloroethene
BSV-5	0.33	µg/m3	6.8	1.1	0.31	Benzene
BSV-5	0.22	µg/m3	ND	0.94	0.43	Trichloroethene
BSV-5	0.16	µg/m3	22	1.3	5,200.00	Toluene
BSV-5	0.28	µg/m3	17	260	9.40	Tetrachloroethene
BSV-5	0.18	µg/m3	4.0	ND	0.97	Ethyl Benzene
BSV-5	0.36	µg/m3	14	ND	100.00	m,p-Xylene
BSV-5	0.18	µg/m3	3.8	ND	100.00	o-Xylene
BSV-5	0.82	µg/m3	ND	ND	63.00	trans-1,2-Dichloroethene
BSV-5	0.20	µg/m3	28	3.9	0.16	Chloroform

Table 1
Analysis of Soil Gas Samples

April 4, 2013 Sampling
Bozeman Landfill

CLIENTSAMPID	APPROX REPLMT (ug/m3)	UNITS (µg/m3)	SHALLOW RESULTS(µg/m3)	DEEP RESULTS(µg/m3)	EPA SL	COMPOUND NAME
DEPTH (feet below ground surface)			7.8	15.8		
BSV-6	3.1	µg/m3	ND	ND	2,100.00	Tetrahydrofuran
BSV-6	1.0	µg/m3	2.7	ND	7.30	1,2,4-Trimethylbenzene
BSV-6	0.054	µg/m3	ND	ND	0.16	Vinyl Chloride
BSV-6	0.17	µg/m3	ND	ND	No SL	cis-1,2-Dichloroethene
BSV-6	0.34	µg/m3	10	2.4	0.31	Benzene
BSV-6	0.23	µg/m3	ND	ND	0.43	Trichloroethene
BSV-6	0.16	µg/m3	18	2.0	5,200.00	Toluene
BSV-6	0.29	µg/m3	2.2	48	9.40	Tetrachloroethene
BSV-6	0.18	µg/m3	3.0	0.61	0.97	Ethyl Benzene
BSV-6	0.37	µg/m3	9.6	1.1	100.00	m,p-Xylene
BSV-6	0.18	µg/m3	2.8	0.71	100.00	o-Xylene
BSV-6	0.84	µg/m3	ND	ND	63.00	trans-1,2-Dichloroethene
BSV-6	0.21	µg/m3	32	0.50	0.16	Chloroform

CLIENTSAMPID	APPROX REPLMT (ug/m3)	UNITS (µg/m3)	SHALLOW RESULTS(µg/m3)	DEEP RESULTS(µg/m3)	EPA SL	COMPOUND NAME
DEPTH (feet below ground surface)			6.8	--		
BSV-7	3.6	µg/m3	ND	--	2,100.00	Tetrahydrofuran
BSV-7	1.2	µg/m3	ND	--	7.30	1,2,4-Trimethylbenzene
BSV-7	0.063	µg/m3	ND	--	0.16	Vinyl Chloride
BSV-7	0.20	µg/m3	ND	--	No SL	cis-1,2-Dichloroethene
BSV-7	0.40	µg/m3	2.2	--	0.31	Benzene
BSV-7	0.27	µg/m3	ND	--	0.43	Trichloroethene
BSV-7	0.19	µg/m3	0.83	--	5,200.00	Toluene
BSV-7	0.34	µg/m3	9.2	--	9.40	Tetrachloroethene
BSV-7	0.22	µg/m3	0.43	--	0.97	Ethyl Benzene
BSV-7	0.43	µg/m3	0.66	--	100.00	m,p-Xylene
BSV-7	0.22	µg/m3	0.38	--	100.00	o-Xylene
BSV-7	0.98	µg/m3	ND	--	63.00	trans-1,2-Dichloroethene
BSV-7	0.24	µg/m3	ND	--	0.16	Chloroform

CLIENTSAMPID	APPROX REPLMT (ug/m3)	UNITS (µg/m3)	SHALLOW RESULTS(µg/m3)	DEEP RESULTS(µg/m3)	EPA SL	COMPOUND NAME
DEPTH (feet below ground surface)			8.8	18.8		
BSV-8	8.1	µg/m3	ND	ND	2,100.00	Tetrahydrofuran
BSV-8	2.7	µg/m3	ND	ND	7.30	1,2,4-Trimethylbenzene
BSV-8	0.14	µg/m3	ND	ND	0.16	Vinyl Chloride
BSV-8	0.44	µg/m3	ND	ND	No SL	cis-1,2-Dichloroethene
BSV-8	0.88	µg/m3	0.89	1.8	0.31	Benzene
BSV-8	0.59	µg/m3	ND	ND	0.43	Trichloroethene
BSV-8	0.41	µg/m3	4.1	8.0	5,200.00	Toluene
BSV-8	0.75	µg/m3	530	680	9.40	Tetrachloroethene
BSV-8	0.48	µg/m3	0.98	3.0	0.97	Ethyl Benzene
BSV-8	0.96	µg/m3	2.8	8.5	100.00	m,p-Xylene
BSV-8	0.48	µg/m3	1.2	2.8	100.00	o-Xylene
BSV-8	2.2	µg/m3	ND	ND	63.00	trans-1,2-Dichloroethene
BSV-8	0.54	µg/m3	1.6	ND	0.16	Chloroform



Google earth

feet
meters

1000


600



Notes:

Soil gas probes (BSV-) installed March 20 and 21, 2013

All soil gas probe locations are between the sidewalk and street curb, in the public ROW

 New Residential Construction

 Groundwater Monitoring Well

 Methane Monitoring Probe (BLG-)

LOCATIONS OF SOIL GAS PROBES

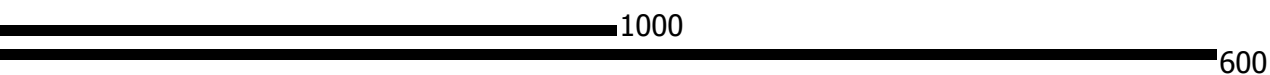
BOZEMAN LANDFILL
BOZEMAN, MONTANA
MARCH 21, 2013

FIGURE 1



Google earth

feet
meters




Notes:

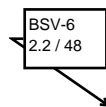
Methane monitoring probes (BLG-) sampled October 30, 2012
 Soil gas probes (BSV-) installed March 20 and 21, 2013
 and sampled April 4, 2013

All BSV- probe locations are between the sidewalk and street
 curb, in the public ROW

 New Residential Construction

 Groundwater Monitoring Well

 Methane Monitoring Probe (BLG-)



Soil Gas Probe Location
 Shallow Probe / Deep Probe
 Component Concentration in
 micrograms per cubic meter
 (ug/m³)

Tetrachloroethene USEPA
 Residential Air Screening Level
 is 9.4 ug/m³
 (November 2012)

TETRACHLOROETHENE
 IN SOIL GAS
 BOZEMAN LANDFILL
 BOZEMAN, MONTANA
 APRIL 4, 2013

FIGURE 2



Google earth

feet
meters

1000

600



Notes:

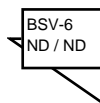
Methane monitoring probes (BLG-) sampled October 30, 2012
 Soil gas probes (BSV-) installed March 20 and 21, 2013
 and sampled April 4, 2013

All BSV- probe locations are between the sidewalk and street
 curb, in the public ROW

 New Residential Construction

 Groundwater Monitoring Well

 Methane Monitoring Probe (BLG-)

 BSV-6
ND / ND

Soil Gas Probe Location
 Shallow Probe / Deep Probe
 Component Concentration in
 micrograms per cubic meter
 ($\mu\text{g}/\text{m}^3$)

Trichloroethene USEPA
 Residential Air Screening Level
 is $0.43 \mu\text{g}/\text{m}^3$
 (November 2012)

ND : Not Detected
 < : Less Than

TRICHLOROETHENE

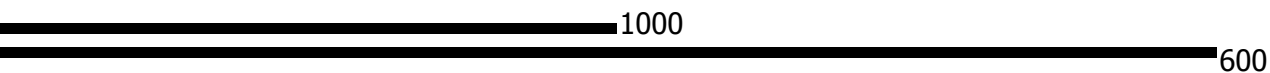
IN SOIL GAS
 BOZEMAN LANDFILL
 BOZEMAN, MONTANA
 APRIL 4, 2013

FIGURE 3



Google earth

feet
meters




Notes:

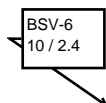
Methane monitoring probes (BLG-) sampled October 30, 2012
 Soil gas probes (BSV-) installed March 20 and 21, 2013
 and sampled April 4, 2013

All BSV- probe locations are between the sidewalk and street
 curb, in the public ROW

 New Residential Construction

 Groundwater Monitoring Well

 Methane Monitoring Probe (BLG-)


 BSV-6
 10 / 2.4

Soil Gas Probe Location
 Shallow Probe / Deep Probe
 Component Concentration in
 micrograms per cubic meter
 (ug/m³)

Benzene USEPA
 Residential Air Screening Level
 is 0.31 ug/m³
 (November 2012)

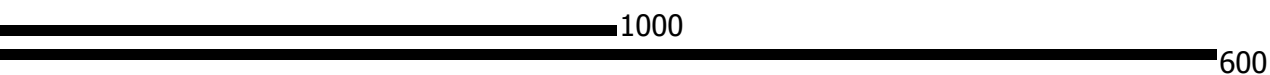
BENZENE
 IN SOIL GAS
 BOZEMAN LANDFILL
 BOZEMAN, MONTANA
 APRIL 4, 2013

FIGURE 4



Google earth

feet
meters




Notes:

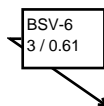
Methane monitoring probes (BLG-) sampled October 30, 2012
 Soil gas probes (BSV-) installed March 20 and 21, 2013
 and sampled April 4, 2013

All BSV- probe locations are between the sidewalk and street
 curb, in the public ROW

 New Residential Construction

 Groundwater Monitoring Well

 Methane Monitoring Probe (BLG-)

 BSV-6
3 / 0.61

Soil Gas Probe Location
 Shallow Probe / Deep Probe
 Component Concentration in
 micrograms per cubic meter
 ($\mu\text{g}/\text{m}^3$)

Ethylbenzene USEPA
 Residential Air Screening Level
 is $0.97 \mu\text{g}/\text{m}^3$
 (November 2012)

ND : Not Detected

ETHYLBENZENE
 IN SOIL GAS
 BOZEMAN LANDFILL
 BOZEMAN, MONTANA
 APRIL 4, 2013

FIGURE 5



Google earth

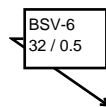


Notes:

Methane monitoring probes (BLG-) sampled October 30, 2012
 Soil gas probes (BSV-) installed March 20 and 21, 2013
 and sampled April 4, 2013

All BSV- probe locations are between the sidewalk and street
 curb, in the public ROW

- New Residential Construction
- Groundwater Monitoring Well
- Methane Monitoring Probe (BLG-)



Soil Gas Probe Location
 Shallow Probe / Deep Probe
 Component Concentration in
 micrograms per cubic meter
 (ug/m³)

Chloroform USEPA
 Residential Air Screening Level
 is 0.11 ug/m³
 (November 2012)

ND : Not Detected
 < : Less Than

CHLOROFORM
 IN SOIL GAS
 BOZEMAN LANDFILL
 BOZEMAN, MONTANA
 APRIL 4, 2013

FIGURE 6

ATTACHMENT A

LOG OF DRILLING AND INSTALLATION

PAGE 1 OF 1



TETRA TECH, INC.

PROJECT: Bozeman Landfill
 JOB NO.: 114-710303.746
 DRILL TYPE: Geoprobe 5410
 DRILLED BY: Enviro Probe Serv. WET
 LOGGED BY: MF Pearson
 REMARKS: _____

BOREHOLE WELL or PROBE NO.: BSV-1
 LOCATION: N Part of St. Andrews Dr. and closest to McElhattan Rd
 DATE: 3/21/2013

DEPTH (FT)	GRAPHIC LOG	CLASSIFICATION AND DESCRIPTION	SAMPLE INTERVAL	S.P.T. (IN) (BLOWS/FT.)	ORGANIC VAPOR CONTENT (ppm)	WELL COMPLETION
0.00		Topsoil Sand & Gravel Sub-grade - very moist				
0.00 - 5.00		Clayey Silt - lt. brown, moist firm 4-7' drill pushes easily down	25%			
5.00 - 7.50		Obs. wet to very moist sandy silt w/ scattered gravel in this zone	25%			
7.50		← abrupt change in lithology Did not obs. material in drill tip - gravel in silt/sand matrix				
7.50 - 10.00		Refusal @ 7.5' (due to Sand & Gravel Intercept)				
<p>Conduct single completion Hole is dry during completion 1500 - 1530 Begin concrete & manhole process - 1550 finish</p> <p style="text-align: center;">TDB @ 7.5'</p>						
<p style="text-align: right;">7.50' TD</p> <p style="text-align: right;">7.5'</p> <p style="text-align: right;">10/20 Silica Sand</p> <p style="text-align: right;">Hydrated Powdered Bentonite</p> <p style="text-align: right;">6.33'</p> <p style="text-align: right;">7.5'</p> <p style="text-align: right;">7.50' TD</p> <p style="text-align: right;">7.5'</p> <p style="text-align: right;">10/20 Silica Sand</p> <p style="text-align: right;">Hydrated Powdered Bentonite</p> <p style="text-align: right;">10/20 Silica Sand</p>						

LOG OF DRILLING AND INSTALLATION

PAGE 1 OF 1



TETRA TECH, INC.

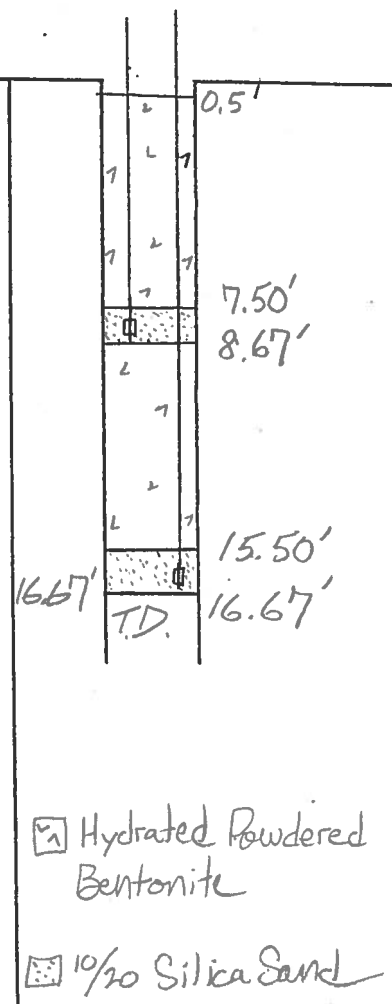
PROJECT: Bozeman Landfill
 JOB NO.: 114-710303.740
 DRILL TYPE: Geoprobe 5410
 DRILLED BY: Enviro Probe Serv. WET
 LOGGED BY: MF Pearson
 REMARKS: _____

BOREHOLE WELL or PROBE NO.: BSV-2
 LOCATION: N part of St Andrews Dr., across from 610 St Andrews Dr. residence
 DATE: 3/21/13

DEPTH (FT)	GRAPHIC LOG	CLASSIFICATION AND DESCRIPTION	SAMPLE INTERVAL	S.F.T. (IN) (BLOWS/FT.)	ORGANIC VAPOR CONTENT (PPM)	WELL COMPLETION
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Setup & Drill - 914

	Topsoil S+G subgrade					0.5'
	Clayey silt - moist, firm, H. brown ML	35%				
5	Silt - moist, firm, H. brown, tr. frgr. sand	60%				
	0.2' wet zone w/ incr. frgr. sand					7.50'
		60				8.67'
	Cont'd Silt as above but w/ tr. scattered gravel to 16.4'	60				
15	Change to Sand & Gravel w/ silt matrix GM at 16.4'					15.50'
	Refusal @ 16.67' - TD					16.67'
	1000 Start Compl. 1045 Finish Compl. 3/21/13 1555 Begin concrete & manhole					T.D.



1000

LOG OF DRILLING AND INSTALLATION



TETRA TECH, INC.

PROJECT: Borzeman Landfill
 JOB NO.: 114-710303-740
 DRILL TYPE: Geoprobe 5410
 DRILLED BY: WET Enviro Probe Services
 LOGGED BY: MF Pearson
 REMARKS: _____

BOREHOLE WELL or PROBE NO.: BSV-3
 LOCATION: N side of St Andrews near 696 St. Andrews
 DATE: 3/20/2013

DEPTH (FT)	GRAPHIC LOG	CLASSIFICATION AND DESCRIPTION	SAMPLE INTERVAL	S.P.T. (IN) (BLOWS/FT.)	ORGANIC VAPOR CONTENT (ppm)	WELL COMPLETION
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1635 Begin drilling

0-3'	Topsoil w/ scattered gravel then clayey silt w/ scattered gravel to 3'		60%			0.5'
3-4'	Silt-Firm, lt. brown, moist					
4-8'	Clayey Silt OL CL - very Firm/stiff moist, lt. brown		100%			7.10'
8-11.6'						8.25'
11.6-16'	S&G in silty matrix - Firm, moist Cont'd Clayey Silt - stiff, moist Lighter brown, very moist - sl. wet					
16-16.25'	Silt, moist w/ gravel at 16.20'-16.25'					15.10'
16.25'	Refusal at 16.25'					16.25'
TD @ 16.25'						

- Hydrated Powdered Bentonite
- 10/20 Silica Sand

Well comp. 1700 - 1820
 3/21/13 1615 Begin concrete & manhole

700

LOG OF DRILLING AND INSTALLATION



TETRA TECH, INC.

PROJECT: Bozeman Landfill
 JOB NO.: 114-710303.740
 DRILL TYPE: Geoprobe 5410
 DRILLED BY: WET Enviroprobe Services
 LOGGED BY: MF Pearson
 REMARKS: _____

BOREHOLE WELL or PROBE NO.: BSV-4
 LOCATION: Corner of Turnberry & St. Andrews
 DATE: 3/20/13 - 3/21/13

DEPTH (FT)	GRAPHIC LOG	CLASSIFICATION AND DESCRIPTION	SAMPLE INTERVAL	S.P.T. (IN) (BLOWS/FT.)	ORGANIC VAPOR CONTENT (ppm)	WELL COMPLETION
						BSV-4-Mid Single Compl.
		3/20/13 Topsoil & scattered gravel to ~1'				Not Sampled
		Sandy silt w/ trace clay, lt. brown, moist, firm to 4.8'	50%			
5		Slight change - Incr. sand - v. fn. gr. Cont'd sandy silt SM moist scattered gravel @ 6.5', for 4"	50%			
		Sandy silt to 8'				8.83'
10		8'-12' Silt, lt. brown, moist, Firm (but breaks up in hand). Incr. clay content @ 11-12'	60%			10.00'
		Refusal - Gravel intercepted @ 14.33'	90%			14.33' Refusal
		Decide to complete a 'shallow' probe				1550
		12'-14' - Silt w/ minor clay & tr. sand (fn. gr.), moist, as in 8-12' incr. clay content: 13-14'		815 to	BSV-4 second Borehole	BSV-4 0.5' Sampled
		14'-14.33' - Gravel in sandy silt to silty sand matrix				7.50'
		1550 Finish BSV-4 S Completion and Move onto BSV-4 D hole. 4 S and 4 D are single completions/borehole				8.67'
		1620 Second borehole 4' to w - Refusal @ 14.5' Leave hole open and move to BSV-3 to gain knowledge (3/20). Return on 3/21 and decide on dual completion in second borehole				13.50'
						14.67'

- Hydrated Powdered Bentonite
- 10/20 Silica Sand

520

LOG OF DRILLING AND INSTALLATION

PAGE 1 OF 1



TETRA TECH, INC.

PROJECT: Bozeman Landfill
 JOB NO.: 114-710303.740
 DRILL TYPE: Geoprobe 5410
 DRILLED BY: WET Enviro Probe Serv.
 LOGGED BY: MFPearson
 REMARKS: _____

BOREHOLE WELL or PROBE NO.: BSV-5
 LOCATION: East end of Turnberry
 DATE: 3/20/2013

DEPTH (FT)	GRAPHIC LOG	CLASSIFICATION AND DESCRIPTION	SAMPLE INTERVAL	S.P.T. (IN) (BLOWS/FT.)	ORGANIC VAPOR CONTENT (ppm)	WELL COMPLETION
0.0		Topsail and SRG subbase to 1.5'				
1.5		Brown clayey silt Ch, very moist, Firm/stiff to 10'				
5.0		Thin gravel interval				
10.0		10'-13' Lighter brown, less stiff silt w/ minor clay				
13.0		13'-16' Clayey Silt or Silty Clay, brown, moist, very stiff				
16.0		16-17.8' As above				
17.8		17.8-19.5' Clayey silty sand, brown, moist, not as firm				
19.5		19.5-20' Clayey silt, very firm/stiff, moist				
20.0		TD				

Hydrated Powdered Bentonite
 10/20 Silica Sand

LOG OF DRILLING AND INSTALLATION

PAGE 1 OF 1



TETRA TECH, INC.

PROJECT: Bozeman Landfill

JOB NO.: 114-110303.740

DRILL TYPE: Geoprobe 5410

BOREHOLE WELL or PROBE NO.: BSV-6

DRILLED BY: WET Environmental Services

LOCATION: S of LF-3 well

LOGGED BY: MF Pearson

REMARKS: _____

DATE: 3/21/13

DEPTH (FT)	GRAPHIC LOG	CLASSIFICATION AND DESCRIPTION	SAMPLE INTERVAL	S.P.T. (IN) (BLOWS/FT.)	ORGANIC VAPOR CONTENT (ppm)	WELL COMPLETION
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Setup & Drill 1055

<p>8.00</p> <p>5</p> <p>15</p> <p>1140</p>		<p>5+6 Subbase</p> <p>Clayey Silt - v. moist (wet at top) lt. brown, stiff,</p> <p>4-8' Silt w/carbon, very dense/ stiff, moist, and lt. brown</p> <p>Carbon zone</p> <p>Cont'd Silt - lt. brown, very stiff, moist</p> <p>0.35' wet to v. moist zone</p> <p>At 16.7' Change to Sand & Gravel</p> <p>Sand and Gravel in silty matrix - 6M</p> <p>16.5' to TD very moist, but not wet very dense/stiff</p> <p>Refusal @ 18.17'</p> <p>Due to obs. of very moist condition @ ~18', decide to have bottom of sand at 17'</p> <p>1140 start compl.</p> <p>1230 finish compl.</p> <p>1230-1400 Driller's break</p>			<p>10/20 Silica Sand</p>	<p>0.5'</p> <p>7.83'</p> <p>9.00'</p> <p>15.83'</p> <p>17.00'</p> <p>Hydrated bentonite powder</p> <p>18.17'</p> <p>TD</p>
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LOG OF DRILLING AND INSTALLATION



TETRA TECH, INC.

PROJECT: Bozeman Landfill
 JOB NO.: 114-710303-740
 DRILL TYPE: Geoprobe 5410
 DRILLED BY: WET Enviro Probe Serv.
 LOGGED BY: MF Pearson
 REMARKS: _____

BOREHOLE WELL or PROBE NO.: BSV-7
 LOCATION: Second Try Betw. 972 & 938
St Andrews Dr. residences (4' East of abandoned)
 DATE: 3/21/2013 (BSV-7)

DEPTH (FT)	CLASSIFICATION AND DESCRIPTION	SAMPLE INTERVAL	S.P.T. (N) (BLOWS/FT.)	ORGANIC VAPOR CONTENT (ppm)	WELL COMPLETION
<p>5</p>	<p>Topsoil Sand & Gravel Sub-base - wet Silt - very firm/stiff, moist, w/organic matter - dark gray to gray brown Scattered gravel 6.75' - change to Sand & Gravel w/ silt matrix GM, moist, firm, lt brown TD Stopped at 8' to prevent water inflow - Begin completion Very little water made during compl. ∴ could complete 'well' w/ bentonite above groundwater Offsite @ 1835</p>				<p style="text-align: right;">BSV-7</p> <p>0.5</p> <p>6.83'</p> <p>8.0'</p> <p>6'10'</p> <p>7'9"</p> <p>8'</p> <p><input checked="" type="checkbox"/> Hydrated Powdered Bentonite <input checked="" type="checkbox"/> 10/20 Silica Sand</p>

LOG OF DRILLING AND INSTALLATION

PAGE ____ OF ____



TETRA TECH, INC.

PROJECT: _____
 JOB NO.: _____
 DRILL TYPE: _____
 DRILLED BY: _____
 LOGGED BY: _____
 REMARKS: _____

BOREHOLE WELL or PROBE NO.: BSV-7
 LOCATION: Abandoned due to water inflow
 DATE: _____

DEPTH (FT)	GRAPHIC LOG	CLASSIFICATION AND DESCRIPTION	SAMPLE INTERVAL	S.P.T. (IN) (BLOWS/FT.)	ORGANIC VAPOR CONTENT (ppm)	WELL COMPLETION
------------	-------------	--------------------------------	-----------------	-------------------------	-----------------------------	-----------------

1300 Setup & drill

0.0	Topsoil	S+G Sub-base				
5		Silt-firm, moist, w/organic matter dk gray to gray brown				
		Silt w/ scattered gravel & fng sand at 6.75' and silt GM				
		Cont'd Sand & Gravel w/ Silt to TD - moist, not wet!, gray, GM				
		Refusal 10' 8"				
		Notice water when placing deep probe. Believe water coming in from up high in the borehole - Sand & Gravel Sub-base ??? Water level rising. We try to put in a good compl. where sand top is 6' 7". Probe is set ~ 3" below that. Water rises to ~ 3.5' and so we tamp using a tamping rod. Area around probe may drain to enable probe w/ a bollity - gas sampling.				
		1730 Decide to try and do another hole to 7.5' TD only. Setup and drill ~ 4' E of earlier borehole & compl.				
						Seal below wk
						6.58'
						10.67'
						6' 7"
						7' 6"
						wh up to 3.5'
						Beut 6' 7" to 0.5 pow in 1-1/20
						5.5 - 5' 5"
						6.67 - 6' 8"

Abandoned Due to Water inflow

1330

LOG OF DRILLING AND INSTALLATION

PAGE 1 OF 1



TETRA TECH, INC.

PROJECT: Bozeman Landfill

JOB NO.: 114-710303.740

DRILL TYPE: Geoprobe 5410

BOREHOLE WELL or PROBE NO.: BSU-8

DRILLED BY: Enviro Probe Services WET

LOCATION: Wind of Laddie Ct

LOGGED BY: MF Pearson

DATE: 3/20/2013

REMARKS: _____

DEPTH (FT)	GRAPHIC LOG	CLASSIFICATION AND DESCRIPTION	SAMPLE INTERVAL	S.P.T. (IN) (BLOWS/FT.)	ORGANIC VAPOR CONTENT (ppm)	WELL COMPLETION
		0.5' Topsoil Sand & Gravel subgrade				
		Very moist Clayey Silt w/ tr. fine gr. sand	60			
		4.2 Dense to ~4.2'				
		Moist Silt - brn w/ carbonaceous zones, dense, firm	85			
		Grading down to Sandy Silt - lighter brown, moist, not as firm	80			
		Tan brown Silt - moist, sl. dense/firm minor fr. gr. sand, to TD tan-brown	70			
		TDC @ 20'				
						Hydrated Powdered Bentonite
						8.83
						10.0
						18.83
						20.0
						TO
						10/20 Silica Sand

ATTACHMENT B

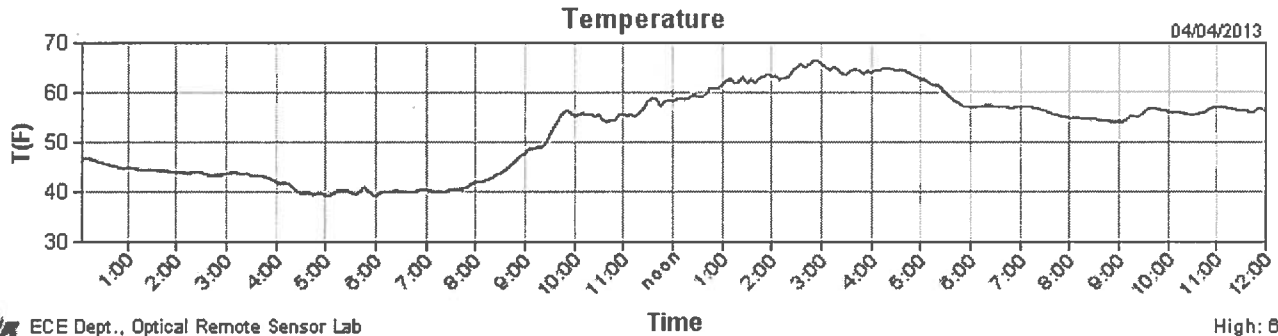
Ambient Outdoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality									
Site ID: <i>BSV-5</i>					Start Weather: <i>Breeze, dry, ~ 55°F</i>				
Project Name: <i>Boz Landfill</i>					Start Air Temp:				
Sample location: <i>East end of Turnberry Ct.</i>					Start Atmospheric Pressure: <i>24.98 inHg</i>				
Date: <i>4/4/13</i>					End Weather:				
Field Personnel: <i>MFP</i>					End Air Temp:				
Recorded by: <i>MFP</i>					End Atmospheric Pressure:				
Canister and Sample Information									
Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge # ^{check}	Initial Vacuum	Final Vacuum
<i>4/4/13</i>	<i>1151</i>	<i>1224</i>		<i>BSV-5 Shallow</i>	<i>4242</i>	<i>FC00785</i>	<i>-24.8"</i>	<i>-25.3</i>	<i>-6.1</i>
	<i>1228</i>	<i>1254</i>		<i>BSV-5 Deep</i>	<i>34482</i>	<i>FC00159</i>	<i>-24.9"</i>	<i>-27.5</i>	<i>-8.6</i>
Comment/location description:									

Data for 04/04/2013



Sea-Level Adjusted Pressure Absolute Pressure Temperature Relative Humidity Dew Point
 mb/inHg mb/inHg °C/°F % °C/°F



ECE Dept., Optical Remote Sensor Lab
<http://orsl.eps.montana.edu/weather/>

High: 66.
 Low: 39.

Wind
 m/s & ° from true north

Precipitation
 0 mm/0 in

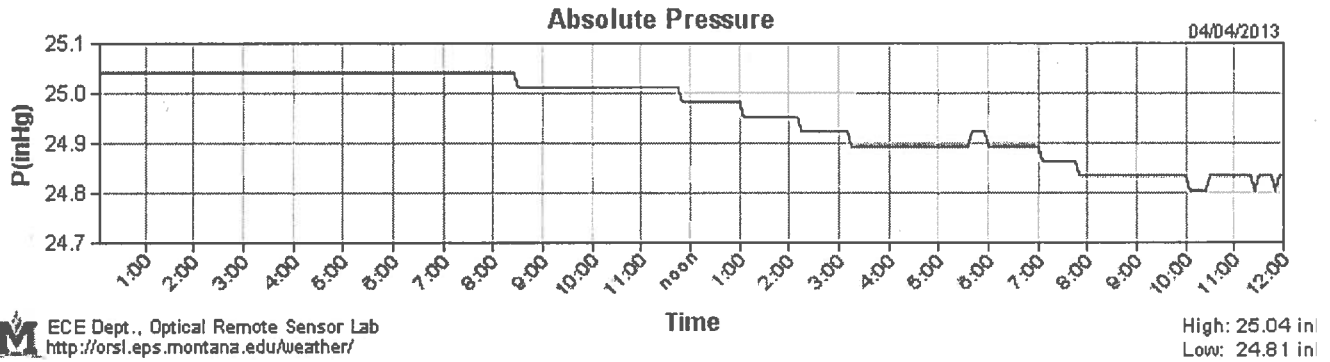
Solar Irradiance
 w/m²

* Select the desired unit above to view the corresponding chart. *
 (Example: clicking °F shows the chart in Fahrenheit.)

Data for 04/04/2013



Sea-Level Adjusted Pressure Absolute Pressure Temperature Relative Humidity Dew Point
 mb/inHg mb/inHg °C/°F % °C/°F



ECE Dept., Optical Remote Sensor Lab
<http://orsl.eps.montana.edu/weather/>

Wind
m/s & ° from true north

Precipitation
0 mm/0 in

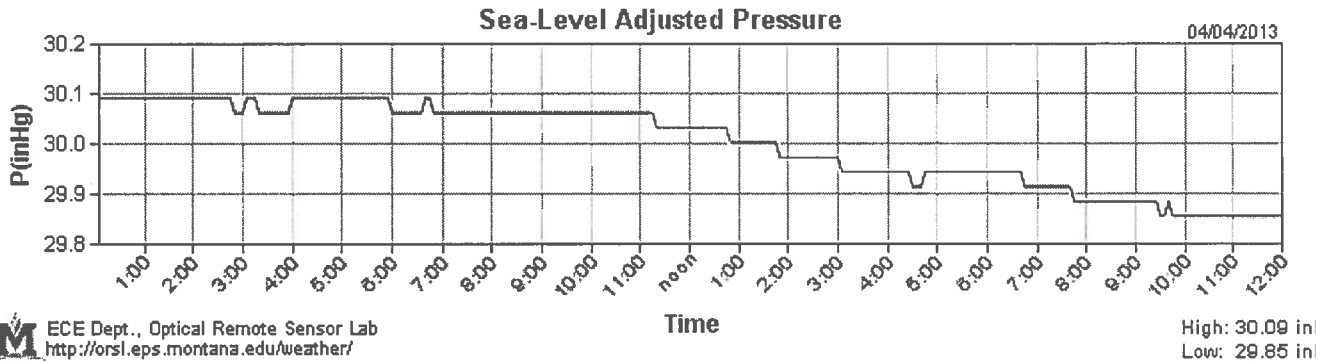
Solar Irradiance
w/m²

* Select the desired unit above to view the corresponding chart. *
 (Example: clicking °F shows the chart in Fahrenheit.)

Data for 04/04/2013



Sea-Level Adjusted Pressure Absolute Pressure Temperature Relative Humidity Dew Point
 mb/inHg mb/inHg °C/°F % °C/°F



ECE Dept., Optical Remote Sensor Lab
<http://orsl.eps.montana.edu/weather/>

Wind
 m/s & ° from true north

Precipitation
 0 mm/0 in

Solar Irradiance
 w/m²

* Select the desired unit above to view the corresponding chart. *
 (Example: clicking °F shows the chart in Fahrenheit.)

ATTACHMENT C

4/22/2013

Mr. Mark Pearson
Tetra Tech
851 Bridger Drive
Suite 6
Bozeman MT 59715

Project Name: Bozeman Landfill

Project #: 114-710303.740

Workorder #: 1304183

Dear Mr. Mark Pearson

The following report includes the data for the above referenced project for sample(s) received on 4/8/2013 at Air Toxics Ltd.

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

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

Regards,



Kelly Buettner
Project Manager

WORK ORDER #: 1304183

Work Order Summary

CLIENT: Mr. Mark Pearson
 Tetra Tech
 851 Bridger Drive
 Suite 6
 Bozeman, MT 59715

BILL TO: Mr. Mark Pearson
 Tetra Tech
 851 Bridger Drive
 Suite 6
 Bozeman, MT 59715

PHONE: 406-582-8780

P.O. #

FAX: 406-582-8790

PROJECT # 114-710303.740 Bozeman Landfill

DATE RECEIVED: 04/08/2013

CONTACT: Kelly Buettner

DATE COMPLETED: 04/22/2013

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	BSV-1	Modified TO-15	11.6 "Hg	5.2 psi
01B	BSV-1	Modified TO-15	11.6 "Hg	5.2 psi
02A	DUP	Modified TO-15	11.8 "Hg	5 psi
02B	DUP	Modified TO-15	11.8 "Hg	5 psi
03A	BSV-2 Shallow	Modified TO-15	10.4 "Hg	5.2 psi
03B	BSV-2 Shallow	Modified TO-15	10.4 "Hg	5.2 psi
04A	BSV-2 Deep	Modified TO-15	11 "Hg	5.2 psi
04B	BSV-2 Deep	Modified TO-15	11 "Hg	5.2 psi
05A	BSV-3 Shallow	Modified TO-15	12.2 "Hg	5.1 psi
05B	BSV-3 Shallow	Modified TO-15	12.2 "Hg	5.1 psi
06A	BSV-3 Deep	Modified TO-15	12.8 "Hg	5.3 psi
06B	BSV-3 Deep	Modified TO-15	12.8 "Hg	5.3 psi
07A	BSV-4 Shallow	Modified TO-15	13.1 "Hg	5.3 psi
07B	BSV-4 Shallow	Modified TO-15	13.1 "Hg	5.3 psi
08A	BSV-4 Deep	Modified TO-15	12.6 "Hg	5.1 psi
08B	BSV-4 Deep	Modified TO-15	12.6 "Hg	5.1 psi
09A	BSV-5 Shallow	Modified TO-15	10.2 "Hg	5.4 psi
09B	BSV-5 Shallow	Modified TO-15	10.2 "Hg	5.4 psi
10A	BSV-5 Deep	Modified TO-15	11.8 "Hg	5 psi
10B	BSV-5 Deep	Modified TO-15	11.8 "Hg	5 psi
11A	BSV-6 Shallow	Modified TO-15	11 "Hg	5.1 psi
11B	BSV-6 Shallow	Modified TO-15	11 "Hg	5.1 psi
12A	BSV-6 Deep	Modified TO-15	12 "Hg	5 psi

Continued on next page

WORK ORDER #: 1304183

Work Order Summary

CLIENT: Mr. Mark Pearson
 Tetra Tech
 851 Bridger Drive
 Suite 6
 Bozeman, MT 59715

PHONE: 406-582-8780

FAX: 406-582-8790

DATE RECEIVED: 04/08/2013

DATE COMPLETED: 04/22/2013

BILL TO: Mr. Mark Pearson
 Tetra Tech
 851 Bridger Drive
 Suite 6
 Bozeman, MT 59715

P.O. #

PROJECT # 114-710303.740 Bozeman Landfill

CONTACT: Kelly Buettner

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
12B	BSV-6 Deep	Modified TO-15	12 "Hg	5 psi
13A	BSV-7	Modified TO-15	13.7 "Hg	5.1 psi
13B	BSV-7	Modified TO-15	13.7 "Hg	5.1 psi
14A	BSV-8 Shallow	Modified TO-15	11.6 "Hg	5.1 psi
14B	BSV-8 Shallow	Modified TO-15	11.6 "Hg	5.1 psi
15A	BSV-8 Deep	Modified TO-15	13.5 "Hg	5.3 psi
15B	BSV-8 Deep	Modified TO-15	13.5 "Hg	5.3 psi
16A	Lab Blank	Modified TO-15	NA	NA
16B	Lab Blank	Modified TO-15	NA	NA
16C	Lab Blank	Modified TO-15	NA	NA
16D	Lab Blank	Modified TO-15	NA	NA
17A	CCV	Modified TO-15	NA	NA
17B	CCV	Modified TO-15	NA	NA
17C	CCV	Modified TO-15	NA	NA
17D	CCV	Modified TO-15	NA	NA
18A	LCS	Modified TO-15	NA	NA
18AA	LCSD	Modified TO-15	NA	NA
18B	LCS	Modified TO-15	NA	NA
18BB	LCSD	Modified TO-15	NA	NA
18C	LCS	Modified TO-15	NA	NA
18CC	LCSD	Modified TO-15	NA	NA
18D	LCS	Modified TO-15	NA	NA
18DD	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: 

 Technical Director

DATE: 04/22/13

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NY NELAP - 11291,
 TX NELAP - T104704434-12-4, UT NELAP CA009332012-3, WA NELAP - C935

Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
 Accreditation number: CA300005, Effective date: 10/18/2012, Expiration date: 10/17/2013.

Eurofins Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

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



LABORATORY NARRATIVE
Modified TO-15 Full Scan/SIM
Tetra Tech
Workorder# 1304183

Fifteen 6 Liter Summa Canister (SIM Certified) samples were received on April 08, 2013. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the Full Scan and SIM acquisition modes. The method involves concentrating up to 1.0 liters of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis.

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

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

<i>Requirement</i>	<i>TO-15</i>	<i>ATL Modifications</i>
ICAL %RSD acceptance criteria	$\leq 30\%$ RSD with 2 compounds allowed out to $< 40\%$ RSD	For Full Scan: 30% RSD with 4 compounds allowed out to $< 40\%$ RSD For SIM: Project specific; default criteria is $\leq 30\%$ RSD with 10% of compounds allowed out to $< 40\%$ RSD
Daily Calibration	$\pm 30\%$ Difference	For Full Scan: $\leq 30\%$ Difference with four allowed out up to $\leq 40\%$.; flag and narrate outliers For SIM: Project specific; default criteria is $\leq 30\%$ Difference with 10% of compounds allowed out up to $\leq 40\%$.; flag and narrate outliers
Blank and standards	Zero air	Nitrogen
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases

Receiving Notes

The Chain of Custody (COC) information for sample BSV-8 Shallow did not match the entry on the sample tag with regard to sample date. The information on the COC was used to process and report the sample.

Analytical Notes

The results for each sample in this report were acquired from two separate data files originating from

the same analytical run. The two data files have the same base file name and are differentiated with a "sim" extension on the SIM data file.

Dilution was performed on samples BSV-5 Deep, BSV-8 Shallow and BSV-8 Deep due to the presence of high level target species.

Definition of Data Qualifying Flags

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

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

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

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

N - The identification is based on presumptive evidence.

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

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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

Client Sample ID: BSV-1

Lab ID#: 1304183-01A

No Detections Were Found.

Client Sample ID: BSV-1

Lab ID#: 1304183-01B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.11	0.39	0.35	1.2
Trichloroethene	0.044	0.41	0.24	2.2
Toluene	0.044	0.18	0.17	0.68
Tetrachloroethene	0.044	13	0.30	90
Ethyl Benzene	0.044	0.056	0.19	0.24
Chloroform	0.044	0.13	0.22	0.64

Client Sample ID: DUP

Lab ID#: 1304183-02A

No Detections Were Found.

Client Sample ID: DUP

Lab ID#: 1304183-02B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.11	0.38	0.35	1.2
Trichloroethene	0.044	0.42	0.24	2.2
Toluene	0.044	0.17	0.17	0.63
Tetrachloroethene	0.044	14	0.30	96
Ethyl Benzene	0.044	0.074	0.19	0.32
m,p-Xylene	0.088	0.12	0.38	0.52
o-Xylene	0.044	0.075	0.19	0.32
Chloroform	0.044	0.12	0.22	0.61

Client Sample ID: BSV-2 Shallow

Lab ID#: 1304183-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
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**Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN**

Client Sample ID: BSV-2 Shallow

Lab ID#: 1304183-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,2,4-Trimethylbenzene	0.21	0.41	1.0	2.0

Client Sample ID: BSV-2 Shallow

Lab ID#: 1304183-03B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.10	0.93	0.33	3.0
Toluene	0.041	1.0	0.16	3.9
Tetrachloroethene	0.041	4.1	0.28	28
Ethyl Benzene	0.041	0.34	0.18	1.5
m,p-Xylene	0.083	0.70	0.36	3.0
o-Xylene	0.041	0.30	0.18	1.3
Chloroform	0.041	0.77	0.20	3.7

Client Sample ID: BSV-2 Deep

Lab ID#: 1304183-04A

No Detections Were Found.

Client Sample ID: BSV-2 Deep

Lab ID#: 1304183-04B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.11	0.83	0.34	2.6
Toluene	0.043	0.58	0.16	2.2
Tetrachloroethene	0.043	11	0.29	72
Ethyl Benzene	0.043	0.21	0.18	0.93
m,p-Xylene	0.086	0.44	0.37	1.9
o-Xylene	0.043	0.21	0.18	0.92
Chloroform	0.043	0.36	0.21	1.7

Client Sample ID: BSV-3 Shallow

Lab ID#: 1304183-05A

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

Client Sample ID: BSV-3 Shallow

Lab ID#: 1304183-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,2,4-Trimethylbenzene	0.23	0.49	1.1	2.4

Client Sample ID: BSV-3 Shallow

Lab ID#: 1304183-05B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.11	3.3	0.36	10
Toluene	0.046	4.9	0.17	18
Tetrachloroethene	0.046	0.12	0.31	0.78
Ethyl Benzene	0.046	0.73	0.20	3.2
m,p-Xylene	0.091	2.1	0.40	9.0
o-Xylene	0.046	0.84	0.20	3.6
Chloroform	0.046	15	0.22	75

Client Sample ID: BSV-3 Deep

Lab ID#: 1304183-06A

No Detections Were Found.

Client Sample ID: BSV-3 Deep

Lab ID#: 1304183-06B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.12	1.1	0.38	3.6
Toluene	0.048	0.32	0.18	1.2
Tetrachloroethene	0.048	0.33	0.32	2.2
Ethyl Benzene	0.048	0.11	0.21	0.48
m,p-Xylene	0.095	0.18	0.41	0.78
o-Xylene	0.048	0.13	0.21	0.56
Chloroform	0.048	0.44	0.23	2.2

Client Sample ID: BSV-4 Shallow

Lab ID#: 1304183-07A

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

Client Sample ID: BSV-4 Shallow

Lab ID#: 1304183-07A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,2,4-Trimethylbenzene	0.24	0.28	1.2	1.4

Client Sample ID: BSV-4 Shallow

Lab ID#: 1304183-07B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.12	2.0	0.38	6.3
Toluene	0.048	1.7	0.18	6.6
Tetrachloroethene	0.048	0.40	0.33	2.7
Ethyl Benzene	0.048	0.35	0.21	1.5
m,p-Xylene	0.096	0.87	0.42	3.8
o-Xylene	0.048	0.35	0.21	1.5
Chloroform	0.048	1.7	0.24	8.3

Client Sample ID: BSV-4 Deep

Lab ID#: 1304183-08A

No Detections Were Found.

Client Sample ID: BSV-4 Deep

Lab ID#: 1304183-08B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.12	1.5	0.37	4.8
Toluene	0.047	0.42	0.18	1.6
Tetrachloroethene	0.047	0.99	0.32	6.7
Ethyl Benzene	0.047	0.12	0.20	0.53
m,p-Xylene	0.093	0.20	0.40	0.88
o-Xylene	0.047	0.13	0.20	0.57
Chloroform	0.047	0.085	0.23	0.42

Client Sample ID: BSV-5 Shallow

Lab ID#: 1304183-09A

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

Client Sample ID: BSV-5 Shallow

Lab ID#: 1304183-09A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,2,4-Trimethylbenzene	0.21	0.81	1.0	4.0

Client Sample ID: BSV-5 Shallow

Lab ID#: 1304183-09B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.10	2.1	0.33	6.8
Toluene	0.041	5.8	0.16	22
Tetrachloroethene	0.041	2.5	0.28	17
Ethyl Benzene	0.041	0.93	0.18	4.0
m,p-Xylene	0.083	3.3	0.36	14
o-Xylene	0.041	0.88	0.18	3.8
Chloroform	0.041	5.7	0.20	28

Client Sample ID: BSV-5 Deep

Lab ID#: 1304183-10A

No Detections Were Found.

Client Sample ID: BSV-5 Deep

Lab ID#: 1304183-10B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.18	0.34	0.59	1.1
Trichloroethene	0.074	0.18	0.40	0.94
Toluene	0.074	0.35	0.28	1.3
Tetrachloroethene	0.074	38	0.50	260
Chloroform	0.074	0.79	0.36	3.9

Client Sample ID: BSV-6 Shallow

Lab ID#: 1304183-11A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
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**Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN**

Client Sample ID: BSV-6 Shallow

Lab ID#: 1304183-11A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,2,4-Trimethylbenzene	0.21	0.55	1.0	2.7

Client Sample ID: BSV-6 Shallow

Lab ID#: 1304183-11B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.11	3.3	0.34	10
Toluene	0.043	4.9	0.16	18
Tetrachloroethene	0.043	0.32	0.29	2.2
Ethyl Benzene	0.043	0.69	0.18	3.0
m,p-Xylene	0.085	2.2	0.37	9.6
o-Xylene	0.043	0.64	0.18	2.8
Chloroform	0.043	6.5	0.21	32

Client Sample ID: BSV-6 Deep

Lab ID#: 1304183-12A

No Detections Were Found.

Client Sample ID: BSV-6 Deep

Lab ID#: 1304183-12B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.11	0.74	0.36	2.4
Toluene	0.045	0.53	0.17	2.0
Tetrachloroethene	0.045	7.1	0.30	48
Ethyl Benzene	0.045	0.14	0.19	0.61
m,p-Xylene	0.090	0.26	0.39	1.1
o-Xylene	0.045	0.16	0.19	0.71
Chloroform	0.045	0.10	0.22	0.50

Client Sample ID: BSV-7

Lab ID#: 1304183-13A

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

Client Sample ID: BSV-7

Lab ID#: 1304183-13A

No Detections Were Found.

Client Sample ID: BSV-7

Lab ID#: 1304183-13B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.12	0.68	0.40	2.2
Toluene	0.050	0.22	0.19	0.83
Tetrachloroethene	0.050	1.4	0.34	9.2
Ethyl Benzene	0.050	0.10	0.22	0.43
m,p-Xylene	0.099	0.15	0.43	0.66
o-Xylene	0.050	0.086	0.22	0.38

Client Sample ID: BSV-8 Shallow

Lab ID#: 1304183-14A

No Detections Were Found.

Client Sample ID: BSV-8 Shallow

Lab ID#: 1304183-14B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.28	0.28	0.88	0.89
Toluene	0.11	1.1	0.41	4.1
Tetrachloroethene	0.11	78	0.75	530
Ethyl Benzene	0.11	0.22	0.48	0.98
m,p-Xylene	0.22	0.65	0.96	2.8
o-Xylene	0.11	0.26	0.48	1.2
Chloroform	0.11	0.32	0.54	1.6

Client Sample ID: BSV-8 Deep

Lab ID#: 1304183-15A

No Detections Were Found.

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

Client Sample ID: BSV-8 Deep

Lab ID#: 1304183-15B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.41	0.57	1.3	1.8
Toluene	0.16	2.1	0.62	8.0
Tetrachloroethene	0.16	100	1.1	680
Ethyl Benzene	0.16	0.68	0.71	3.0
m,p-Xylene	0.33	2.0	1.4	8.5
o-Xylene	0.16	0.64	0.71	2.8

Client Sample ID: BSV-1

Lab ID#: 1304183-01A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041716	Date of Collection:	4/4/13 4:33:00 PM
Dil. Factor:	2.21	Date of Analysis:	4/17/13 11:05 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrahydrofuran	1.1	Not Detected	3.2	Not Detected
1,2,4-Trimethylbenzene	0.22	Not Detected	1.1	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	88	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	99	70-130

Client Sample ID: BSV-1

Lab ID#: 1304183-01B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041716sim	Date of Collection: 4/4/13 4:33:00 PM
Dil. Factor:	2.21	Date of Analysis: 4/17/13 11:05 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.022	Not Detected	0.056	Not Detected
cis-1,2-Dichloroethene	0.044	Not Detected	0.18	Not Detected
Benzene	0.11	0.39	0.35	1.2
Trichloroethene	0.044	0.41	0.24	2.2
Toluene	0.044	0.18	0.17	0.68
Tetrachloroethene	0.044	13	0.30	90
Ethyl Benzene	0.044	0.056	0.19	0.24
m,p-Xylene	0.088	Not Detected	0.38	Not Detected
o-Xylene	0.044	Not Detected	0.19	Not Detected
trans-1,2-Dichloroethene	0.22	Not Detected	0.88	Not Detected
Chloroform	0.044	0.13	0.22	0.64

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	93	70-130
Toluene-d8	95	70-130
4-Bromofluorobenzene	100	70-130

Client Sample ID: DUP

Lab ID#: 1304183-02A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041715	Date of Collection:	4/4/13 4:33:00 PM
Dil. Factor:	2.21	Date of Analysis:	4/17/13 09:52 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrahydrofuran	1.1	Not Detected	3.2	Not Detected
1,2,4-Trimethylbenzene	0.22	Not Detected	1.1	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	87	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	90	70-130

Client Sample ID: DUP

Lab ID#: 1304183-02B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041715sim	Date of Collection: 4/4/13 4:33:00 PM
Dil. Factor:	2.21	Date of Analysis: 4/17/13 09:52 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.022	Not Detected	0.056	Not Detected
cis-1,2-Dichloroethene	0.044	Not Detected	0.18	Not Detected
Benzene	0.11	0.38	0.35	1.2
Trichloroethene	0.044	0.42	0.24	2.2
Toluene	0.044	0.17	0.17	0.63
Tetrachloroethene	0.044	14	0.30	96
Ethyl Benzene	0.044	0.074	0.19	0.32
m,p-Xylene	0.088	0.12	0.38	0.52
o-Xylene	0.044	0.075	0.19	0.32
trans-1,2-Dichloroethene	0.22	Not Detected	0.88	Not Detected
Chloroform	0.044	0.12	0.22	0.61

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	91	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	92	70-130

Client Sample ID: BSV-2 Shallow

Lab ID#: 1304183-03A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041717	Date of Collection:	4/4/13 3:35:00 PM
Dil. Factor:	2.07	Date of Analysis:	4/18/13 08:44 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrahydrofuran	1.0	Not Detected	3.0	Not Detected
1,2,4-Trimethylbenzene	0.21	0.41	1.0	2.0

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	88	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	96	70-130



Client Sample ID: BSV-2 Shallow

Lab ID#: 1304183-03B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041717sim	Date of Collection:	4/4/13 3:35:00 PM
Dil. Factor:	2.07	Date of Analysis:	4/18/13 08:44 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.021	Not Detected	0.053	Not Detected
cis-1,2-Dichloroethene	0.041	Not Detected	0.16	Not Detected
Benzene	0.10	0.93	0.33	3.0
Trichloroethene	0.041	Not Detected	0.22	Not Detected
Toluene	0.041	1.0	0.16	3.9
Tetrachloroethene	0.041	4.1	0.28	28
Ethyl Benzene	0.041	0.34	0.18	1.5
m,p-Xylene	0.083	0.70	0.36	3.0
o-Xylene	0.041	0.30	0.18	1.3
trans-1,2-Dichloroethene	0.21	Not Detected	0.82	Not Detected
Chloroform	0.041	0.77	0.20	3.7

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	92	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	100	70-130



Client Sample ID: BSV-2 Deep

Lab ID#: 1304183-04A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041806	Date of Collection:	4/4/13 4:03:00 PM
Dil. Factor:	2.14	Date of Analysis:	4/18/13 01:25 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrahydrofuran	1.1	Not Detected	3.2	Not Detected
1,2,4-Trimethylbenzene	0.21	Not Detected	1.0	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	85	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	94	70-130

Client Sample ID: BSV-2 Deep

Lab ID#: 1304183-04B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041806sim	Date of Collection:	4/4/13 4:03:00 PM
Dil. Factor:	2.14	Date of Analysis:	4/18/13 01:25 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.021	Not Detected	0.055	Not Detected
cis-1,2-Dichloroethene	0.043	Not Detected	0.17	Not Detected
Benzene	0.11	0.83	0.34	2.6
Trichloroethene	0.043	Not Detected	0.23	Not Detected
Toluene	0.043	0.58	0.16	2.2
Tetrachloroethene	0.043	11	0.29	72
Ethyl Benzene	0.043	0.21	0.18	0.93
m,p-Xylene	0.086	0.44	0.37	1.9
o-Xylene	0.043	0.21	0.18	0.92
trans-1,2-Dichloroethene	0.21	Not Detected	0.85	Not Detected
Chloroform	0.043	0.36	0.21	1.7

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	88	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	100	70-130



Client Sample ID: BSV-3 Shallow

Lab ID#: 1304183-05A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041807	Date of Collection:	4/4/13 2:30:00 PM	
Dil. Factor:	2.28	Date of Analysis:	4/18/13 02:16 PM	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrahydrofuran	1.1	Not Detected	3.4	Not Detected
1,2,4-Trimethylbenzene	0.23	0.49	1.1	2.4

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	83	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	98	70-130

Client Sample ID: BSV-3 Shallow

Lab ID#: 1304183-05B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041807sim	Date of Collection:	4/4/13 2:30:00 PM
Dil. Factor:	2.28	Date of Analysis:	4/18/13 02:16 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.023	Not Detected	0.058	Not Detected
cis-1,2-Dichloroethene	0.046	Not Detected	0.18	Not Detected
Benzene	0.11	3.3	0.36	10
Trichloroethene	0.046	Not Detected	0.24	Not Detected
Toluene	0.046	4.9	0.17	18
Tetrachloroethene	0.046	0.12	0.31	0.78
Ethyl Benzene	0.046	0.73	0.20	3.2
m,p-Xylene	0.091	2.1	0.40	9.0
o-Xylene	0.046	0.84	0.20	3.6
trans-1,2-Dichloroethene	0.23	Not Detected	0.90	Not Detected
Chloroform	0.046	15	0.22	75

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	87	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	102	70-130



Air Toxics

Client Sample ID: BSV-3 Deep

Lab ID#: 1304183-06A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041808	Date of Collection:	4/4/13 3:01:00 PM	
Dil. Factor:	2.38	Date of Analysis:	4/18/13 02:58 PM	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrahydrofuran	1.2	Not Detected	3.5	Not Detected
1,2,4-Trimethylbenzene	0.24	Not Detected	1.2	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	82	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	100	70-130



Air Toxics

Client Sample ID: BSV-3 Deep

Lab ID#: 1304183-06B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041808sim	Date of Collection:	4/4/13 3:01:00 PM
Dil. Factor:	2.38	Date of Analysis:	4/18/13 02:58 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.024	Not Detected	0.061	Not Detected
cis-1,2-Dichloroethene	0.048	Not Detected	0.19	Not Detected
Benzene	0.12	1.1	0.38	3.6
Trichloroethene	0.048	Not Detected	0.26	Not Detected
Toluene	0.048	0.32	0.18	1.2
Tetrachloroethene	0.048	0.33	0.32	2.2
Ethyl Benzene	0.048	0.11	0.21	0.48
m,p-Xylene	0.095	0.18	0.41	0.78
o-Xylene	0.048	0.13	0.21	0.56
trans-1,2-Dichloroethene	0.24	Not Detected	0.94	Not Detected
Chloroform	0.048	0.44	0.23	2.2

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	88	70-130
Toluene-d8	95	70-130
4-Bromofluorobenzene	99	70-130

Client Sample ID: BSV-4 Shallow

Lab ID#: 1304183-07A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041809	Date of Collection:	4/4/13 1:44:00 PM
Dil. Factor:	2.41	Date of Analysis:	4/18/13 03:47 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrahydrofuran	1.2	Not Detected	3.6	Not Detected
1,2,4-Trimethylbenzene	0.24	0.28	1.2	1.4

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	84	70-130
Toluene-d8	95	70-130
4-Bromofluorobenzene	99	70-130

Client Sample ID: BSV-4 Shallow

Lab ID#: 1304183-07B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041809sim	Date of Collection:	4/4/13 1:44:00 PM
Dil. Factor:	2.41	Date of Analysis:	4/18/13 03:47 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.024	Not Detected	0.062	Not Detected
cis-1,2-Dichloroethene	0.048	Not Detected	0.19	Not Detected
Benzene	0.12	2.0	0.38	6.3
Trichloroethene	0.048	Not Detected	0.26	Not Detected
Toluene	0.048	1.7	0.18	6.6
Tetrachloroethene	0.048	0.40	0.33	2.7
Ethyl Benzene	0.048	0.35	0.21	1.5
m,p-Xylene	0.096	0.87	0.42	3.8
o-Xylene	0.048	0.35	0.21	1.5
trans-1,2-Dichloroethene	0.24	Not Detected	0.96	Not Detected
Chloroform	0.048	1.7	0.24	8.3

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	87	70-130
Toluene-d8	95	70-130
4-Bromofluorobenzene	100	70-130



Air Toxics

Client Sample ID: BSV-4 Deep

Lab ID#: 1304183-08A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041810	Date of Collection:	4/4/13 2:11:00 PM
Dil. Factor:	2.33	Date of Analysis:	4/18/13 04:50 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrahydrofuran	1.2	Not Detected	3.4	Not Detected
1,2,4-Trimethylbenzene	0.23	Not Detected	1.1	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	85	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	96	70-130



Air Toxics

Client Sample ID: BSV-4 Deep

Lab ID#: 1304183-08B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041810sim	Date of Collection:	4/4/13 2:11:00 PM
Dil. Factor:	2.33	Date of Analysis:	4/18/13 04:50 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.023	Not Detected	0.060	Not Detected
cis-1,2-Dichloroethene	0.047	Not Detected	0.18	Not Detected
Benzene	0.12	1.5	0.37	4.8
Trichloroethene	0.047	Not Detected	0.25	Not Detected
Toluene	0.047	0.42	0.18	1.6
Tetrachloroethene	0.047	0.99	0.32	6.7
Ethyl Benzene	0.047	0.12	0.20	0.53
m,p-Xylene	0.093	0.20	0.40	0.88
o-Xylene	0.047	0.13	0.20	0.57
trans-1,2-Dichloroethene	0.23	Not Detected	0.92	Not Detected
Chloroform	0.047	0.085	0.23	0.42

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	88	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	99	70-130



Air Toxics

Client Sample ID: BSV-5 Shallow

Lab ID#: 1304183-09A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041811	Date of Collection:	4/4/13 12:24:00 PM
Dil. Factor:	2.07	Date of Analysis:	4/18/13 05:31 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrahydrofuran	1.0	Not Detected	3.0	Not Detected
1,2,4-Trimethylbenzene	0.21	0.81	1.0	4.0

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	80	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	97	70-130

Client Sample ID: BSV-5 Shallow

Lab ID#: 1304183-09B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041811sim	Date of Collection:	4/4/13 12:24:00 PM
Dil. Factor:	2.07	Date of Analysis:	4/18/13 05:31 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.021	Not Detected	0.053	Not Detected
cis-1,2-Dichloroethene	0.041	Not Detected	0.16	Not Detected
Benzene	0.10	2.1	0.33	6.8
Trichloroethene	0.041	Not Detected	0.22	Not Detected
Toluene	0.041	5.8	0.16	22
Tetrachloroethene	0.041	2.5	0.28	17
Ethyl Benzene	0.041	0.93	0.18	4.0
m,p-Xylene	0.083	3.3	0.36	14
o-Xylene	0.041	0.88	0.18	3.8
trans-1,2-Dichloroethene	0.21	Not Detected	0.82	Not Detected
Chloroform	0.041	5.7	0.20	28

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	86	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	101	70-130

Client Sample ID: BSV-5 Deep

Lab ID#: 1304183-10A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041812	Date of Collection:	4/4/13 12:54:00 PM
Dil. Factor:	3.68	Date of Analysis:	4/18/13 06:22 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrahydrofuran	1.8	Not Detected	5.4	Not Detected
1,2,4-Trimethylbenzene	0.37	Not Detected	1.8	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	78	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	97	70-130

Client Sample ID: BSV-5 Deep

Lab ID#: 1304183-10B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041812sim	Date of Collection: 4/4/13 12:54:00 PM
Dil. Factor:	3.68	Date of Analysis: 4/18/13 06:22 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.037	Not Detected	0.094	Not Detected
cis-1,2-Dichloroethene	0.074	Not Detected	0.29	Not Detected
Benzene	0.18	0.34	0.59	1.1
Trichloroethene	0.074	0.18	0.40	0.94
Toluene	0.074	0.35	0.28	1.3
Tetrachloroethene	0.074	38	0.50	260
Ethyl Benzene	0.074	Not Detected	0.32	Not Detected
m,p-Xylene	0.15	Not Detected	0.64	Not Detected
o-Xylene	0.074	Not Detected	0.32	Not Detected
trans-1,2-Dichloroethene	0.37	Not Detected	1.4	Not Detected
Chloroform	0.074	0.79	0.36	3.9

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	84	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	99	70-130

Client Sample ID: BSV-6 Shallow

Lab ID#: 1304183-11A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041813	Date of Collection:	4/4/13 6:09:00 PM
Dil. Factor:	2.13	Date of Analysis:	4/18/13 07:14 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrahydrofuran	1.1	Not Detected	3.1	Not Detected
1,2,4-Trimethylbenzene	0.21	0.55	1.0	2.7

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	82	70-130
Toluene-d8	95	70-130
4-Bromofluorobenzene	91	70-130

Client Sample ID: BSV-6 Shallow

Lab ID#: 1304183-11B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041813sim	Date of Collection: 4/4/13 6:09:00 PM
Dil. Factor:	2.13	Date of Analysis: 4/18/13 07:14 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.021	Not Detected	0.054	Not Detected
cis-1,2-Dichloroethene	0.043	Not Detected	0.17	Not Detected
Benzene	0.11	3.3	0.34	10
Trichloroethene	0.043	Not Detected	0.23	Not Detected
Toluene	0.043	4.9	0.16	18
Tetrachloroethene	0.043	0.32	0.29	2.2
Ethyl Benzene	0.043	0.69	0.18	3.0
m,p-Xylene	0.085	2.2	0.37	9.6
o-Xylene	0.043	0.64	0.18	2.8
trans-1,2-Dichloroethene	0.21	Not Detected	0.84	Not Detected
Chloroform	0.043	6.5	0.21	32

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	89	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	97	70-130

Client Sample ID: BSV-6 Deep

Lab ID#: 1304183-12A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041815	Date of Collection:	4/4/13 6:28:00 PM
Dil. Factor:	2.24	Date of Analysis:	4/18/13 09:18 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrahydrofuran	1.1	Not Detected	3.3	Not Detected
1,2,4-Trimethylbenzene	0.22	Not Detected	1.1	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	80	70-130
Toluene-d8	95	70-130
4-Bromofluorobenzene	93	70-130

Client Sample ID: BSV-6 Deep

Lab ID#: 1304183-12B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041815sim	Date of Collection:	4/4/13 6:28:00 PM
Dil. Factor:	2.24	Date of Analysis:	4/18/13 09:18 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.022	Not Detected	0.057	Not Detected
cis-1,2-Dichloroethene	0.045	Not Detected	0.18	Not Detected
Benzene	0.11	0.74	0.36	2.4
Trichloroethene	0.045	Not Detected	0.24	Not Detected
Toluene	0.045	0.53	0.17	2.0
Tetrachloroethene	0.045	7.1	0.30	48
Ethyl Benzene	0.045	0.14	0.19	0.61
m,p-Xylene	0.090	0.26	0.39	1.1
o-Xylene	0.045	0.16	0.19	0.71
trans-1,2-Dichloroethene	0.22	Not Detected	0.89	Not Detected
Chloroform	0.045	0.10	0.22	0.50

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	83	70-130
Toluene-d8	93	70-130
4-Bromofluorobenzene	94	70-130

Client Sample ID: BSV-7

Lab ID#: 1304183-13A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041816	Date of Collection:	4/4/13 5:16:00 PM
Dil. Factor:	2.48	Date of Analysis:	4/18/13 09:55 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrahydrofuran	1.2	Not Detected	3.6	Not Detected
1,2,4-Trimethylbenzene	0.25	Not Detected	1.2	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	82	70-130
Toluene-d8	95	70-130
4-Bromofluorobenzene	91	70-130



Air Toxics

Client Sample ID: BSV-7

Lab ID#: 1304183-13B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041816sim	Date of Collection:	4/4/13 5:16:00 PM
Dil. Factor:	2.48	Date of Analysis:	4/18/13 09:55 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.025	Not Detected	0.063	Not Detected
cis-1,2-Dichloroethene	0.050	Not Detected	0.20	Not Detected
Benzene	0.12	0.68	0.40	2.2
Trichloroethene	0.050	Not Detected	0.27	Not Detected
Toluene	0.050	0.22	0.19	0.83
Tetrachloroethene	0.050	1.4	0.34	9.2
Ethyl Benzene	0.050	0.10	0.22	0.43
m,p-Xylene	0.099	0.15	0.43	0.66
o-Xylene	0.050	0.086	0.22	0.38
trans-1,2-Dichloroethene	0.25	Not Detected	0.98	Not Detected
Chloroform	0.050	Not Detected	0.24	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	85	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	98	70-130



Client Sample ID: BSV-8 Shallow

Lab ID#: 1304183-14A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041817	Date of Collection:	4/4/13 10:43:00 AM	
Dil. Factor:	5.50	Date of Analysis:	4/18/13 10:38 PM	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrahydrofuran	2.8	Not Detected	8.1	Not Detected
1,2,4-Trimethylbenzene	0.55	Not Detected	2.7	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	80	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	92	70-130



Client Sample ID: BSV-8 Shallow

Lab ID#: 1304183-14B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041817sim	Date of Collection:	4/4/13 10:43:00 AM
Dil. Factor:	5.50	Date of Analysis:	4/18/13 10:38 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.055	Not Detected	0.14	Not Detected
cis-1,2-Dichloroethene	0.11	Not Detected	0.44	Not Detected
Benzene	0.28	0.28	0.88	0.89
Trichloroethene	0.11	Not Detected	0.59	Not Detected
Toluene	0.11	1.1	0.41	4.1
Tetrachloroethene	0.11	78	0.75	530
Ethyl Benzene	0.11	0.22	0.48	0.98
m,p-Xylene	0.22	0.65	0.96	2.8
o-Xylene	0.11	0.26	0.48	1.2
trans-1,2-Dichloroethene	0.55	Not Detected	2.2	Not Detected
Chloroform	0.11	0.32	0.54	1.6

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	84	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	96	70-130

Client Sample ID: BSV-8 Deep

Lab ID#: 1304183-15A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041818	Date of Collection:	4/4/13 11:15:00 AM
Dil. Factor:	8.23	Date of Analysis:	4/18/13 11:23 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrahydrofuran	4.1	Not Detected	12	Not Detected
1,2,4-Trimethylbenzene	0.82	Not Detected	4.0	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	79	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	97	70-130

Client Sample ID: BSV-8 Deep

Lab ID#: 1304183-15B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041818sim	Date of Collection: 4/4/13 11:15:00 AM
Dil. Factor:	8.23	Date of Analysis: 4/18/13 11:23 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.082	Not Detected	0.21	Not Detected
cis-1,2-Dichloroethene	0.16	Not Detected	0.65	Not Detected
Benzene	0.41	0.57	1.3	1.8
Trichloroethene	0.16	Not Detected	0.88	Not Detected
Toluene	0.16	2.1	0.62	8.0
Tetrachloroethene	0.16	100	1.1	680
Ethyl Benzene	0.16	0.68	0.71	3.0
m,p-Xylene	0.33	2.0	1.4	8.5
o-Xylene	0.16	0.64	0.71	2.8
trans-1,2-Dichloroethene	0.82	Not Detected	3.3	Not Detected
Chloroform	0.16	Not Detected	0.80	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	83	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	99	70-130

Client Sample ID: Lab Blank

Lab ID#: 1304183-16A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041705	Date of Collection:	NA
Dil. Factor:	1.00	Date of Analysis:	4/17/13 12:27 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
1,2,4-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	85	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	92	70-130

Client Sample ID: Lab Blank

Lab ID#: 1304183-16B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041705sim	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 4/17/13 12:27 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.010	Not Detected	0.026	Not Detected
cis-1,2-Dichloroethene	0.020	Not Detected	0.079	Not Detected
Benzene	0.050	Not Detected	0.16	Not Detected
Trichloroethene	0.020	Not Detected	0.11	Not Detected
Toluene	0.020	Not Detected	0.075	Not Detected
Tetrachloroethene	0.020	Not Detected	0.14	Not Detected
Ethyl Benzene	0.020	Not Detected	0.087	Not Detected
m,p-Xylene	0.040	Not Detected	0.17	Not Detected
o-Xylene	0.020	Not Detected	0.087	Not Detected
trans-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Chloroform	0.020	Not Detected	0.098	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	87	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	95	70-130



Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 1304183-16C

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041805	Date of Collection:	NA
Dil. Factor:	1.00	Date of Analysis:	4/18/13 12:29 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
1,2,4-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	84	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	101	70-130

Client Sample ID: Lab Blank

Lab ID#: 1304183-16D

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041805sim	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 4/18/13 12:29 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.010	Not Detected	0.026	Not Detected
cis-1,2-Dichloroethene	0.020	Not Detected	0.079	Not Detected
Benzene	0.050	Not Detected	0.16	Not Detected
Trichloroethene	0.020	Not Detected	0.11	Not Detected
Toluene	0.020	Not Detected	0.075	Not Detected
Tetrachloroethene	0.020	Not Detected	0.14	Not Detected
Ethyl Benzene	0.020	Not Detected	0.087	Not Detected
m,p-Xylene	0.040	Not Detected	0.17	Not Detected
o-Xylene	0.020	Not Detected	0.087	Not Detected
trans-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Chloroform	0.020	Not Detected	0.098	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	85	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	99	70-130



Air Toxics

Client Sample ID: CCV

Lab ID#: 1304183-17A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041702	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 4/17/13 09:58 AM

Compound	%Recovery
Tetrahydrofuran	96
1,2,4-Trimethylbenzene	85

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	74	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	97	70-130

Client Sample ID: CCV

Lab ID#: 1304183-17B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041702sim	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 4/17/13 09:58 AM

Compound	%Recovery
Vinyl Chloride	71
cis-1,2-Dichloroethene	98
Benzene	91
Trichloroethene	95
Toluene	94
Tetrachloroethene	102
Ethyl Benzene	99
m,p-Xylene	99
o-Xylene	96
trans-1,2-Dichloroethene	97
Chloroform	76

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	75	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	94	70-130



Air Toxics

Client Sample ID: CCV

Lab ID#: 1304183-17C

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041802	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 4/18/13 10:09 AM

Compound	%Recovery
Tetrahydrofuran	98
1,2,4-Trimethylbenzene	96

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	76	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	100	70-130

Client Sample ID: CCV

Lab ID#: 1304183-17D

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041802sim	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 4/18/13 10:09 AM

Compound	%Recovery
Vinyl Chloride	72
cis-1,2-Dichloroethene	101
Benzene	94
Trichloroethene	99
Toluene	98
Tetrachloroethene	106
Ethyl Benzene	103
m,p-Xylene	107
o-Xylene	105
trans-1,2-Dichloroethene	100
Chloroform	79

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	76	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	100	70-130



Air Toxics

Client Sample ID: LCS

Lab ID#: 1304183-18A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041703	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 4/17/13 10:44 AM

Compound	%Recovery
Tetrahydrofuran	88
1,2,4-Trimethylbenzene	94

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	78	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	100	70-130



Air Toxics

Client Sample ID: LCSD

Lab ID#: 1304183-18AA

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041704	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 4/17/13 11:28 AM

Compound	%Recovery
Tetrahydrofuran	84
1,2,4-Trimethylbenzene	90

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	75	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	104	70-130

Client Sample ID: LCS

Lab ID#: 1304183-18B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041703sim	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 4/17/13 10:44 AM

Compound	%Recovery
Vinyl Chloride	76
cis-1,2-Dichloroethene	95
Benzene	91
Trichloroethene	94
Toluene	91
Tetrachloroethene	100
Ethyl Benzene	100
m,p-Xylene	106
o-Xylene	102
trans-1,2-Dichloroethene	109
Chloroform	78

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	81	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	104	70-130



Air Toxics

Client Sample ID: LCSD

Lab ID#: 1304183-18BB

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041704sim	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 4/17/13 11:28 AM

Compound	%Recovery
Vinyl Chloride	80
cis-1,2-Dichloroethene	97
Benzene	89
Trichloroethene	94
Toluene	95
Tetrachloroethene	98
Ethyl Benzene	101
m,p-Xylene	106
o-Xylene	103
trans-1,2-Dichloroethene	108
Chloroform	80

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	84	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	106	70-130



Air Toxics

Client Sample ID: LCS

Lab ID#: 1304183-18C

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041803	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 4/18/13 10:45 AM

Compound	%Recovery
Tetrahydrofuran	85
1,2,4-Trimethylbenzene	82

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	74	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	99	70-130



Air Toxics

Client Sample ID: LCSD

Lab ID#: 1304183-18CC

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041804	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 4/18/13 11:28 AM

Compound	%Recovery
Tetrahydrofuran	88
1,2,4-Trimethylbenzene	91

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	77	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	102	70-130



Air Toxics

Client Sample ID: LCS

Lab ID#: 1304183-18D

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041803sim	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 4/18/13 10:45 AM

Compound	%Recovery
Vinyl Chloride	72
cis-1,2-Dichloroethene	97
Benzene	90
Trichloroethene	94
Toluene	92
Tetrachloroethene	99
Ethyl Benzene	97
m,p-Xylene	100
o-Xylene	97
trans-1,2-Dichloroethene	108
Chloroform	77

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	79	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	101	70-130

Client Sample ID: LCSD

Lab ID#: 1304183-18DD

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	a041804sim	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 4/18/13 11:28 AM

Compound	%Recovery
Vinyl Chloride	77
cis-1,2-Dichloroethene	98
Benzene	90
Trichloroethene	96
Toluene	95
Tetrachloroethene	100
Ethyl Benzene	98
m,p-Xylene	103
o-Xylene	101
trans-1,2-Dichloroethene	108
Chloroform	80

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	79	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	103	70-130



CHAIN-OF-CUSTODY RECORD

Sample Transportation Notice

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

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Page 1 of 2

Project Manager Kelly Buettner Mark Pearson, P.M.
 Collected by: (Print and Sign) Mark Pearson Mark Pearson
 Company Tetra Tech Email mark.pearson@tetra
 Address 851 Bridger Dr. Ste 6 City Bozeman State MT Zip tech.
 Phone 406-582-8780 Fax com

Project Info:	Turn Around Time:	Lab Use Only
	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Rush <small>specify</small>	Pressurized by: Date: Pressurization Gas: N ₂ He
P.O. #	-	
Project #	<u>114-710303.740</u>	
Project Name	<u>Bozeman Landfill</u>	

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum			
						Initial	Final	Receipt	Final (psi)
UIAB	BSV-1	33539	4/4/2013	1633		-25.5	-7.8		
UAAB	DUP	35167		↓		-25.2	-8.4		
USA-B	BSV-2 Shallow	9922		1535		-25.3	-6.9		
UYA-B	BSV-2 Deep	33553		1603		-25.4	-7.0		
USA-B	BSV-3 Shallow	5693		1430		-26.2	-7.6		
U6A-B	BSV-3 Deep	946		1501		-26.1	-9.5		
U7A-B	BSV-4 Shallow	34504		1344		-24.2	-8.0		
U8A-B	BSV-4 Deep	414		1411		-24.9	-7.9		
UYA-B	BSV-5 Shallow	4242		1224		-25.3	-6.1		
WA-B	BSV-5 Deep	34482		1254		-27.5	-8.6		

Relinquished by: (signature) <u>Mark Pearson</u> Date/Time <u>4/5/13 1400</u>	Received by: (signature) <u>Fed Ex Bozeman</u> Date/Time <u>4/5/13 1400</u>	Notes:
Relinquished by: (signature) _____ Date/Time _____	Received by: (signature) <u>ATL</u> Date/Time <u>4/8/13</u>	
Relinquished by: (signature) _____ Date/Time _____	Received by: (signature) _____ Date/Time _____	

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	<u>FedEx</u>		<u>N/A</u>	<u>Good</u>	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> None	<u>1304183</u>



CHAIN-OF-CUSTODY RECORD

Sample Transportation Notice

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180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Project Manager _____
 Collected by: (Print and Sign) Mark Pearson
 Company _____ Email _____
 Address _____ City _____ State _____ Zip _____
 Phone _____ Fax _____

Project Info:
 P.O. # _____
 Project # _____
 Project Name Bozeman Landfill

Turn Around Time:
 Normal
 Rush
 _____ specify
 Lab Use Only
 Pressurized by: _____
 Date: _____
 Pressurization Gas: _____
 N₂ He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum			
						Initial	Final	Receipt	Final (psi)
11AB	BSV-6 Shallow	14092	4/4/2013	1809	See attached	-25.75	-7.0		
12AB	BSV-6 Deep	34428	↓	1828	↓	-23.0	-8.0		
13AB	BSV-7	33534	↓	1716	↓	-25.6	-10.0		
14AB	BSV-8 Shallow	03111	↓	1043	↓	-24.75	-7.4		
15AB	BSV-8 Deep	96103	↓	1115	↓	-26.00	-9.1		

Relinquished by: (signature) <u>Mark Pearson</u> Date/Time <u>4/5/13 1400</u>	Received by: (signature) <u>FedEx Bozeman</u> Date/Time <u>4/5/13 1400</u>	Notes:
Relinquished by: (signature) _____ Date/Time _____	Received by: (signature) _____ Date/Time <u>0920</u>	
Relinquished by: (signature) _____ Date/Time _____	Received by: (signature) <u>ATL</u> Date/Time <u>4/8/13</u>	

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	<u>FedEx</u>		<u>N/A</u>	<u>good</u>	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> None	<u>1304183</u>

Bozeman Landfill
April 4, 2013 Monitoring Event
Bozeman, Montana
Project Number 114-710303.740

Analyze in accordance with TO-15 SIM with the following component list:

Chloroform
Vinyl chloride
Tetrachloroethene
Trichloroethene
Benzene
Ethylbenzene
Toluene
Xylenes
cis-1,2-DCE
trans-1,2-DCE
1,2,4-trimethylbenzene
Tetrahydrofuran