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Ms. Dilan Roe
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Re: 1233 Bockman Road
San Lorenzo, California
ACEH Case No: RO00003217

Dear Ms. Roe:

PaulsCorp, LLC, has retained Pangea Environmental Services, Inc. (Pangea) for environmental consulting services for the project referenced above. Pangea is submitting the attached report on my behalf.

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached report are true and correct to the best of my knowledge.

Sincerely,

Andrew J. Lavaux
Managing Director Multifamily Development

November 16, 2016

Andrew Lavaux
PaulsCorp, LLC
100 Saint Paul Street
Denver, Colorado 80206

Re: **Data Gap Investigation Report – Buildings 3 & 4**
Bockman Road Property
1233 Bockman Road
San Leandro, California 94577

Dear Mr. Lavaux:

On behalf of PaulsCorp, LLC, PANGEA Environmental Services, Inc. prepared this *Data Gap Investigation Report – Buildings 3 & 4* for the subject property (Site). This assessment was performed to investigate subsurface conditions to help facilitate development at the Site.

If you have any questions or comments, please call me at (510) 435-8664 or email briddell@pangeaenv.com.

Sincerely,
Pangea Environmental Services, Inc.

Bob Clark-Riddell, P.E.
Principal Engineer

Attachment: *Data Gap Investigation Report – Buildings 3 & 4*

DATA GAP INVESTIGATION REPORT – BUILDINGS 3 & 4

1233 Bockman Road
San Lorenzo, CA 94577

November 16, 2016

Prepared for:

PaulsCorp, LLC
100 Saint Paul Street
Denver, Colorado 80206

Prepared by:

PANGEA Environmental Services, Inc.
1710 Franklin Street, Suite 200
Oakland, California 94612

Written by:

Ron Scheele, P.G.
Principal Geologist

Bob Clark-Riddell, P.E.
Principal Engineer

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1.0 INTRODUCTION

On behalf of PaulsCorp, LLC (PaulsCorp), PANGEA Environmental Services, Inc. (PANGEA) has prepared this Data Gap Investigation Report – Buildings 3 & 4 for the subject property located at 1233 Bockman Road in San Lorenzo, California (Site) (Figure 1). The purpose of this assessment was to investigate subsurface soil gas conditions beneath proposed Buildings 3 and 4, particularly with regards to the potential for vapor intrusion of volatile organic compounds (VOCs). This investigation was performed in accordance with PANGEA's Data Gap Field Investigation Workplan (Workplan) dated October 17, 2016 to help facilitate development at the Site. The oversight agency generally concurred with the Workplan scope in email correspondence dated October 18, 2016.

2.0 SITE BACKGROUND

The Site is currently under initial grading for residential development of 53 two-story residential units. Extensive Site assessment has been conducted to initially delineate the extent of volatile organic compounds (VOCs) in the site subsurface. The VOC impact is apparently due a historic dry cleaner at 1269 Bockman Road (eastern portion of Site), a former auto shop at 1415 Bockman Road (western portion of the Site), and potential offsite sources of petroleum hydrocarbons from 1210 Bockman (former Impulse Motors fueling station/auto repair facility) and 17093 Via Chiquita (commercial street sweeping business).

2.1 Site Description and History

The Site consists of an approximately 3.87-acre lot along Bockman road in San Lorenzo, California (Figure 2). The property is owned and being redeveloped by PaulsCorp, LLC into 53 two-story residential units. The assessor parcel number (APN) for the Site is 411-63-17. The subject property is relatively flat and lies at an elevation of about 20 feet above mean sea level. There are currently no buildings on-site but historically the Site consisted of a strip mall and associated parking lot. The Site is surrounded in all directions by single and multi-family residences.

According to a Phase I Environmental Site Assessment (ESA) prepared on June 3, 2016, by ENGEO Incorporated (ENGEO), the Site was used a strip mall until the buildings were demolished in 2007. Two former tenants of note were identified: a dry cleaner that operated between approximately 1960 and 1979; and an automotive repair shop that operated hydraulic lifts. The report also noted that a gasoline service station previously existed on the adjacent parcel to the south of the Site across Bockman Road at 1210 Bockman Road.

2.2 Chemicals of Potential Concern

The chemicals of potential concern (COPC) at this Site primarily include tetrachloroethene (PCE) and its potential breakdown products, and petroleum hydrocarbons. The following chemicals have been detected in shallow *soil gas* in excess of conservative residential soil vapor environmental screening levels (ESLs) established by the San Francisco Bay Region Water Quality Control Board (RWQCB) and were identified as chemicals of concern (COCs): *benzene, ethylbenzene, and PCE*. The following additional VOCs have been detected at the Site below ESLs: acetone; chloroform; 1,2-dichloroethane; naphthalene; 1,1,1-trichloroethylene (TCE); toluene; xylenes; and gas-range, diesel-range, and motor oil-range total petroleum hydrocarbons. No significant VOC impact has been detected in soil or groundwater based on data comparison to ESLs.

2.3 Summary of Previous Site Investigation

A summary of previous environmental investigation activities is provided in PANGEA's *Data Gap Field Investigation Workplan* dated October 17, 2016.

2.4 Site Geology and Hydrogeology

The Site property is located within the East Bay Plain subbasin, which is part of the larger Santa Clara Valley Groundwater Basin. The East Bay Plain subbasin is a northwest trending alluvial plain bounded to the north by San Pablo bay, to the east by the contact with Franciscan Basement rock, and to the south by the Niles Cone Groundwater basin. The basin extends beneath San Francisco Bay to the west. Groundwater is generally found very near the surface throughout the basin.

The East Bay Plain subbasin aquifer system consists of unconsolidated sediments of Quaternary age. The Early Holocene Temescal Formation is the most recently deposited and consists of primarily silts and clays with some gravel layers.

The relatively flat Site lies at an elevation of approximately 20 ft above mean sea level to the east of San Francisco Bay (Figure 1). Soil beneath the site consists of sandy gravel fill (likely baserock material) to approximately 1 ft bgs underlain by 2 to 3 ft of moderately plastic clay. The clay layer is underlain by silt and a discontinuous, one-foot thick sand lens observed intermittently between 6 and 10 ft bgs. PANGEA observed groundwater between 7 and 9 ft bgs, while others reported first encountered groundwater deeper. Based on data from neighboring sites, static groundwater was approximately 8 ft bgs (1201 Bockman) and groundwater flows to the northwest.

3.0 SITE ASSESSMENT

Site assessment activities involved the sampling of shallow soil gas to determine VOC levels within the proposed footprint of proposed Buildings 3 and 4. To facilitate soil gas sampling, four (4) soil gas probes (SV-51 through SV-54) were installed as shown on Figure 3. Soil gas probe installation and sampling was conducted in general accordance with the DTSC's *Advisory: Active Soil Gas Investigation* dated July 2015. During the same sampling event, soil gas samples were also collected from soil gas probes SV-46 to SV-50, SV-55 and SV-56 in accordance with the Workplan. Results from these other soil gas probes will be documented in a separate report.

3.1 Pre-Drilling Activities

A Site-specific health and safety plan was prepared to protect Site workers and the plan was kept on-site during all field activities. Proposed drilling locations were marked and Underground Service Alert was notified before the proposed field activities. A well permit was obtained from Alameda County Public Works Agency (ACPWA) in included in Appendix A.

3.2 Temporary Soil Gas Well Install and Sampling

On October 20, 2016, four soil gas probes were installed by PeneCore Drilling Inc. of Woodland, California. The soil gas probes were constructed by drilled a soil boring to 5.5 ft bgs by hand auger. A vapor implant attached to ¼-inch Teflon™ tubing was set at 5 ft bgs with 6 inches of Monterey #3 sand placed above and below the vapor implant. Six inches of dry bentonite crumbles was poured on top of the sand and the remaining annular space backfilled with hydrated bentonite. The Teflon™ tubing was set in a 2-inch PVC riser and capped to prevent moisture from entering. Soil collected during hand augering was classified according to the Unified Soil Classification System. Soil boring logs with probe construction details are provided in Appendix B.

On October 21, 2016, the four soil gas probes were sampled by PANGEA field staff. Due to the naturally tight formation, the soil gas wells were purged following installation and allowed to equilibrate for approximately 24 hours prior to sampling. Samples were collected by connecting a 1-liter Summa™ canister to the tubing through a flow rate regulator calibrated to a rate of approximately 100-200 milliliters per minute (mL/min). To further evaluate potential leakage within the sampling system, a leak-check enclosure/shroud was placed over the sample train and isopropyl alcohol was introduced into the shroud. A PID was used to monitor the concentration of isopropyl alcohol within the shroud during sample collection. For quality control purposes, a shroud sample was collected during sampling of soil gas probe SV-56 conducted during the same day. Soil gas sampling field notes are provided in Appendix C. Soil gas samples were transported to C&T following chain-of-custody protocol. Samples were analyzed for VOCs by EPA Method TO-15.

Following soil gas sampling, soil vapor probes SV-51 through SV-54 were drilled out and destroyed per permit requirements.

3.3 Waste Disposal

Investigation derived waste (IDW) generated during field activities was temporarily stored on Site on plastic sheeting. Following review of analytical results, the IDW will be transported to an appropriate facility for disposal or recycling in conjunction with pilot study or CAP excavation activities.

4.0 SITE ASSESSMENT RESULTS

The Site assessment under Buildings 3 and 4 consisted of advancing four borings for installation and sampling of soil gas wells.

4.1 Field Observations

During hand augering, soil consisting primarily of clay and silt was encountered in the top 5.5 ft consistent with previous investigations. No groundwater was encountered. During soil gas screening with a PID, VOCs were only detected in soil gas probe SV-54, at a concentration of 0.8 parts per million per volume (ppmv). Soil boring logs are included in Appendix C.

4.2 Soil Gas Analytical Results

Soil gas samples were collected from four temporary soil gas wells (SV-51 through SV-54) for analysis of VOCs. All samples were collected from vapor implants placed 5 feet bgs. Select soil gas sample results are shown on Figure 3 and summarized in Table 1. The laboratory analytical report is presented in Appendix D.

VOCs including PCE, trichloroethene (TCE), benzene, toluene, xylenes, and chloroform were detected in various samples. However, no compounds were detected above their respective residential ESLs for soil gas. PCE was detected in three of the four soil gas samples, at a maximum concentration of 41 $\mu g/m^3$ in SV-54. None of the sample results were near or exceeded the residential ESL for PCE in soil gas of 240 $\mu g/m^3$. Benzene was detected in each of the four samples, at a maximum concentration of 9.3 $\mu g/m^3$ in SV-53. All four samples results were well below the residential ESL for benzene in soil gas of 48 $\mu g/m^3$. No ethylbenzene was detected in the four soil gas samples.

Leak check compound isopropyl alcohol was detected at 39,000 $\mu g/m^3$ in the aboveground shroud sample from SV-56 collected the same day. Extremely low levels of isopropyl alcohol were detected in the four soil gas samples ranging from 12 to 32 $\mu g/m^3$ indicating that the sample results are indicative of subsurface conditions.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the above information, PANGEA offers the following conclusions and recommendations:

- Shallow *soil gas* within the footprints of planned Buildings 3 and 4 is impacted with low concentrations of PCE and benzene well below their respective residential shallow soil gas ESLs. Based on the soil gas sampling data, PANGEA concludes that no further action (e.g., assessment or vapor intrusion mitigation) is merited near Buildings 3 and 4.

6.0 REFERENCES

CalEPA/DTSC, 2011, (CalEPA, 2011) *Vapor Intrusion Mitigation Advisory (VIMA),* October 2011

CalEPA/DTSC, 2015, (CalEPA, 2015) *Advisory – Active Soil Gas Investigations,* July 2015

Department of Water Resources, 2003, *Bulletin 118*, October 2003.

Figuers, S., 1998, Groundwater study and water supply history of the East Bay Plain, Alameda and Contra Costa Counties, California: Norfleet Consultants, June 15.

Figure 1

1233 Bockman Road
San Lorenzo, California

PANGEA

Vicinity Map

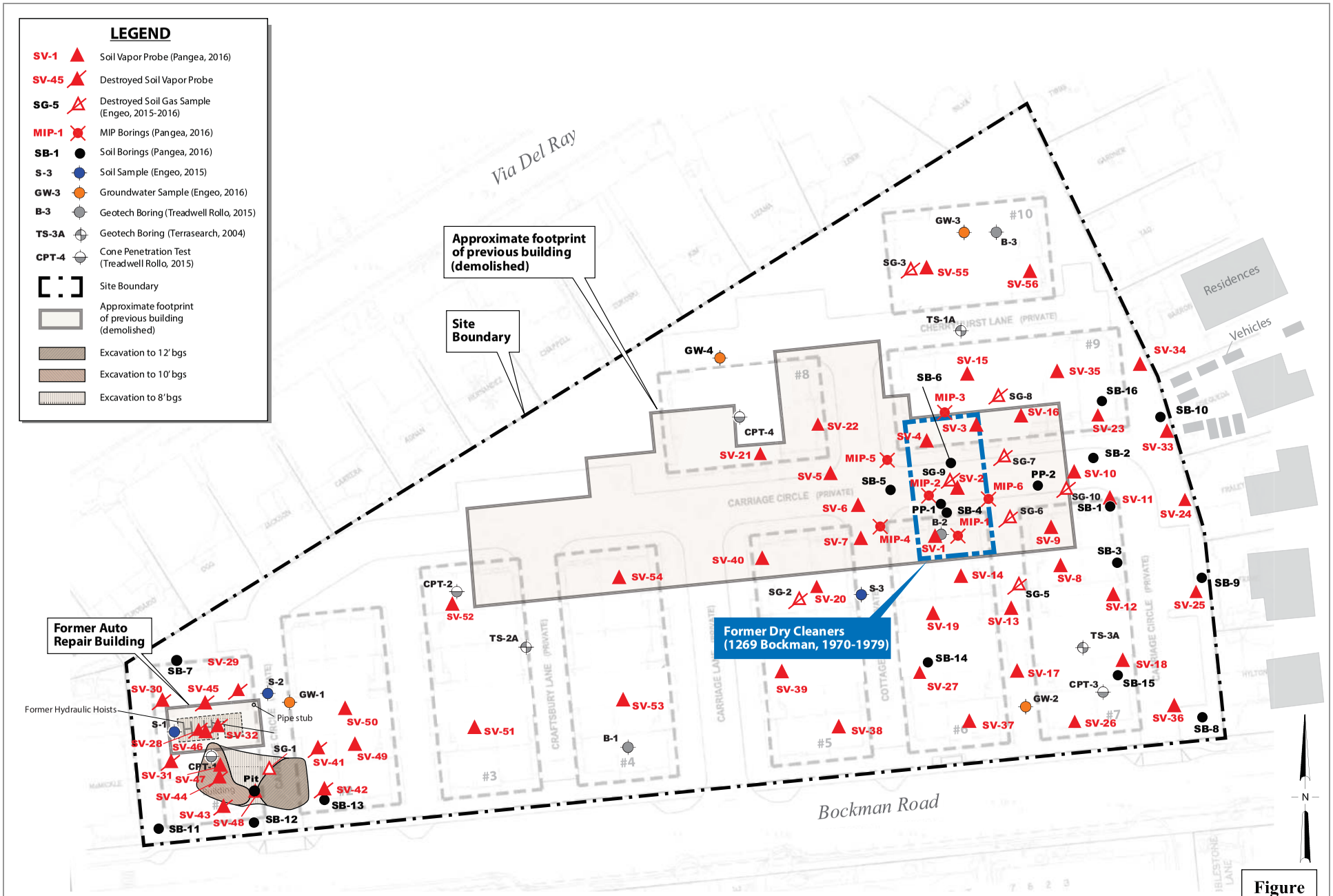

Figure 2

Map courtesy of ENGEO Incorporated. Base map derived from a electronic file titled "ACAD2010-151072-BASE.dwg," received on 09/15/15, and "Bockman Road," by Tetra Tech dated 06/11/15.

1233 Bockman Road
San Lorenzo, California

PANGEA

Site Map

Figure
3

1233 Bockman Road
San Lorenzo, California

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Table 1. Soil Gas Analytical Data - 1233 Bockman Road, San Lorenzo, California

Boring/ Sample ID	Date Sampled	Sample Depth (ft bgs)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	1,2-DCA	PCE	TCE	Chloroform	Other VOCs	Isopropyl Alcohol (Leak Check Compound)	Carbon Dioxide	Oxygen	Methane	Notes
			ug/m^3											%	%	%	
Residential ESL - Soil/Subslab Gas:			**48**	**160,000**	**560**	**52,000**	**41**	**54**	**240**	**240**	**61**	**Varies**	**NA**	**NA**	**NA**	**NA**	
Soil Gas Samples - Engeo 2015 - 2016																	
SG-1	06/25/15	5.0	1.34	6.33	<3.2	<6.5	<7.8	<3.1	<5.1	<8.1	4.92	--	<30	--	--	--	
SG-2	06/25/15	5.0	2.45	18.3	1.81	14.83	<7.8	<3.1	<5.1	<8.1	<7.4	--	<30	--	--	--	
SG-5	06/24/16	8.0	<19	<26	<27	<44	<140	<55	<24	<150	<130	--	--	--	--	--	
SG-6	06/24/16	6.0	<1.6	4.1	143	260	<5.2	<2.1	**256**	<5.4	<4.9	--	--	--	--	--	
SG-7	06/24/16	8.0	21.9	20.9	<4.9	<9.9	<12	<4.7	24.4	<12	<11	--	--	--	--	--	
SG-8	06/24/16	6.0	9.18	19.1	232	1,172	<5.2	<2.1	16.7	<5.4	<4.9	--	--	--	--	--	
SG-9	06/24/16	6.0	3.84	9.96	<2.2	4.69	<5.2	<2.1	**256**	<5.4	<4.9	--	--	--	--	--	
SG-10	06/24/16	8.0	**61.8**	76.2	<2.0	6.97	<10	<4.1	<1.8	<11	<9.8	--	--	--	--	--	
Soil Gas Samples - Pangea 2016																	
SV-1	07/27/16	6.0	<3.5	<4.2	<4.8	<4.8	<23	<4.5	49	<5.9	<5.4	#	<11	--	--	--	
SV-2	07/27/16	6.0	<7.1	<8.3	<9.6	<9.6	<46	<8.9	**1,500**	<12	<11	#	<22	--	--	--	
SV-3	07/27/16	6.0	14	14	4.7	7.7	<22	<4.2	**820**	<5.6	<5.1	#	140	--	--	--	
SV-4	07/27/16	6.0	18	7.5	<7.6	<7.6	<36	<7.0	150	<9.4	<8.5	#	<17	--	--	--	
	09/01/16	6.0	<6.2	<7.3	<8.4	<16.8	<40	<7.8	190	<10	<9.4	#	<19	--	--	--	
SV-5	07/27/16	6.0	3.8	<3.7	<4.3	<4.3	<21	<4.0	**710**	<5.3	<4.8	#	<9.6	--	--	--	
SV-6	07/27/16	6.0	12	<3.8	<4.4	<4.4	<21	<4.1	**430**	<5.4	<4.9	#	<9.9	--	--	--	
SV-7	07/27/16	6.0	18	27	<5.1	<5.1	<25	<4.7	15	<6.3	<5.7	#	<12	--	--	--	
SV-8	07/28/16	6.0	<4.9*	<11*	<10*	<15*	--	<14*	**640**	<8.7*	<9.4*	#	<22*	--	--	--	
Shroud (SV-8)	07/28/16	--	--	--	--	--	--	--	--	--	--	--	130,000	--	--	--	Shroud sample
SV-9	09/01/16	6.0	<5.2	<6.1	<7.1	<14.2	<34	<6.6	<11	<8.8	<8.0	#	62	--	--	--	
SV-10	07/28/16	6.0	<4.9*	<11*	<10*	<15*	--	<14*	**2,000**	170*	<9.4*	#	<22*	--	--	--	
SV-11	07/28/16	6.0	<4.9*	<11*	<10*	<15*	--	<14*	**2,600**	150*	<9.4*	#	<22*	--	--	--	
SV-12	07/28/16	6.0	<4.9*	<11*	<10*	110*	--	<14*	**930**	76*	<9.4*	#	<22*	--	--	--	
SV-13	07/28/16	6.0	<4.9*	<11*	380	1,470	--	<14*	100*	<8.7*	<9.4*	#	<22*	--	--	--	
SV-14	07/27/16	6.0	3.4	3.6	160	980	<20	<3.8	17	<5.1	<4.6	#	64	--	--	--	
SV-15	07/27/16	6.0	25	9.2	<4.6	8.6	<22	<4.3	85	6.1	<5.2	#	<10	--	--	--	
SV-16	07/27/16	6.0	35	13	<11	<11	<52	<10	<17	<13	<12	#	<24	--	--	--	
SV-17	07/28/16	6.0	34	13	28	191	--	<4.1	20	9.7	<5.0	#	150	--	--	--	
SV-18	07/28/16	6.0	**54**	59	**1,100**	3,190	--	<4.1	66	<5.5	<5.0	#	7.9*	--	--	--	
SV-19	07/28/16	6.0	15	40	**900**	2,490	--	<4.1	20	11	<5.0	#	8.7*	--	--	--	
SV-20	08/05/16	6.0	66*	160	**4,300**	18,400	17*	<130	<8.6*	<170	<160	#	<310	--	--	--	
SV-21	08/05/16	6.0	5.6*	<11	330	3,090	3.2*	<12	160	<16	<15	#	<29	--	--	--	
	09/01/16	6.0	<3.2	<3.8	<4.3	9.7	<21	<4.0	220	<5.4	<4.9	#	<9.8	--	--	--	
SV-22	08/05/16	6.0	21*	<82	340	18,100	10*	<88	24*	<120	<110	#	<210	--	--	--	
	09/01/16	6.0	<3.3	<3.9	<4.5	30.7	<21	<4.1	46	<5.5	8.0	#	<10	--	--	--	
SV-23	08/05/16	6.0	24*	150	**8,700**	34,000	19*	<130	9.0*	<170	<150	#	<310	--	--	--	

Pangea

Table 1. Soil Gas Analytical Data - 1233 Bockman Road, San Lorenzo, California

Boring/ Sample ID	Date Sampled	Sample Depth (ft bgs)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	1,2-DCA	PCE	TCE	Chloroform	Other VOCs	Isopropyl Alcohol (Leak Check Compound)	Carbon Dioxide	Oxygen	Methane	Notes
			ug/m^3											%	%	%	
Residential ESL - Soil/Subslab Gas:			**48**	**160,000**	**560**	**52,000**	**41**	**54**	**240**	**240**	**61**	**Varies**	**NA**	**NA**	**NA**	**NA**	
SV-24	08/05/16	6.0	42	45	**1,300**	5,500	13*	<35	<2.4*	<47	<43	#	<86	--	--	--	
Shroud (SV-24)	08/05/16	--	--	--	--	--	--	--	--	--	--	--	180,000	--	--	--	Shroud sample
SV-25	08/05/16	6.0	39	47	270	1,440	<1.2*	<11	1.2*	<14	<13	#	<26	--	--	--	
SV-26	08/05/16	6.0	23	28	180	920	2.6*	<4.4	7.6	<5.8	<5.3	#	<11	--	--	--	
SV-27	08/05/16	6.0	**73**	48	230	1,250	3.9*	<7.9	<0.53*	<11	<9.6	#	<19	--	--	--	
SV-28	08/23/16	6.0	<3.3	<3.9	<4.5	<9.0	<22	<4.2	200	9.6	<5.1	#	1,800	--	--	--	
SV-29	08/23/16	6.0	7.5	<3.9	<4.5	17.1	<21	<4.1	7.0	<5.5	<5.0	#	83	--	--	--	
SV-30	09/01/16	6.0	31	42	6.3	33.3	<21	<4.0	<6.7	<5.3	6.6	#	<9.7	--	--	--	
SV-31	09/01/16	6.0	16	34	6.4	40	<19	<3.7	<6.2	<4.9	<4.5	#	<9.0	--	--	--	
SV-32	09/01/16	6.0	6.4	3.9	<4.5	<9.0	<21	<4.1	14	<5.5	<5.0	#	<10	--	--	--	
SV-33	09/01/16	6.0	20	27	<4.2	8.8	<20	<3.9	<6.6	<5.2	<4.7	#	<9.5	--	--	--	
SV-34	09/01/16	6.0	17	33	4.7	24.3	<22	<4.3	<7.3	<5.7	<5.2	#	<11	--	--	--	
SV-35	09/01/16	6.0	36	100	16	79	<20	<3.8	<6.4	<5.1	5.8	#	<9.3	--	--	--	
SV-36	09/01/16	6.0	33	72	11	53	<22	<4.2	<7.1	<5.6	<5.1	#	<10	--	--	--	
SV-37	09/01/16	6.0	43	110	17	85	<21	<4.0	<6.6	<5.3	<4.8	#	<9.6	--	--	--	
SV-38	09/01/16	6.0	**48**	120	24	120	<20	<3.9	<6.5	<5.2	<4.7	#	<9.4	--	--	--	
SV-39	09/01/16	6.0	19	30	<4.1	12	<20	<3.8	<6.4	<5.1	<4.6	#	<9.3	--	--	--	
SV-40	09/01/16	6.0	29	51	<4.7	22.2	<23	<4.4	26	<5.9	17	#	<11	--	--	--	
SV-41	09/19/16	6.0	**49**	31	<6.1	7.6	<30	<5.7	<9.6	<7.6	<6.9	#	<14	--	2.9	--	
SV-42	09/19/16	6.0	<20	<24	<27	<54	<130	<25	<43	<34	<31	#	<62	--	11	--	
SV-43	09/19/16	6.5	7.2	23	6.9	32.2	<20	<3.9	<6.5	<5.2	<4.7	#	<9.5	--	10	--	
SV-44	09/19/16	6.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	not sampled, water in tubing
SV-45	09/19/16	6.0	8.7	33	9.4	43.3	<23	<4.4	20	<5.8	<5.2	#	<11	--	4.5	--	
SV-46	10/20/16	5.0	16	17	6.3	30.3	<22	<4.2	9.4	<5.6	<5.1	#	<10	0.76	2.0	0.93	
SV-47	10/20/16	5.0	15	19	6.4	38	<20	<3.9	9.4	13	<4.7	#	32	0.69	2.5	0.86	
SV-48	10/20/16	5.0	10	15	7.1	67	<23	<4.4	8.0	<5.9	<5.3	#	14	0.94	2.4	<0.22	
SV-49	10/20/16	5.0	22	26	<4.8	12	<23	<4.5	<7.5	<5.9	<5.4	#	<11	5.6	1.7	0.33	
SV-50	10/20/16	5.0	37	36	<4.8	13	<23	<4.5	<7.5	<5.9	8.2	#	14	3.7	2.4	0.35	
SV-51	10/20/16	5.0	7.4	8.8	<4.5	7.0	<21	<4.1	<7.0	<5.5	<5.0	#	12	--	--	--	Building 3
SV-52	10/20/16	5.0	4.7	4.6	<4.4	<8.8	<21	<4.1	23	<5.5	<5.0	#	13	--	--	--	Building 3
SV-53	10/20/16	5.0	9.3	9.6	<4.6	8.3	<22	<4.3	19	5.7	30	#	15	--	--	--	Building 4
SV-54	10/20/16	5.0	5.6	6.0	<4.3	4.7	<21	<4.0	41	<5.3	<4.9	#	32	--	--	--	Building 4
SV-55	10/20/16	5.0	81	98	8.9	48	<22	<4.3	<7.2	<5.7	<5.2	#	<10	0.79	14	<0.21	
SV-56	10/20/16	5.0	78	85	9.8	55	<22	<4.3	<7.2	<5.7	6.7	#	<10	1.0	15	<0.21	
Shroud (SV-56)	08/05/16	--	--	--	--	--	--	--	--	--	--	--	39,000	--	--	--	Shroud sample

Pangea

Table 1. Soil Gas Analytical Data - 1233 Bockman Road, San Lorenzo, California

Boring/ Sample ID	Date Sampled	Sample Depth (ft bgs)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	1,2-DCA	PCE	TCE	Chloroform	Other VOCs	Isopropyl Alcohol (Leak Check Compound)	Carbon Dioxide	Oxygen	Methane	Notes
			ug/m^3											%	%	%	
Residential ESL - Soil/Subslab Gas:			**48**	**160,000**	**560**	**52,000**	**41**	**54**	**240**	**240**	**61**	**Varies**	**NA**	**NA**	**NA**	**NA**	

Abbreviations:

DCA = 1,2-dichloroethane

PCE = Tetrachloroethene

TCE = Trichloroethene

1,1,1-TCA = 1,1,1-Trichloroethane

VOCs by EPA Method TO-15.

See lab report for trace concentrations of other VOCs

ug/m^3 = Micrograms per cubic meter of air.

ft bgs = Feet below ground surface

ESL = Environmental Screening Level for Shallow Soil Gas for Evaluation of Potential Vapor Intrusion (Table E-2). Established by the SFBRWQCB, Interim Final - November 2007; Feb 2016 (Rev. 3)

ND = not detected above laboratory reporting limits.

-- = Not analyzed

< n = Chemical not present at a concentration in excess of laboratory detection limit shown.

Bold concentrations exceed residential ESL.

* = Represents an estimated concentration (j-flag value) below the reporting limit, or indicates that there was no detection above the method detection limit.

= other VOCs detected below screening level thresholds. See lab report for details.

contaminant detections highlighted in gray

APPENDIX A

Permit

Alameda County Public Works Agency - Water Resources Well Permit

Public Works Agency
Alameda County

399 Elmhurst Street
Hayward, CA 94544-1395
Telephone: (510)670-6633 Fax:(510)782-1939

Application Approved on: 10/19/2016 By jamesy

Permit Numbers: W2016-0762 to W2016-0763
Permits Valid from 10/20/2016 to 10/20/2016

Application Id: 1476814909893
City of Project Site: San Lorenzo
Site Location: 1233 Bockman Road
San Lorenzo, CA 94580

Development Site

Start Date 10-20-2016 if possible
Project Start Date: 10/20/2016 **Completion Date:** 10/20/2016
Assigned Inspector: Contact Marcelino Vialpando at (510) 670-5760 or Marcelino@acpwa.org

Applicant: Pangea Environmental Services, Inc. - Patrick Groff
1710 Franklin ST #200, Oakland, CA 94612 **Phone:** 925-818-0010

Property Owner: Andrew Lavaux
100 St. Paul Street, #300, Denver, CA 80206 **Phone:** --

Client: Andrew Lavaux
100 St. Paul Street, #300, Denver, CA 80206 **Phone:** --

Total Due: $530.00
Receipt Number: WR2016-0524 **Total Amount Paid:** $530.00
Payer Name : Robert Clark-Riddell Paid By: VISA **PAID IN FULL**

Works Requesting Permits:

Borehole(s) for Geo Probes-Sampling 24 to 72 hours only - 15 Boreholes
Driller: Penecore Drilling - Lic #: 906899 - Method: DP **Work Total: $265.00**

Specifications

Permit Number	Issued Dt	Expire Dt	# Boreholes	Hole Diam	Max Depth
W2016-0762	10/19/2016	01/18/2017	15	2.25 in.	5.00 ft

Specific Work Permit Conditions

1. Backfill bore hole by tremie with cement grout or cement grout/sand mixture. Upper two-three feet replaced in kind or with compacted cuttings. All cuttings remaining or unused shall be containerized and hauled off site. The containers shall be clearly labeled to the ownership of the container and labeled hazardous or non-hazardous.

2. Boreholes shall not be left open for a period of more than 24 hours. All boreholes left open more than 24 hours will need approval from Alameda County Public Works Agency, Water Resources Section. All boreholes shall be backfilled according to permit destruction requirements and all concrete material and asphalt material shall be to Caltrans Spec or County/City Codes. No borehole(s) shall be left in a manner to act as a conduit at any time.

3. Permittee shall assume entire responsibility for all activities and uses under this permit and shall indemnify, defend and save the Alameda County Public Works Agency, its officers, agents, and employees free and harmless from any and all expense, cost, liability in connection with or resulting from the exercise of this Permit including, but not limited to, properly damage, personal injury and wrongful death.

4. Applicant shall contact assigned inspector listed on the top of the permit at least five (5) working days prior to starting,

once the permit has been approved. Confirm the scheduled date(s) at least 24 hours prior to drilling.

5. Permittee, permittee's contractors, consultants or agents shall be responsible to assure that all material or waters generated during drilling, boring destruction, and/or other activities associated with this Permit will be safely handled, properly managed, and disposed of according to all applicable federal, state, and local statutes regulating such. In no case shall these materials and/or waters be allowed to enter, or potentially enter, on or off-site storm sewers, dry wells, or waterways or be allowed to move off the property where work is being completed.

6. Copy of approved drilling permit must be on site at all times. Failure to present or show proof of the approved permit application on site shall result in a fine of $500.00.

7. NOTE:
Under California laws, the owner/operator are responsible for reporting the contamination to the governmental regulatory agencies under Section 25295(a). The owner/operator is liable for civil penalties under Section 25299(a)(4) and criminal penalties under Section 25299(d) for failure to report a leak. The owner/operator is liable for civil penalties under Section 25299(b)(4) for knowing failure to ensure compliance with the law by the operator. These penalty provisions do not apply to a potential buyer.

8. Prior to any drilling activities onto any public right-of-ways, it shall be the applicants responsibilities to contact and coordinate a Underground Service Alert (USA), obtain encroachment permit(s), excavation permit(s) or any other permits required for that City or to the County and follow all City or County Ordinances. It shall also be the applicants responsibilities to provide to the Cities or to Alameda County a Traffic Safety Plan for any lane closures or detours planned. No work shall begin until all the permits and requirements have been approved or obtained.

9. Permit is valid only for the purpose specified herein. No changes in construction procedures, as described on this permit application. Boreholes shall not be converted to monitoring wells, without a permit application process.

Borehole(s) for Investigation-Environmental/Monitorinig Study - 3 Boreholes
Driller: Penecore Drilling - Lic #: 906899 - Method: DP **Work Total: $265.00**

Specifications

Permit Number	Issued Dt	Expire Dt	# Boreholes	Hole Diam	Max Depth
W2016-0763	10/19/2016	01/18/2017	3	2.25 in.	8.00 ft

Specific Work Permit Conditions

1. Backfill bore hole by tremie with cement grout or cement grout/sand mixture. Upper two-three feet replaced in kind or with compacted cuttings. All cuttings remaining or unused shall be containerized and hauled off site. The containers shall be clearly labeled to the ownership of the container and labeled hazardous or non-hazardous.

2. Boreholes shall not be left open for a period of more than 24 hours. All boreholes left open more than 24 hours will need approval from Alameda County Public Works Agency, Water Resources Section. All boreholes shall be backfilled according to permit destruction requirements and all concrete material and asphalt material shall be to Caltrans Spec or County/City Codes. No borehole(s) shall be left in a manner to act as a conduit at any time.

3. Permittee shall assume entire responsibility for all activities and uses under this permit and shall indemnify, defend and save the Alameda County Public Works Agency, its officers, agents, and employees free and harmless from any and all expense, cost, liability in connection with or resulting from the exercise of this Permit including, but not limited to, properly damage, personal injury and wrongful death.

4. Applicant shall contact assigned inspector listed on the top of the permit at least five (5) working days prior to starting, once the permit has been approved. Confirm the scheduled date(s) at least 24 hours prior to drilling.

5. Copy of approved drilling permit must be on site at all times. Failure to present or show proof of the approved permit application on site shall result in a fine of $500.00.

6. Electronic Reporting Regulations (Chapter 30, Division 3 of Title 23 & Division 3 of Title 27, CCR) require electronic submission of any report or data required by a regulatory agency from a cleanup site. Submission dates are set by a Regional Water Board or by a regulatory agency. Once a report/data is successfully uploaded, as required, you have met the reporting requirement (i.e. the compliance measure for electronic submittals is the actual upload itself). The upload date should be on or prior to the regulatory due date.

7. NOTE:
Under California laws, the owner/operator are responsible for reporting the contamination to the governmental regulatory agencies under Section 25295(a). The owner/operator is liable for civil penalties under Section 25299(a)(4) and criminal penalties under Section 25299(d) for failure to report a leak. The owner/operator is liable for civil penalties under Section 25299(b)(4) for knowing failure to ensure compliance with the law by the operator. These penalty provisions do not apply to a potential buyer.

8. Prior to any drilling activities onto any public right-of-ways, it shall be the applicants responsibilities to contact and coordinate a Underground Service Alert (USA), obtain encroachment permit(s), excavation permit(s) or any other permits required for that City or to the County and follow all City or County Ordinances. It shall also be the applicants responsibilities to provide to the Cities or to Alameda County a Traffic Safety Plan for any lane closures or detours planned. No work shall begin until all the permits and requirements have been approved or obtained.

9. Permit is valid only for the purpose specified herein. No changes in construction procedures, as described on this permit application. Boreholes shall not be converted to monitoring wells, without a permit application process.

APPENDIX B

Boring Logs/Well Construction Details

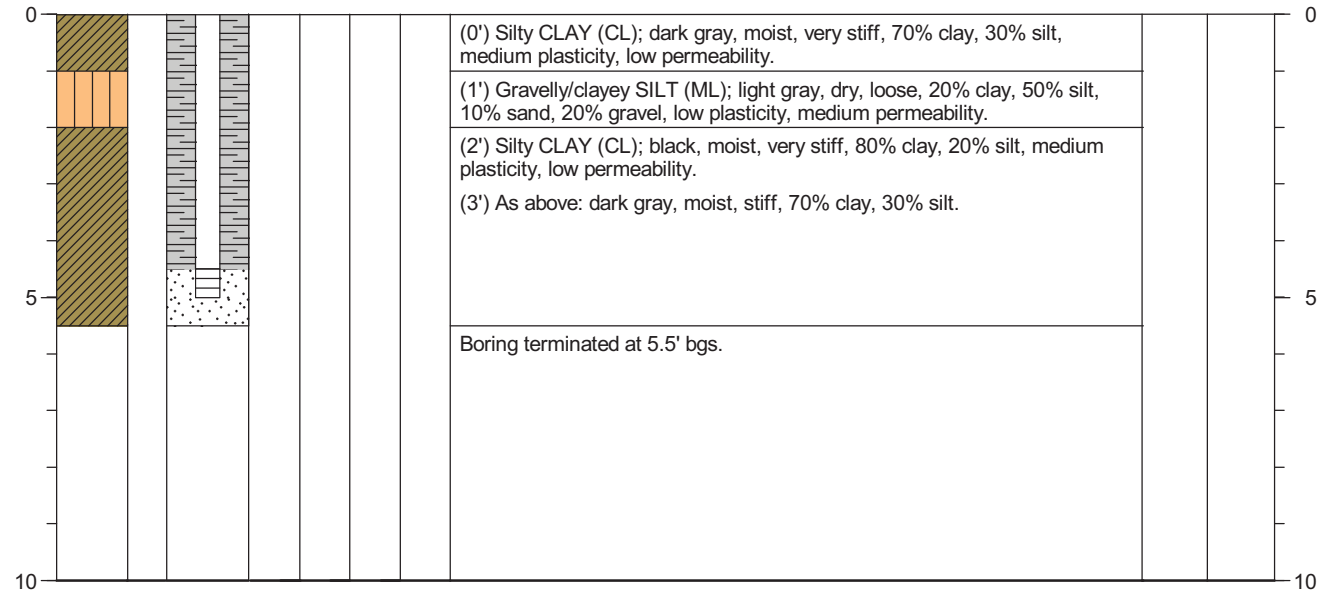
BORING AND WELL LOG LEGEND

LITHOLOGY	WATER LEVEL	WELL/BORING COMPLETION	SAMPLE TYPE	DESCRIPTION
				ASPHALT
				CONCRETE
				FILL
				TOPSOIL
				COBBLES
				IGNEOUS Rock
				METAMORPHIC Rock
				SEDIMENTARY Rock
				Well-graded GRAVEL (GW)
				Poorly graded GRAVEL (GP)
				Silty GRAVEL (GM)
				Clayey GRAVEL (GC)
				Well-graded GRAVEL with silt (GW-GM)
				Poorly graded GRAVEL with silt (GP-GM)
				Well-graded GRAVEL with clay (GW-GC)
				Poorly graded GRAVEL with clay (GP-GC)
				Well-graded SAND (SW)
				Poorly graded SAND (SP)
				Silty SAND (SM)
				Clayey SAND (SC)
				Well-graded SAND with silt (SW-SM)
				Poorly graded SAND with silt (SP-SM)
				Well-graded SAND with clay (SW-SC)
				Poorly graded SAND with clay (SP-SC)
				SILT (ML)
				Lean CLAY (CL)
				Organic SOIL (OL)
				Elastic SILT (MH)
				Fat CLAY (CH)
				Organic SOIL (OH)
				PEAT (PT)
				Volume Descriptors: Trace = <5% Few = 5-10% Little = 15-25% Some = 30-45% Mostly = >=50%
	▽ ▼			Water Level During Drilling Water Level at End of Drilling/in Completed Well
				Cap Riser Screen Cement Bentonite Grout Bentonite Seal Filter Pack Backfill
			GR	Grab
			EN	Encore
			SS	Split Spoon
			SH	Shelby Tube
			CO	Core Barrel
			DP	Direct Push
			ID	Lab Sample and ID

NOTES:

PANGEA	**Client:** Pauls Corporation, LLC **Project:** Bockman **Address:** 1233 Bockman Road, San Lorenzo, CA	**WELL LOG** **Well No.** SV-51 **Page:** 1 of 1

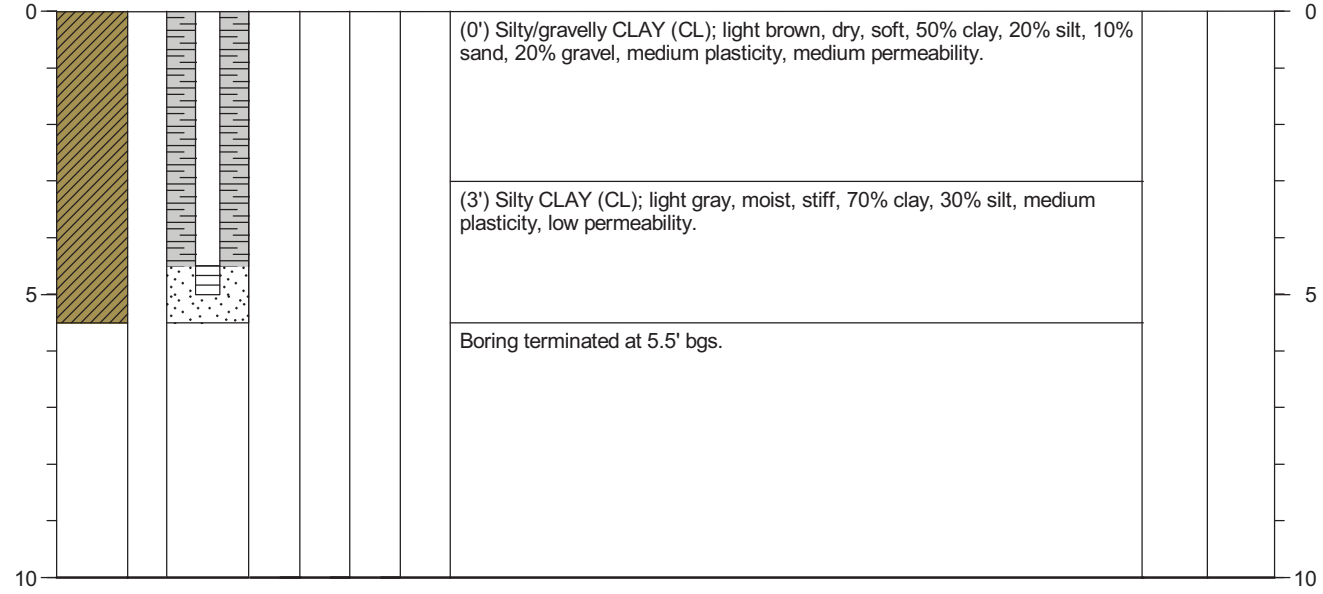
Drilling Start Date:	**10/20/2016**	Boring Depth (ft):	**5.5**	Well Depth (ft):	**5**
Drilling End Date:	**10/20/2016**	Boring Diameter (in):	**3.25**	Well Diameter (in):	
Drilling Company:	**Penecore**	Sampling Method(s):		Screen Slot (in):	**N/A**
Drilling Method:	**Hand Auger**	DTW During Drilling (ft):		Riser Material:	**Teflon Tubing**
Drilling Equipment:		DTW After Drilling (ft):		Screen Material:	**Vapor Implant**
Driller:		Top of Casing Elev. (ft):		Seal Material(s):	**Bentonite**
Logged By:	**Patrick Groff**	Location (X,Y):		Filter Pack:	**#3 Sand**



NOTES: Hydrated bentonite 0-4.0'
Dry bentonite 4-4.5'

PANGEA	**Client:** Pauls Corporation, LLC **Project:** Bockman **Address:** 1233 Bockman Road, San Lorenzo, CA	**WELL LOG** **Well No.** SV-52 **Page:** 1 of 1

Drilling Start Date:	**10/20/2016**	Boring Depth (ft):	**5.5**	Well Depth (ft):	**5**
Drilling End Date:	**10/20/2016**	Boring Diameter (in):	**3.25**	Well Diameter (in):	
Drilling Company:	**Penecore**	Sampling Method(s):		Screen Slot (in):	**N/A**
Drilling Method:	**Hand Auger**	DTW During Drilling (ft):		Riser Material:	**Teflon Tubing**
Drilling Equipment:		DTW After Drilling (ft):		Screen Material:	**Vapor Implant**
Driller:		Top of Casing Elev. (ft):		Seal Material(s):	**Bentonite**
Logged By:	**Patrick Groff**	Location (X,Y):		Filter Pack:	**#3 Sand**



NOTES: Hydrated bentonite 0-4.0'
Dry bentonite 4-4.5'

PANGEA	**Client:** Pauls Corporation, LLC **Project:** Bockman **Address:** 1233 Bockman Road, San Lorenzo, CA	**WELL LOG** **Well No.** SV-53 **Page:** 1 of 1

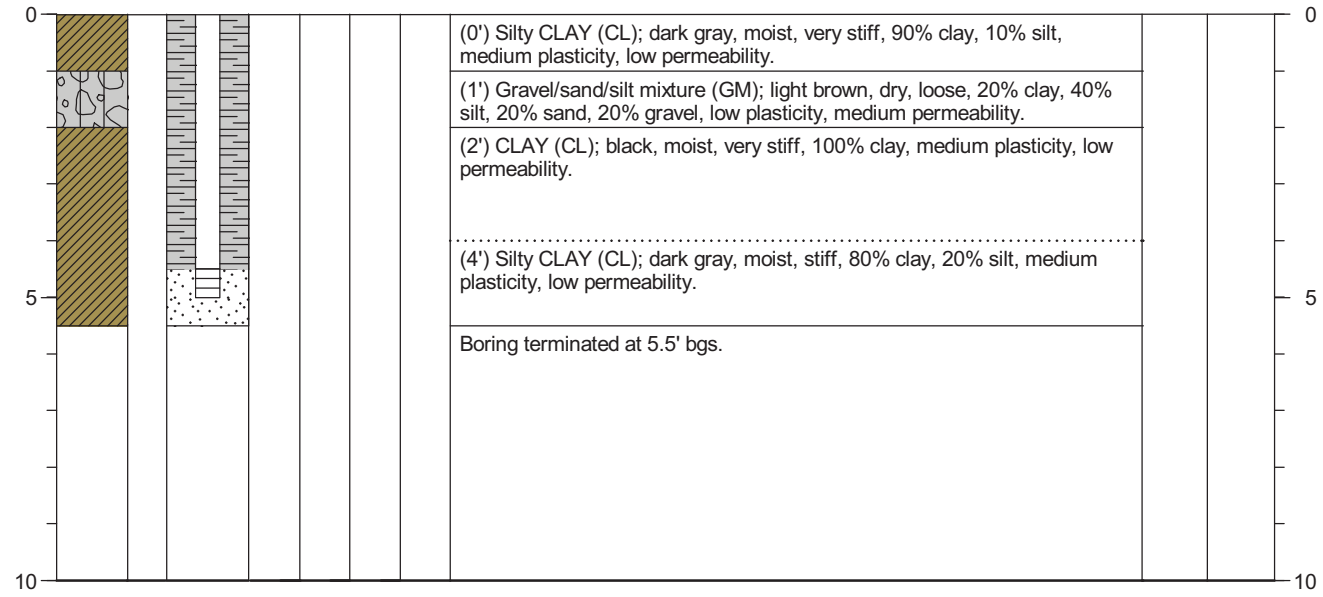
Drilling Start Date:	**10/20/2016**	Boring Depth (ft):	**5.5**	Well Depth (ft):	**5**
Drilling End Date:	**10/20/2016**	Boring Diameter (in):	**3.25**	Well Diameter (in):	
Drilling Company:	**Penecore**	Sampling Method(s):		Screen Slot (in):	**N/A**
Drilling Method:	**Hand Auger**	DTW During Drilling (ft):		Riser Material:	**Teflon Tubing**
Drilling Equipment:		DTW After Drilling (ft):		Screen Material:	**Vapor Implant**
Driller:		Top of Casing Elev. (ft):		Seal Material(s):	**Bentonite**
Logged By:	**Patrick Groff**	Location (X,Y):		Filter Pack:	**#3 Sand**

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT: Sample Type	COLLECT: Date & Time	COLLECT: Blow Counts	COLLECT: Recovery (ft)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: PID (ppm)	MEASURE: Lab Sample	DEPTH (ft)
0								(0') Silty CLAY (CL); black, moist, very stiff, 90% clay, 10% silt, medium plasticity, low permeability.			0
								(1') Gravelly/sandy CLAY (CL); light brown, dry, loose, 20% clay, 40% silt, 20% sand, 20% gravel, low plasticity, medium permeability.			
								(2') CLAY (CL); black, moist, very stiff, 100% clay, medium plasticity, low permeability.			
5								(4') Silty CLAY (CL); dark gray, moist, stiff, 80% clay, 20% silt, medium plasticity, low permeability.			5
								Boring terminated at 5.5' bgs.			
10											10

NOTES: Hydrated bentonite 0-4.0'
Dry bentonite 4-4.5'

PANGEA	**Client:** Pauls Corporation, LLC **Project:** Bockman **Address:** 1233 Bockman Road, San Lorenzo, CA	**WELL LOG** **Well No.** SV-54 **Page:** 1 of 1

Drilling Start Date:	**10/20/2016**	Boring Depth (ft):	**5.5**	Well Depth (ft):	**5**
Drilling End Date:	**10/20/2016**	Boring Diameter (in):	**3.25**	Well Diameter (in):	
Drilling Company:	**Penecore**	Sampling Method(s):		Screen Slot (in):	**N/A**
Drilling Method:	**Hand Auger**	DTW During Drilling (ft):		Riser Material:	**Teflon Tubing**
Drilling Equipment:		DTW After Drilling (ft):		Screen Material:	**Vapor Implant**
Driller:		Top of Casing Elev. (ft):		Seal Material(s):	**Bentonite**
Logged By:	**Patrick Groff**	Location (X,Y):		Filter Pack:	**#3 Sand**



NOTES: Hydrated bentonite 0-4.0'
Dry bentonite 4-4.5'

APPENDIX C

Soil Gas Sampling Field Forms

SOIL GAS PURGING / SAMPLING LOG

Project Name: Beckman
Job Number: 2030.001
Date: 10-21-16
Sampler(s): RG EL
Sample ID / Time:

PANGEA

Probe / Well ID: SV-51
Canister Serial #: 00190
Flow Contoller #: A00305
Initial Vacuum: 30
Final Vacuum: 5

Notes:

SPECIFICATIONS

Tubing Length: ____ inches
Tubing Diameter: ____ inches
Boring Diameter: ____ inches
Sandpack height: ____ inches
Probe Length: ____ inches
Probe Diameter: ____ inches
Summa Flow Rate: ____ mL/min
Purge Flow Rate: ____ mL/min

No Purge

PURGE VOLUME CALCULATION

Purge Volume = tubing + sandpack
Tubing = π x (tubing diameter/2)^2 x length
Tubing = ____ inches^3
Sandpack = π x (boring diameter/2)^2 sandpack height x porosity
Sandpack = ____ inches^3
Single Purge Volume = ____ inches^3
Total Purge Volumes = ____
Start Time = ____
Total Purge Time = ____

π = 3.1416 1 inch^3 = 16.4 mL Estimated Max Porosity = 0.375

TIME	PURGE TIME (min./sec.)	He / IPA IN SHROUD (% / PPM)	CANISTER PRESSURE ("Hg)	VOCs (ppm)	COMMENTS
		No purge sample			
1124	Shut in test - 98.0" H_2O				
1125	Stop shut in test - 98.0" H_2O				
1151	—	1.7	29		Field vacuum Ø
1152	—	9.2	25		"
1154	—	13.6	20		"
1155	—	4.2	15		"
1156	—	7.8	10		"
1158	→	3.6	5		"

SOIL GAS PURGING / SAMPLING LOG

Project Name: Beckman
Job Number: 2030.001
Date: ~~10-20~~ 10-21-16
Sampler(s): ~~PG~~ EL
Sample ID / Time:

PANGEA

Probe / Well ID: SV-52
Canister Serial #: 00261
Flow Contoller #: A00184
Initial Vacuum: 30
Final Vacuum: 5.5

Notes:

SPECIFICATIONS

Tubing Length: _____ inches
Tubing Diameter: _____ inches
Boring Diameter: _____ inches
Sandpack height: _____ inches
Probe Length: _____ inches
Probe Diameter: _____ inches
Summa Flow Rate: _____ mL/min
Purge Flow Rate: _____ mL/min

No Purge

PURGE VOLUME CALCULATION

Purge Volume = tubing + sandpack
Tubing = π x (tubing diameter/2)^2 x length
Tubing = _____ inches^3
Sandpack = π x (boring diameter/2)^2 sandpack height x porosity
Sandpack = _____ inches^3
Single Purge Volume = _____ inches^3
Total Purge Volumes = _____
Start Time = _____
Total Purge Time = _____

π = 3.1416 1 inch^3 = 16.4 mL Estimated Max Porosity = 0.375

TIME	PURGE TIME (min./sec.)	He / IPA IN SHROUD (% / PPM)	CANISTER PRESSURE ("Hg)	VOCs (ppm)	COMMENTS
		No purge sample			
1204	Start shut in test		-95.0" H_2O		
1205	Stop shut in test		-95.0" H_2O		
1210	—	1.1	25		Field vacuum
1211	—	6.3	25		"
1212	—	5.0	20		"
1214	—	21.2	15		"
1216	—	13.9	10		"
1219	—	7.9	~~5.5~~ 5		"

SOIL GAS PURGING / SAMPLING LOG

Project Name: Bockman
Job Number: 2030.001
Date: 10-21-16
Sampler(s): BG EL
Sample ID / Time:

PANGEA

Probe / Well ID: SV-53
Canister Serial #: 00280
Flow Contoller #: A00188
Initial Vacuum: 29
Final Vacuum: 6

Notes:

SPECIFICATIONS

Tubing Length: ____ inches
Tubing Diameter: ____ inches
Boring Diameter: ____ inches
Sandpack height: ____ inches
Probe Length: ____ inches
Probe Diameter: ____ inches
Summa Flow Rate: ____ mL/min
Purge Flow Rate: ____ mL/min

No Purge

PURGE VOLUME CALCULATION

Purge Volume = tubing + sandpack
Tubing = π x (tubing diameter/2)^2 x length
Tubing = ____ inches^3
Sandpack = π x (boring diameter/2)^2 sandpack height x porosity
Sandpack = ____ inches^3
Single Purge Volume = ____ inches^3
Total Purge Volumes = ____
Start Time = ____
Total Purge Time = ____

π = 3.1416 1 inch^3 = 16.4 mL Estimated Max Porosity = 0.375

TIME	PURGE TIME (min./sec.)	He / IPA IN SHROUD (% / PPM)	CANISTER PRESSURE ("Hg)	VOCs (ppm)	COMMENTS
		No Purge Sample			
1218	start shut in test		93.5" H_2O		
1219	stop shut in test		93.5" H_2O		
1231	—	~~27~~ 15.0	27		field vacuum Ø
1232	—	31.6	25		"
1233	—	21.7	20		"
1235	—	12.4	15		"
1236	—	12.1	10		"
1238	—	10.4	5		"

SOIL GAS PURGING / SAMPLING LOG

Project Name: Bockman
Job Number: 2030.001
Date: 10-21-16
Sampler(s): PF EL
Sample ID / Time:

PANGEA

Probe / Well ID: SV-54
Canister Serial #: 00864
Flow Contoller #: A00297
Initial Vacuum: 30
Final Vacuum: 4.5

Notes:

SPECIFICATIONS

Tubing Length: _____ inches
Tubing Diameter: _____ inches
Boring Diameter: _____ inches
Sandpack height: _____ inches
Probe Length: _____ inches
Probe Diameter: _____ inches
Summa Flow Rate: _____ mL/min
Purge Flow Rate: _____ mL/min

No Purge

PURGE VOLUME CALCULATION

Purge Volume = tubing + sandpack
Tubing = π x (tubing diameter/2)^2 x length
Tubing = _____ inches^3
Sandpack = π x (boring diameter/2)^2 sandpack height x porosity
Sandpack = _____ inches^3
Single Purge Volume = _____ inches^3
Total Purge Volumes = _____
Start Time = _____
Total Purge Time = _____

π = 3.1416 1 inch^3 = 16.4 mL Estimated Max Porosity = 0.375

TIME	PURGE TIME (min./sec.)	He / (IPA) IN SHROUD (% / PPM)	CANISTER PRESSURE ("Hg)	VOCs (ppm)	COMMENTS
		No purge sample			
1246	Start Shut in test		- 29.5" H_2O		
1247	Stop Shut in test		- 29.5" H_2O		
1255	—	7.4	30		Field Vacuum ⊘
1258	—	9.7	25		"
1300	—	10.3	20		"
1303	—	7.8	15		"
1305	—	16.4	10		"
1309	—	6.6	5		"

APPENDIX D

Laboratory Analytical Reports


Curtis & Tompkins, Ltd.
Analytical Laboratories, Since 1878

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

Laboratory Job Number 282480
ANALYTICAL REPORT

Pangea Environmental	Project : 2030.001
1710 Franklin Street	Location : Bockman
Oakland, CA 94612	Level : II

Sample ID	Lab ID
SV-46	282480-001
SV-47	282480-002
SV-48	282480-003
SV-49	282480-004
SV-50	282480-005
SV-51	282480-006
SV-52	282480-007
SV-53	282480-008
SV-54	282480-009
SV-55	282480-010
SV-56	282480-011
SHROUD	282480-012

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature. The results contained in this report meet all requirements of NELAC and pertain only to those samples which were submitted for analysis. This report may be reproduced only in its entirety.

Signature: Will Rice Date: 10/28/2016

Will Rice
Project Manager
will.rice@ctberk.com

CA ELAP# 2896, NELAP# 4044-001

Curtis & Tompkins, Ltd.

CASE NARRATIVE

Laboratory number:	**282480**
Client:	**Pangea Environmental**
Project:	**2030.001**
Location:	**Bockman**
Request Date:	**10/21/16**
Samples Received:	**10/21/16**

This data package contains sample and QC results for twelve air samples, requested for the above referenced project on 10/21/16. The samples were received cold and intact.

Volatile Organics in Air by MS (EPA TO-15):

High response was observed for vinyl acetate in the CCV analyzed 10/21/16 13:41; affected data was qualified with "b". High recovery was observed for vinyl acetate in the BS for batch 240422; the associated RPD was within limits, and this analyte was not detected at or above the RL in the associated samples. High surrogate recoveries were observed for bromofluorobenzene in SV-47 (lab # 282480-002) and SV-48 (lab # 282480-003). No other analytical problems were encountered.

Volatile Organics in Air GC (ASTM D1946):

No analytical problems were encountered.

Curtis & Tompkins, Ltd.
Analytical Laboratory Since 1878
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AIR TESTING CHAIN OF CUSTODY
& PURCHASE ORDER

Chain of Custody # :

C&T LOGIN # 282480

Project No: 2030.001
Project Name: Beckman
EDD Format: _____ Rpt Level: II III IV
Turnaround Time: ☐ RUSH _____ ☐ Standard

Sampler: Patrick Graff
Report To: Ron Scheele
Company : Pangea
Telephone: (510) 836-3760
Email: rscheele@pangeaenv.com

Lab No.	Sample ID.	Sampling Information: Date Collected	Time Collected	Canister ID (Bar Code #)	Flow Controller ID	Sample Volume (Gauge Reading)	TESTING REQUESTED: TO-15	Fixed Gases: O_2, CO_2, CH_4			
1	SV-46	10-21-16	0932	00379	A00222	30/5	X	X			
2	SV-47	"	1006	00282	A00295	30/5	X	X			
3	SV-48	"	1032	00144	A00298	30/7	X	X			
4	SV-49		1048	00172	A00296	30/7	X	X			
5	SV-50		1115	00412	A00204	30/5	X	X			
6	SV-51		1151	00190	A05305	30/5	X				
7	SV-52		1210	00261	A00184	30/5.5	X				
8	SV-53		1231	00280	A00188	29/6	X				
9	SV-54		1255	00064	A00297	30/4.5	X				
10	SV-55		1349	00162	A00206	29.5/6.0	X				
11	SV-56		1409	00307	A00189	29/6	X	X			
12	Shroud		1411	00171	A00299	29/5	X				

Notes:
EDF request

RELINQUISHED BY:
10-21-16 1710 DATE/TIME
DATE/TIME
DATE/TIME

RECEIVED BY:
10/21/16 17:10 DATE/TIME
DATE/TIME
DATE/TIME

COOLER RECEIPT CHECKLIST

Curtis & Tompkins, Ltd.

Login # 282480 Date Received 10/21/16 Number of coolers 2
Client Pangea Project Buckman

Date Opened 10/21/16 By (print) FWA (sign) Eddie Ang
Date Logged in ↓ By (print) ↓ (sign) ↓
Date Labeled ↓ By (print) ↓ (sign) ↓

1. Did cooler come with a shipping slip (airbill, etc) YES (NO)
   Shipping info
2A. Were custody seals present? .... ☐ YES (circle) on cooler on samples ☑ NO
   How many Name Date
2B. Were custody seals intact upon arrival? YES NO (N/A)
3. Were custody papers dry and intact when received? (YES) NO
4. Were custody papers filled out properly (ink, signed, etc)? (YES) NO
5. Is the project identifiable from custody papers? (If so fill out top of form) (YES) NO
6. Indicate the packing in cooler: (if other, describe)

☐ Bubble Wrap ☐ Foam blocks ☐ Bags ☑ None
☐ Cloth material ☐ Cardboard ☐ Styrofoam ☐ Paper towels

7. Temperature documentation: * Notify PM if temperature exceeds 6°C

Type of ice used: ☐ Wet ☐ Blue/Gel ☐ None Temp(°C)

☐ Temperature blank(s) included? ☐ Thermometer# ☐ IR Gun#

☐ Samples received on ice directly from the field. Cooling process had begun

8. Were Method 5035 sampling containers present? YES (NO)
   If YES, what time were they transferred to freezer?
9. Did all bottles arrive unbroken/unopened? (YES) NO
10. Are there any missing / extra samples? YES (NO)
11. Are samples in the appropriate containers for indicated tests? (YES) NO
12. Are sample labels present, in good condition and complete? (YES) NO
13. Do the sample labels agree with custody papers? (YES) NO
14. Was sufficient amount of sample sent for tests requested? (YES) NO
15. Are the samples appropriately preserved? YES NO (N/A)
16. Did you check preservatives for all bottles for each sample? YES NO (N/A)
17. Did you document your preservative check? (pH strip lot#) YES NO (N/A)
18. Did you change the hold time in LIMS for unpreserved VOAs? YES NO (N/A)
19. Did you change the hold time in LIMS for preserved terracores? YES NO (N/A)
20. Are bubbles > 6mm absent in VOA samples? YES NO (N/A)
21. Was the client contacted concerning this sample delivery? YES (NO)
   If YES, Who was called? By Date:

COMMENTS

Curtis & Tompkins, Ltd.

Detections Summary for 282480

Results for any subcontracted analyses are not included in this summary.

Client : Pangea Environmental
Project : 2030.001
Location : Bockman

Client Sample ID : SV-46 Laboratory Sample ID : 282480-001

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Freon 12	73		1.0	ppbv	As Recd	2.070	EPA TO-15	METHOD
Trichlorofluoromethane	3.9		1.0	ppbv	As Recd	2.070	EPA TO-15	METHOD
Acetone	24		4.1	ppbv	As Recd	2.070	EPA TO-15	METHOD
Carbon Disulfide	32		1.0	ppbv	As Recd	2.070	EPA TO-15	METHOD
n-Hexane	54		1.0	ppbv	As Recd	2.070	EPA TO-15	METHOD
2-Butanone	3.7		1.0	ppbv	As Recd	2.070	EPA TO-15	METHOD
Benzene	5.0		1.0	ppbv	As Recd	2.070	EPA TO-15	METHOD
n-Heptane	25		1.0	ppbv	As Recd	2.070	EPA TO-15	METHOD
Toluene	4.5		1.0	ppbv	As Recd	2.070	EPA TO-15	METHOD
Tetrachloroethene	1.4		1.0	ppbv	As Recd	2.070	EPA TO-15	METHOD
Ethylbenzene	1.5		1.0	ppbv	As Recd	2.070	EPA TO-15	METHOD
m,p-Xylenes	4.8		1.0	ppbv	As Recd	2.070	EPA TO-15	METHOD
o-Xylene	2.1		1.0	ppbv	As Recd	2.070	EPA TO-15	METHOD
4-Ethyltoluene	2.6		1.0	ppbv	As Recd	2.070	EPA TO-15	METHOD
1,3,5-Trimethylbenzene	2.4		1.0	ppbv	As Recd	2.070	EPA TO-15	METHOD
1,2,4-Trimethylbenzene	6.7		1.0	ppbv	As Recd	2.070	EPA TO-15	METHOD
Carbon Dioxide	7,600		2,100	ppmv	As Recd	2.070	ASTM D1946	METHOD
Oxygen	20,000		2,100	ppmv	As Recd	2.070	ASTM D1946	METHOD
Methane	9,300		2,100	ppmv	As Recd	2.070	ASTM D1946	METHOD

Curtis & Tompkins, Ltd.

Client Sample ID : SV-47 Laboratory Sample ID : 282480-002

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Freon 12	1.9		0.96	ppbv	As Recd	1.910	EPA TO-15	METHOD
Acetone	44		3.8	ppbv	As Recd	1.910	EPA TO-15	METHOD
Carbon Disulfide	48		0.96	ppbv	As Recd	1.910	EPA TO-15	METHOD
Isopropanol	13		3.8	ppbv	As Recd	1.910	EPA TO-15	METHOD
n-Hexane	54		0.96	ppbv	As Recd	1.910	EPA TO-15	METHOD
2-Butanone	10		0.96	ppbv	As Recd	1.910	EPA TO-15	METHOD
Benzene	4.7		0.96	ppbv	As Recd	1.910	EPA TO-15	METHOD
n-Heptane	50		0.96	ppbv	As Recd	1.910	EPA TO-15	METHOD
Trichloroethene	2.5		0.96	ppbv	As Recd	1.910	EPA TO-15	METHOD
Toluene	4.9		0.96	ppbv	As Recd	1.910	EPA TO-15	METHOD
Tetrachloroethene	1.4		0.96	ppbv	As Recd	1.910	EPA TO-15	METHOD
Ethylbenzene	1.5		0.96	ppbv	As Recd	1.910	EPA TO-15	METHOD
m,p-Xylenes	5.7		0.96	ppbv	As Recd	1.910	EPA TO-15	METHOD
o-Xylene	3.1		0.96	ppbv	As Recd	1.910	EPA TO-15	METHOD
4-Ethyltoluene	2.5		0.96	ppbv	As Recd	1.910	EPA TO-15	METHOD
1,3,5-Trimethylbenzene	2.6		0.96	ppbv	As Recd	1.910	EPA TO-15	METHOD
1,2,4-Trimethylbenzene	7.8		0.96	ppbv	As Recd	1.910	EPA TO-15	METHOD
Carbon Dioxide	6,900		1,900	ppmv	As Recd	1.910	ASTM D1946	METHOD
Oxygen	25,000		1,900	ppmv	As Recd	1.910	ASTM D1946	METHOD
Methane	8,600		1,900	ppmv	As Recd	1.910	ASTM D1946	METHOD

Client Sample ID : SV-48 Laboratory Sample ID : 282480-003

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Freon 12	2.2		1.1	ppbv	As Recd	2.180	EPA TO-15	METHOD
Acetone	27		4.4	ppbv	As Recd	2.180	EPA TO-15	METHOD
Carbon Disulfide	13		1.1	ppbv	As Recd	2.180	EPA TO-15	METHOD
Isopropanol	5.9		4.4	ppbv	As Recd	2.180	EPA TO-15	METHOD
n-Hexane	16		1.1	ppbv	As Recd	2.180	EPA TO-15	METHOD
2-Butanone	2.2		1.1	ppbv	As Recd	2.180	EPA TO-15	METHOD
Cyclohexane	29		1.1	ppbv	As Recd	2.180	EPA TO-15	METHOD
Benzene	3.2		1.1	ppbv	As Recd	2.180	EPA TO-15	METHOD
n-Heptane	9.2		1.1	ppbv	As Recd	2.180	EPA TO-15	METHOD
Toluene	3.9		1.1	ppbv	As Recd	2.180	EPA TO-15	METHOD
Tetrachloroethene	1.2		1.1	ppbv	As Recd	2.180	EPA TO-15	METHOD
Ethylbenzene	1.6		1.1	ppbv	As Recd	2.180	EPA TO-15	METHOD
m,p-Xylenes	9.8		1.1	ppbv	As Recd	2.180	EPA TO-15	METHOD
o-Xylene	5.5		1.1	ppbv	As Recd	2.180	EPA TO-15	METHOD
4-Ethyltoluene	2.8		1.1	ppbv	As Recd	2.180	EPA TO-15	METHOD
1,3,5-Trimethylbenzene	2.4		1.1	ppbv	As Recd	2.180	EPA TO-15	METHOD
1,2,4-Trimethylbenzene	6.4		1.1	ppbv	As Recd	2.180	EPA TO-15	METHOD
Carbon Dioxide	9,400		2,200	ppmv	As Recd	2.180	ASTM D1946	METHOD
Oxygen	24,000		2,200	ppmv	As Recd	2.180	ASTM D1946	METHOD

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Client Sample ID : SV-49 Laboratory Sample ID : 282480-004

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Acetone	23		4.4	ppbv	As Recd	2.200	EPA TO-15	METHOD
Carbon Disulfide	3.2		1.1	ppbv	As Recd	2.200	EPA TO-15	METHOD
MTBE	2.3		1.1	ppbv	As Recd	2.200	EPA TO-15	METHOD
n-Hexane	2.8		1.1	ppbv	As Recd	2.200	EPA TO-15	METHOD
2-Butanone	5.4		1.1	ppbv	As Recd	2.200	EPA TO-15	METHOD
Benzene	6.8		1.1	ppbv	As Recd	2.200	EPA TO-15	METHOD
n-Heptane	1.7		1.1	ppbv	As Recd	2.200	EPA TO-15	METHOD
Toluene	7.0		1.1	ppbv	As Recd	2.200	EPA TO-15	METHOD
2-Hexanone	1.7		1.1	ppbv	As Recd	2.200	EPA TO-15	METHOD
m,p-Xylenes	2.7		1.1	ppbv	As Recd	2.200	EPA TO-15	METHOD
Carbon Dioxide	56,000		2,200	ppmv	As Recd	2.200	ASTM D1946	METHOD
Oxygen	17,000		2,200	ppmv	As Recd	2.200	ASTM D1946	METHOD
Methane	3,300		2,200	ppmv	As Recd	2.200	ASTM D1946	METHOD

Client Sample ID : SV-50 Laboratory Sample ID : 282480-005

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Acetone	34		4.4	ppbv	As Recd	2.210	EPA TO-15	METHOD
Carbon Disulfide	23		1.1	ppbv	As Recd	2.210	EPA TO-15	METHOD
Isopropanol	5.7		4.4	ppbv	As Recd	2.210	EPA TO-15	METHOD
MTBE	1.2		1.1	ppbv	As Recd	2.210	EPA TO-15	METHOD
n-Hexane	4.1		1.1	ppbv	As Recd	2.210	EPA TO-15	METHOD
cis-1,2-Dichloroethene	2.1		1.1	ppbv	As Recd	2.210	EPA TO-15	METHOD
2-Butanone	6.0		1.1	ppbv	As Recd	2.210	EPA TO-15	METHOD
Chloroform	1.7		1.1	ppbv	As Recd	2.210	EPA TO-15	METHOD
Benzene	11		1.1	ppbv	As Recd	2.210	EPA TO-15	METHOD
n-Heptane	2.3		1.1	ppbv	As Recd	2.210	EPA TO-15	METHOD
Toluene	9.5		1.1	ppbv	As Recd	2.210	EPA TO-15	METHOD
m,p-Xylenes	3.0		1.1	ppbv	As Recd	2.210	EPA TO-15	METHOD
Carbon Dioxide	37,000		2,200	ppmv	As Recd	2.210	ASTM D1946	METHOD
Oxygen	24,000		2,200	ppmv	As Recd	2.210	ASTM D1946	METHOD
Methane	3,500		2,200	ppmv	As Recd	2.210	ASTM D1946	METHOD

Client Sample ID : SV-51 Laboratory Sample ID : 282480-006

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Acetone	4.5		4.1	ppbv	As Recd	2.050	EPA TO-15	METHOD
Carbon Disulfide	2.7		1.0	ppbv	As Recd	2.050	EPA TO-15	METHOD
Isopropanol	5.0		4.1	ppbv	As Recd	2.050	EPA TO-15	METHOD
Cyclohexane	1.7		1.0	ppbv	As Recd	2.050	EPA TO-15	METHOD
Benzene	2.3		1.0	ppbv	As Recd	2.050	EPA TO-15	METHOD
Toluene	2.3		1.0	ppbv	As Recd	2.050	EPA TO-15	METHOD
m,p-Xylenes	1.6		1.0	ppbv	As Recd	2.050	EPA TO-15	METHOD

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Client Sample ID : SV-52 Laboratory Sample ID : 282480-007

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Acetone	4.5		4.1	ppbv	As Recd	2.040	EPA TO-15	METHOD
Isopropanol	5.2		4.1	ppbv	As Recd	2.040	EPA TO-15	METHOD
Cyclohexane	1.2		1.0	ppbv	As Recd	2.040	EPA TO-15	METHOD
Benzene	1.5		1.0	ppbv	As Recd	2.040	EPA TO-15	METHOD
Toluene	1.2		1.0	ppbv	As Recd	2.040	EPA TO-15	METHOD
Tetrachloroethene	3.4		1.0	ppbv	As Recd	2.040	EPA TO-15	METHOD

Client Sample ID : SV-53 Laboratory Sample ID : 282480-008

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Acetone	13		4.2	ppbv	As Recd	2.110	EPA TO-15	METHOD
Carbon Disulfide	10		1.1	ppbv	As Recd	2.110	EPA TO-15	METHOD
Isopropanol	6.1		4.2	ppbv	As Recd	2.110	EPA TO-15	METHOD
n-Hexane	1.2		1.1	ppbv	As Recd	2.110	EPA TO-15	METHOD
2-Butanone	1.9		1.1	ppbv	As Recd	2.110	EPA TO-15	METHOD
Chloroform	6.2		1.1	ppbv	As Recd	2.110	EPA TO-15	METHOD
Benzene	2.9		1.1	ppbv	As Recd	2.110	EPA TO-15	METHOD
Trichloroethene	1.1		1.1	ppbv	As Recd	2.110	EPA TO-15	METHOD
Toluene	2.6		1.1	ppbv	As Recd	2.110	EPA TO-15	METHOD
Tetrachloroethene	2.8		1.1	ppbv	As Recd	2.110	EPA TO-15	METHOD
m,p-Xylenes	1.9		1.1	ppbv	As Recd	2.110	EPA TO-15	METHOD
1,2,4-Trimethylbenzene	1.2		1.1	ppbv	As Recd	2.110	EPA TO-15	METHOD

Client Sample ID : SV-54 Laboratory Sample ID : 282480-009

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Freon 12	2.7		1.0	ppbv	As Recd	1.990	EPA TO-15	METHOD
Acetone	7.1		4.0	ppbv	As Recd	1.990	EPA TO-15	METHOD
Carbon Disulfide	1.4		1.0	ppbv	As Recd	1.990	EPA TO-15	METHOD
Isopropanol	13		4.0	ppbv	As Recd	1.990	EPA TO-15	METHOD
Benzene	1.8		1.0	ppbv	As Recd	1.990	EPA TO-15	METHOD
Toluene	1.6		1.0	ppbv	As Recd	1.990	EPA TO-15	METHOD
Tetrachloroethene	6.1		1.0	ppbv	As Recd	1.990	EPA TO-15	METHOD
m,p-Xylenes	1.1		1.0	ppbv	As Recd	1.990	EPA TO-15	METHOD

Curtis & Tompkins, Ltd.

Client Sample ID : SV-55 Laboratory Sample ID : 282480-010

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Acetone	15		4.3	ppbv	As Recd	2.130	EPA TO-15	METHOD
Carbon Disulfide	38		1.1	ppbv	As Recd	2.130	EPA TO-15	METHOD
n-Hexane	2.5		1.1	ppbv	As Recd	2.130	EPA TO-15	METHOD
Benzene	25		1.1	ppbv	As Recd	2.130	EPA TO-15	METHOD
n-Heptane	3.0		1.1	ppbv	As Recd	2.130	EPA TO-15	METHOD
Toluene	26		1.1	ppbv	As Recd	2.130	EPA TO-15	METHOD
Ethylbenzene	2.1		1.1	ppbv	As Recd	2.130	EPA TO-15	METHOD
m,p-Xylenes	8.7		1.1	ppbv	As Recd	2.130	EPA TO-15	METHOD
o-Xylene	2.4		1.1	ppbv	As Recd	2.130	EPA TO-15	METHOD
1,2,4-Trimethylbenzene	1.6		1.1	ppbv	As Recd	2.130	EPA TO-15	METHOD
Carbon Dioxide	7,900		2,100	ppmv	As Recd	2.130	ASTM D1946	METHOD
Oxygen	140,000		2,100	ppmv	As Recd	2.130	ASTM D1946	METHOD

Client Sample ID : SV-56 Laboratory Sample ID : 282480-011

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Acetone	30		4.2	ppbv	As Recd	2.120	EPA TO-15	METHOD
Carbon Disulfide	33		1.1	ppbv	As Recd	2.120	EPA TO-15	METHOD
n-Hexane	1.5		1.1	ppbv	As Recd	2.120	EPA TO-15	METHOD
2-Butanone	1.4		1.1	ppbv	As Recd	2.120	EPA TO-15	METHOD
Chloroform	1.4		1.1	ppbv	As Recd	2.120	EPA TO-15	METHOD
Benzene	24		1.1	ppbv	As Recd	2.120	EPA TO-15	METHOD
n-Heptane	2.5		1.1	ppbv	As Recd	2.120	EPA TO-15	METHOD
Toluene	23		1.1	ppbv	As Recd	2.120	EPA TO-15	METHOD
Ethylbenzene	2.3		1.1	ppbv	As Recd	2.120	EPA TO-15	METHOD
m,p-Xylenes	10		1.1	ppbv	As Recd	2.120	EPA TO-15	METHOD
o-Xylene	2.8		1.1	ppbv	As Recd	2.120	EPA TO-15	METHOD
1,2,4-Trimethylbenzene	2.0		1.1	ppbv	As Recd	2.120	EPA TO-15	METHOD
Carbon Dioxide	10,000		2,100	ppmv	As Recd	2.120	ASTM D1946	METHOD
Oxygen	150,000		2,100	ppmv	As Recd	2.120	ASTM D1946	METHOD

Client Sample ID : SHROUD Laboratory Sample ID : 282480-012

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Isopropanol	39,000		1,600	ppbv	As Recd	824.0	EPA TO-15	METHOD

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SV-46	Diln Fac:	2.070
Lab ID:	282480-001	Batch#:	240422
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/22/16

Analyte	Result (V)	RL	Result (M)	RL
Freon 12	73	1.0	360	5.1
Freon 114	ND	1.0	ND	7.2
Chloromethane	ND	1.0	ND	2.1
Vinyl Chloride	ND	1.0	ND	2.6
1,3-Butadiene	ND	1.0	ND	2.3
Bromomethane	ND	1.0	ND	4.0
Chloroethane	ND	1.0	ND	2.7
Trichlorofluoromethane	3.9	1.0	22	5.8
Acrolein	ND	4.1	ND	9.5
1,1-Dichloroethene	ND	1.0	ND	4.1
Freon 113	ND	1.0	ND	7.9
Acetone	24	4.1	57	9.8
Carbon Disulfide	32	1.0	98	3.2
Isopropanol	ND	4.1	ND	10
Methylene Chloride	ND	1.0	ND	3.6
trans-1,2-Dichloroethene	ND	1.0	ND	4.1
MTBE	ND	1.0	ND	3.7
n-Hexane	54	1.0	190	3.6
1,1-Dichloroethane	ND	1.0	ND	4.2
Vinyl Acetate	ND	1.0	ND	3.6
cis-1,2-Dichloroethene	ND	1.0	ND	4.1
2-Butanone	3.7	1.0	11	3.1
Ethyl Acetate	ND	1.0	ND	3.7
Tetrahydrofuran	ND	1.0	ND	3.1
Chloroform	ND	1.0	ND	5.1
1,1,1-Trichloroethane	ND	1.0	ND	5.6
Cyclohexane	ND	1.0	ND	3.6
Carbon Tetrachloride	ND	1.0	ND	6.5
Benzene	5.0	1.0	16	3.3
1,2-Dichloroethane	ND	1.0	ND	4.2
n-Heptane	25	1.0	100	4.2
Trichloroethene	ND	1.0	ND	5.6
1,2-Dichloropropane	ND	1.0	ND	4.8
Bromodichloromethane	ND	1.0	ND	6.9
cis-1,3-Dichloropropene	ND	1.0	ND	4.7

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SV-46	Diln Fac:	2.070
Lab ID:	282480-001	Batch#:	240422
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/22/16

Analyte	Result (V)	RL	Result (M)	RL
4-Methyl-2-Pentanone	ND	1.0	ND	4.2
Toluene	4.5	1.0	17	3.9
trans-1,3-Dichloropropene	ND	1.0	ND	4.7
1,1,2-Trichloroethane	ND	1.0	ND	5.6
Tetrachloroethene	1.4	1.0	9.4	7.0
2-Hexanone	ND	1.0	ND	4.2
Dibromochloromethane	ND	1.0	ND	8.8
1,2-Dibromoethane	ND	1.0	ND	8.0
Chlorobenzene	ND	1.0	ND	4.8
Ethylbenzene	1.5	1.0	6.3	4.5
m,p-Xylenes	4.8	1.0	21	4.5
o-Xylene	2.1	1.0	9.3	4.5
Styrene	ND	1.0	ND	4.4
Bromoform	ND	1.0	ND	11
1,1,2,2-Tetrachloroethane	ND	1.0	ND	7.1
4-Ethyltoluene	2.6	1.0	13	5.1
1,3,5-Trimethylbenzene	2.4	1.0	12	5.1
1,2,4-Trimethylbenzene	6.7	1.0	33	5.1
1,3-Dichlorobenzene	ND	1.0	ND	6.2
1,4-Dichlorobenzene	ND	1.0	ND	6.2
Benzyl chloride	ND	1.0	ND	5.4
1,2-Dichlorobenzene	ND	1.0	ND	6.2
1,2,4-Trichlorobenzene	ND	1.0	ND	7.7
Hexachlorobutadiene	ND	1.0	ND	11
Naphthalene	ND	4.1	ND	22

Surrogate	%REC	Limits
Bromofluorobenzene	119	80-121

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SV-47	Diln Fac:	1.910
Lab ID:	282480-002	Batch#:	240422
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/22/16

Analyte	Result (V)	RL	Result (M)	RL
Freon 12	1.9	0.96	9.2	4.7
Freon 114	ND	0.96	ND	6.7
Chloromethane	ND	0.96	ND	2.0
Vinyl Chloride	ND	0.96	ND	2.4
1,3-Butadiene	ND	0.96	ND	2.1
Bromomethane	ND	0.96	ND	3.7
Chloroethane	ND	0.96	ND	2.5
Trichlorofluoromethane	ND	0.96	ND	5.4
Acrolein	ND	3.8	ND	8.8
1,1-Dichloroethene	ND	0.96	ND	3.8
Freon 113	ND	0.96	ND	7.3
Acetone	44	3.8	100	9.1
Carbon Disulfide	48	0.96	150	3.0
Isopropanol	13	3.8	32	9.4
Methylene Chloride	ND	0.96	ND	3.3
trans-1,2-Dichloroethene	ND	0.96	ND	3.8
MTBE	ND	0.96	ND	3.4
n-Hexane	54	0.96	190	3.4
1,1-Dichloroethane	ND	0.96	ND	3.9
Vinyl Acetate	ND	0.96	ND	3.4
cis-1,2-Dichloroethene	ND	0.96	ND	3.8
2-Butanone	10	0.96	29	2.8
Ethyl Acetate	ND	0.96	ND	3.4
Tetrahydrofuran	ND	0.96	ND	2.8
Chloroform	ND	0.96	ND	4.7
1,1,1-Trichloroethane	ND	0.96	ND	5.2
Cyclohexane	ND	0.96	ND	3.3
Carbon Tetrachloride	ND	0.96	ND	6.0
Benzene	4.7	0.96	15	3.1
1,2-Dichloroethane	ND	0.96	ND	3.9
n-Heptane	50	0.96	200	3.9
Trichloroethene	2.5	0.96	13	5.1
1,2-Dichloropropane	ND	0.96	ND	4.4
Bromodichloromethane	ND	0.96	ND	6.4

*= Value outside of QC limits; see narrative
ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SV-47	Diln Fac:	1.910
Lab ID:	282480-002	Batch#:	240422
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/22/16

Analyte	Result (V)	RL	Result (M)	RL
cis-1,3-Dichloropropene	ND	0.96	ND	4.3
4-Methyl-2-Pentanone	ND	0.96	ND	3.9
Toluene	4.9	0.96	19	3.6
trans-1,3-Dichloropropene	ND	0.96	ND	4.3
1,1,2-Trichloroethane	ND	0.96	ND	5.2
Tetrachloroethene	1.4	0.96	9.4	6.5
2-Hexanone	ND	0.96	ND	3.9
Dibromochloromethane	ND	0.96	ND	8.1
1,2-Dibromoethane	ND	0.96	ND	7.3
Chlorobenzene	ND	0.96	ND	4.4
Ethylbenzene	1.5	0.96	6.4	4.1
m,p-Xylenes	5.7	0.96	25	4.1
o-Xylene	3.1	0.96	13	4.1
Styrene	ND	0.96	ND	4.1
Bromoform	ND	0.96	ND	9.9
1,1,2,2-Tetrachloroethane	ND	0.96	ND	6.6
4-Ethyltoluene	2.5	0.96	12	4.7
1,3,5-Trimethylbenzene	2.6	0.96	13	4.7
1,2,4-Trimethylbenzene	7.8	0.96	38	4.7
1,3-Dichlorobenzene	ND	0.96	ND	5.7
1,4-Dichlorobenzene	ND	0.96	ND	5.7
Benzyl chloride	ND	0.96	ND	4.9
1,2-Dichlorobenzene	ND	0.96	ND	5.7
1,2,4-Trichlorobenzene	ND	0.96	ND	7.1
Hexachlorobutadiene	ND	0.96	ND	10
Naphthalene	ND	3.8	ND	20

Surrogate	%REC	Limits
Bromofluorobenzene	126 *	80-121

*= Value outside of QC limits; see narrative
ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SV-48	Diln Fac:	2.180
Lab ID:	282480-003	Batch#:	240422
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/22/16

Analyte	Result (V)	RL	Result (M)	RL
Freon 12	2.2	1.1	11	5.4
Freon 114	ND	1.1	ND	7.6
Chloromethane	ND	1.1	ND	2.3
Vinyl Chloride	ND	1.1	ND	2.8
1,3-Butadiene	ND	1.1	ND	2.4
Bromomethane	ND	1.1	ND	4.2
Chloroethane	ND	1.1	ND	2.9
Trichlorofluoromethane	ND	1.1	ND	6.1
Acrolein	ND	4.4	ND	10
1,1-Dichloroethene	ND	1.1	ND	4.3
Freon 113	ND	1.1	ND	8.4
Acetone	27	4.4	64	10
Carbon Disulfide	13	1.1	41	3.4
Isopropanol	5.9	4.4	14	11
Methylene Chloride	ND	1.1	ND	3.8
trans-1,2-Dichloroethene	ND	1.1	ND	4.3
MTBE	ND	1.1	ND	3.9
n-Hexane	16	1.1	58	3.8
1,1-Dichloroethane	ND	1.1	ND	4.4
Vinyl Acetate	ND	1.1	ND	3.8
cis-1,2-Dichloroethene	ND	1.1	ND	4.3
2-Butanone	2.2	1.1	6.4	3.2
Ethyl Acetate	ND	1.1	ND	3.9
Tetrahydrofuran	ND	1.1	ND	3.2
Chloroform	ND	1.1	ND	5.3
1,1,1-Trichloroethane	ND	1.1	ND	5.9
Cyclohexane	29	1.1	100	3.8
Carbon Tetrachloride	ND	1.1	ND	6.9
Benzene	3.2	1.1	10	3.5
1,2-Dichloroethane	ND	1.1	ND	4.4
n-Heptane	9.2	1.1	38	4.5
Trichloroethene	ND	1.1	ND	5.9
1,2-Dichloropropane	ND	1.1	ND	5.0
Bromodichloromethane	ND	1.1	ND	7.3

*= Value outside of QC limits; see narrative
ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SV-48	Diln Fac:	2.180
Lab ID:	282480-003	Batch#:	240422
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/22/16

Analyte	Result (V)	RL	Result (M)	RL
cis-1,3-Dichloropropene	ND	1.1	ND	4.9
4-Methyl-2-Pentanone	ND	1.1	ND	4.5
Toluene	3.9	1.1	15	4.1
trans-1,3-Dichloropropene	ND	1.1	ND	4.9
1,1,2-Trichloroethane	ND	1.1	ND	5.9
Tetrachloroethene	1.2	1.1	8.0	7.4
2-Hexanone	ND	1.1	ND	4.5
Dibromochloromethane	ND	1.1	ND	9.3
1,2-Dibromoethane	ND	1.1	ND	8.4
Chlorobenzene	ND	1.1	ND	5.0
Ethylbenzene	1.6	1.1	7.1	4.7
m,p-Xylenes	9.8	1.1	43	4.7
o-Xylene	5.5	1.1	24	4.7
Styrene	ND	1.1	ND	4.6
Bromoform	ND	1.1	ND	11
1,1,2,2-Tetrachloroethane	ND	1.1	ND	7.5
4-Ethyltoluene	2.8	1.1	14	5.4
1,3,5-Trimethylbenzene	2.4	1.1	12	5.4
1,2,4-Trimethylbenzene	6.4	1.1	32	5.4
1,3-Dichlorobenzene	ND	1.1	ND	6.6
1,4-Dichlorobenzene	ND	1.1	ND	6.6
Benzyl chloride	ND	1.1	ND	5.6
1,2-Dichlorobenzene	ND	1.1	ND	6.6
1,2,4-Trichlorobenzene	ND	1.1	ND	8.1
Hexachlorobutadiene	ND	1.1	ND	12
Naphthalene	ND	4.4	ND	23

Surrogate	%REC	Limits
Bromofluorobenzene	127 *	80-121

*= Value outside of QC limits; see narrative
ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SV-49	Diln Fac:	2.200
Lab ID:	282480-004	Batch#:	240422
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/22/16

Analyte	Result (V)	RL	Result (M)	RL
Freon 12	ND	1.1	ND	5.4
Freon 114	ND	1.1	ND	7.7
Chloromethane	ND	1.1	ND	2.3
Vinyl Chloride	ND	1.1	ND	2.8
1,3-Butadiene	ND	1.1	ND	2.4
Bromomethane	ND	1.1	ND	4.3
Chloroethane	ND	1.1	ND	2.9
Trichlorofluoromethane	ND	1.1	ND	6.2
Acrolein	ND	4.4	ND	10
1,1-Dichloroethene	ND	1.1	ND	4.4
Freon 113	ND	1.1	ND	8.4
Acetone	23	4.4	55	10
Carbon Disulfide	3.2	1.1	10	3.4
Isopropanol	ND	4.4	ND	11
Methylene Chloride	ND	1.1	ND	3.8
trans-1,2-Dichloroethene	ND	1.1	ND	4.4
MTBE	2.3	1.1	8.1	4.0
n-Hexane	2.8	1.1	9.9	3.9
1,1-Dichloroethane	ND	1.1	ND	4.5
Vinyl Acetate	ND	1.1	ND	3.9
cis-1,2-Dichloroethene	ND	1.1	ND	4.4
2-Butanone	5.4	1.1	16	3.2
Ethyl Acetate	ND	1.1	ND	4.0
Tetrahydrofuran	ND	1.1	ND	3.2
Chloroform	ND	1.1	ND	5.4
1,1,1-Trichloroethane	ND	1.1	ND	6.0
Cyclohexane	ND	1.1	ND	3.8
Carbon Tetrachloride	ND	1.1	ND	6.9
Benzene	6.8	1.1	22	3.5
1,2-Dichloroethane	ND	1.1	ND	4.5
n-Heptane	1.7	1.1	6.9	4.5
Trichloroethene	ND	1.1	ND	5.9
1,2-Dichloropropane	ND	1.1	ND	5.1
Bromodichloromethane	ND	1.1	ND	7.4
cis-1,3-Dichloropropene	ND	1.1	ND	5.0

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SV-49	Diln Fac:	2.200
Lab ID:	282480-004	Batch#:	240422
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/22/16

Analyte	Result (V)	RL	Result (M)	RL
4-Methyl-2-Pentanone	ND	1.1	ND	4.5
Toluene	7.0	1.1	26	4.1
trans-1,3-Dichloropropene	ND	1.1	ND	5.0
1,1,2-Trichloroethane	ND	1.1	ND	6.0
Tetrachloroethene	ND	1.1	ND	7.5
2-Hexanone	1.7	1.1	6.9	4.5
Dibromochloromethane	ND	1.1	ND	9.4
1,2-Dibromoethane	ND	1.1	ND	8.5
Chlorobenzene	ND	1.1	ND	5.1
Ethylbenzene	ND	1.1	ND	4.8
m,p-Xylenes	2.7	1.1	12	4.8
o-Xylene	ND	1.1	ND	4.8
Styrene	ND	1.1	ND	4.7
Bromoform	ND	1.1	ND	11
1,1,2,2-Tetrachloroethane	ND	1.1	ND	7.6
4-Ethyltoluene	ND	1.1	ND	5.4
1,3,5-Trimethylbenzene	ND	1.1	ND	5.4
1,2,4-Trimethylbenzene	ND	1.1	ND	5.4
1,3-Dichlorobenzene	ND	1.1	ND	6.6
1,4-Dichlorobenzene	ND	1.1	ND	6.6
Benzyl chloride	ND	1.1	ND	5.7
1,2-Dichlorobenzene	ND	1.1	ND	6.6
1,2,4-Trichlorobenzene	ND	1.1	ND	8.2
Hexachlorobutadiene	ND	1.1	ND	12
Naphthalene	ND	4.4	ND	23

Surrogate	%REC	Limits
Bromofluorobenzene	109	80-121

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SV-50	Diln Fac:	2.210
Lab ID:	282480-005	Batch#:	240422
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/22/16

Analyte	Result (V)	RL	Result (M)	RL
Freon 12	ND	1.1	ND	5.5
Freon 114	ND	1.1	ND	7.7
Chloromethane	ND	1.1	ND	2.3
Vinyl Chloride	ND	1.1	ND	2.8
1,3-Butadiene	ND	1.1	ND	2.4
Bromomethane	ND	1.1	ND	4.3
Chloroethane	ND	1.1	ND	2.9
Trichlorofluoromethane	ND	1.1	ND	6.2
Acrolein	ND	4.4	ND	10
1,1-Dichloroethene	ND	1.1	ND	4.4
Freon 113	ND	1.1	ND	8.5
Acetone	34	4.4	82	10
Carbon Disulfide	23	1.1	70	3.4
Isopropanol	5.7	4.4	14	11
Methylene Chloride	ND	1.1	ND	3.8
trans-1,2-Dichloroethene	ND	1.1	ND	4.4
MTBE	1.2	1.1	4.2	4.0
n-Hexane	4.1	1.1	14	3.9
1,1-Dichloroethane	ND	1.1	ND	4.5
Vinyl Acetate	ND	1.1	ND	3.9
cis-1,2-Dichloroethene	2.1	1.1	8.4	4.4
2-Butanone	6.0	1.1	18	3.3
Ethyl Acetate	ND	1.1	ND	4.0
Tetrahydrofuran	ND	1.1	ND	3.3
Chloroform	1.7	1.1	8.2	5.4
1,1,1-Trichloroethane	ND	1.1	ND	6.0
Cyclohexane	ND	1.1	ND	3.8
Carbon Tetrachloride	ND	1.1	ND	7.0
Benzene	11	1.1	37	3.5
1,2-Dichloroethane	ND	1.1	ND	4.5
n-Heptane	2.3	1.1	9.3	4.5
Trichloroethene	ND	1.1	ND	5.9
1,2-Dichloropropane	ND	1.1	ND	5.1
Bromodichloromethane	ND	1.1	ND	7.4
cis-1,3-Dichloropropene	ND	1.1	ND	5.0

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SV-50	Diln Fac:	2.210
Lab ID:	282480-005	Batch#:	240422
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/22/16

Analyte	Result (V)	RL	Result (M)	RL
4-Methyl-2-Pentanone	ND	1.1	ND	4.5
Toluene	9.5	1.1	36	4.2
trans-1,3-Dichloropropene	ND	1.1	ND	5.0
1,1,2-Trichloroethane	ND	1.1	ND	6.0
Tetrachloroethene	ND	1.1	ND	7.5
2-Hexanone	ND	1.1	ND	4.5
Dibromochloromethane	ND	1.1	ND	9.4
1,2-Dibromoethane	ND	1.1	ND	8.5
Chlorobenzene	ND	1.1	ND	5.1
Ethylbenzene	ND	1.1	ND	4.8
m,p-Xylenes	3.0	1.1	13	4.8
o-Xylene	ND	1.1	ND	4.8
Styrene	ND	1.1	ND	4.7
Bromoform	ND	1.1	ND	11
1,1,2,2-Tetrachloroethane	ND	1.1	ND	7.6
4-Ethyltoluene	ND	1.1	ND	5.4
1,3,5-Trimethylbenzene	ND	1.1	ND	5.4
1,2,4-Trimethylbenzene	ND	1.1	ND	5.4
1,3-Dichlorobenzene	ND	1.1	ND	6.6
1,4-Dichlorobenzene	ND	1.1	ND	6.6
Benzyl chloride	ND	1.1	ND	5.7
1,2-Dichlorobenzene	ND	1.1	ND	6.6
1,2,4-Trichlorobenzene	ND	1.1	ND	8.2
Hexachlorobutadiene	ND	1.1	ND	12
Naphthalene	ND	4.4	ND	23

Surrogate	%REC	Limits
Bromofluorobenzene	109	80-121

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SV-51	Diln Fac:	2.050
Lab ID:	282480-006	Batch#:	240483
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/24/16

Analyte	Result (V)	RL	Result (M)	RL
Freon 12	ND	1.0	ND	5.1
Freon 114	ND	1.0	ND	7.2
Chloromethane	ND	1.0	ND	2.1
Vinyl Chloride	ND	1.0	ND	2.6
1,3-Butadiene	ND	1.0	ND	2.3
Bromomethane	ND	1.0	ND	4.0
Chloroethane	ND	1.0	ND	2.7
Trichlorofluoromethane	ND	1.0	ND	5.8
Acrolein	ND	4.1	ND	9.4
1,1-Dichloroethene	ND	1.0	ND	4.1
Freon 113	ND	1.0	ND	7.9
Acetone	4.5	4.1	11	9.7
Carbon Disulfide	2.7	1.0	8.4	3.2
Isopropanol	5.0	4.1	12	10
Methylene Chloride	ND	1.0	ND	3.6
trans-1,2-Dichloroethene	ND	1.0	ND	4.1
MTBE	ND	1.0	ND	3.7
n-Hexane	ND	1.0	ND	3.6
1,1-Dichloroethane	ND	1.0	ND	4.1
Vinyl Acetate	ND	1.0	ND	3.6
cis-1,2-Dichloroethene	ND	1.0	ND	4.1
2-Butanone	ND	1.0	ND	3.0
Ethyl Acetate	ND	1.0	ND	3.7
Tetrahydrofuran	ND	1.0	ND	3.0
Chloroform	ND	1.0	ND	5.0
1,1,1-Trichloroethane	ND	1.0	ND	5.6
Cyclohexane	1.7	1.0	6.0	3.5
Carbon Tetrachloride	ND	1.0	ND	6.4
Benzene	2.3	1.0	7.4	3.3
1,2-Dichloroethane	ND	1.0	ND	4.1
n-Heptane	ND	1.0	ND	4.2
Trichloroethene	ND	1.0	ND	5.5
1,2-Dichloropropane	ND	1.0	ND	4.7
Bromodichloromethane	ND	1.0	ND	6.9
cis-1,3-Dichloropropene	ND	1.0	ND	4.7

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SV-51	Diln Fac:	2.050
Lab ID:	282480-006	Batch#:	240483
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/24/16

Analyte	Result (V)	RL	Result (M)	RL
4-Methyl-2-Pentanone	ND	1.0	ND	4.2
Toluene	2.3	1.0	8.8	3.9
trans-1,3-Dichloropropene	ND	1.0	ND	4.7
1,1,2-Trichloroethane	ND	1.0	ND	5.6
Tetrachloroethene	ND	1.0	ND	7.0
2-Hexanone	ND	1.0	ND	4.2
Dibromochloromethane	ND	1.0	ND	8.7
1,2-Dibromoethane	ND	1.0	ND	7.9
Chlorobenzene	ND	1.0	ND	4.7
Ethylbenzene	ND	1.0	ND	4.5
m,p-Xylenes	1.6	1.0	7.0	4.5
o-Xylene	ND	1.0	ND	4.5
Styrene	ND	1.0	ND	4.4
Bromoform	ND	1.0	ND	11
1,1,2,2-Tetrachloroethane	ND	1.0	ND	7.0
4-Ethyltoluene	ND	1.0	ND	5.0
1,3,5-Trimethylbenzene	ND	1.0	ND	5.0
1,2,4-Trimethylbenzene	ND	1.0	ND	5.0
1,3-Dichlorobenzene	ND	1.0	ND	6.2
1,4-Dichlorobenzene	ND	1.0	ND	6.2
Benzyl chloride	ND	1.0	ND	5.3
1,2-Dichlorobenzene	ND	1.0	ND	6.2
1,2,4-Trichlorobenzene	ND	1.0	ND	7.6
Hexachlorobutadiene	ND	1.0	ND	11
Naphthalene	ND	4.1	ND	21

Surrogate	%REC	Limits
Bromofluorobenzene	96	80-121

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SV-52	Diln Fac:	2.040
Lab ID:	282480-007	Batch#:	240422
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/21/16

Analyte	Result (V)	RL	Result (M)	RL
Freon 12	ND	1.0	ND	5.0
Freon 114	ND	1.0	ND	7.1
Chloromethane	ND	1.0	ND	2.1
Vinyl Chloride	ND	1.0	ND	2.6
1,3-Butadiene	ND	1.0	ND	2.3
Bromomethane	ND	1.0	ND	4.0
Chloroethane	ND	1.0	ND	2.7
Trichlorofluoromethane	ND	1.0	ND	5.7
Acrolein	ND	4.1	ND	9.4
1,1-Dichloroethene	ND	1.0	ND	4.0
Freon 113	ND	1.0	ND	7.8
Acetone	4.5	4.1	11	9.7
Carbon Disulfide	ND	1.0	ND	3.2
Isopropanol	5.2	4.1	13	10
Methylene Chloride	ND	1.0	ND	3.5
trans-1,2-Dichloroethene	ND	1.0	ND	4.0
MTBE	ND	1.0	ND	3.7
n-Hexane	ND	1.0	ND	3.6
1,1-Dichloroethane	ND	1.0	ND	4.1
Vinyl Acetate	ND	1.0	ND	3.6
cis-1,2-Dichloroethene	ND	1.0	ND	4.0
2-Butanone	ND	1.0	ND	3.0
Ethyl Acetate	ND	1.0	ND	3.7
Tetrahydrofuran	ND	1.0	ND	3.0
Chloroform	ND	1.0	ND	5.0
1,1,1-Trichloroethane	ND	1.0	ND	5.6
Cyclohexane	1.2	1.0	4.1	3.5
Carbon Tetrachloride	ND	1.0	ND	6.4
Benzene	1.5	1.0	4.7	3.3
1,2-Dichloroethane	ND	1.0	ND	4.1
n-Heptane	ND	1.0	ND	4.2
Trichloroethene	ND	1.0	ND	5.5
1,2-Dichloropropane	ND	1.0	ND	4.7
Bromodichloromethane	ND	1.0	ND	6.8
cis-1,3-Dichloropropene	ND	1.0	ND	4.6

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SV-52	Diln Fac:	2.040
Lab ID:	282480-007	Batch#:	240422
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/21/16

Analyte	Result (V)	RL	Result (M)	RL
4-Methyl-2-Pentanone	ND	1.0	ND	4.2
Toluene	1.2	1.0	4.6	3.8
trans-1,3-Dichloropropene	ND	1.0	ND	4.6
1,1,2-Trichloroethane	ND	1.0	ND	5.6
Tetrachloroethene	3.4	1.0	23	6.9
2-Hexanone	ND	1.0	ND	4.2
Dibromochloromethane	ND	1.0	ND	8.7
1,2-Dibromoethane	ND	1.0	ND	7.8
Chlorobenzene	ND	1.0	ND	4.7
Ethylbenzene	ND	1.0	ND	4.4
m,p-Xylenes	ND	1.0	ND	4.4
o-Xylene	ND	1.0	ND	4.4
Styrene	ND	1.0	ND	4.3
Bromoform	ND	1.0	ND	11
1,1,2,2-Tetrachloroethane	ND	1.0	ND	7.0
4-Ethyltoluene	ND	1.0	ND	5.0
1,3,5-Trimethylbenzene	ND	1.0	ND	5.0
1,2,4-Trimethylbenzene	ND	1.0	ND	5.0
1,3-Dichlorobenzene	ND	1.0	ND	6.1
1,4-Dichlorobenzene	ND	1.0	ND	6.1
Benzyl chloride	ND	1.0	ND	5.3
1,2-Dichlorobenzene	ND	1.0	ND	6.1
1,2,4-Trichlorobenzene	ND	1.0	ND	7.6
Hexachlorobutadiene	ND	1.0	ND	11
Naphthalene	ND	4.1	ND	21

Surrogate	%REC	Limits
Bromofluorobenzene	94	80-121

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SV-53	Diln Fac:	2.110
Lab ID:	282480-008	Batch#:	240422
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/21/16

Analyte	Result (V)	RL	Result (M)	RL
Freon 12	ND	1.1	ND	5.2
Freon 114	ND	1.1	ND	7.4
Chloromethane	ND	1.1	ND	2.2
Vinyl Chloride	ND	1.1	ND	2.7
1,3-Butadiene	ND	1.1	ND	2.3
Bromomethane	ND	1.1	ND	4.1
Chloroethane	ND	1.1	ND	2.8
Trichlorofluoromethane	ND	1.1	ND	5.9
Acrolein	ND	4.2	ND	9.7
1,1-Dichloroethene	ND	1.1	ND	4.2
Freon 113	ND	1.1	ND	8.1
Acetone	13	4.2	32	10
Carbon Disulfide	10	1.1	32	3.3
Isopropanol	6.1	4.2	15	10
Methylene Chloride	ND	1.1	ND	3.7
trans-1,2-Dichloroethene	ND	1.1	ND	4.2
MTBE	ND	1.1	ND	3.8
n-Hexane	1.2	1.1	4.4	3.7
1,1-Dichloroethane	ND	1.1	ND	4.3
Vinyl Acetate	ND	1.1	ND	3.7
cis-1,2-Dichloroethene	ND	1.1	ND	4.2
2-Butanone	1.9	1.1	5.7	3.1
Ethyl Acetate	ND	1.1	ND	3.8
Tetrahydrofuran	ND	1.1	ND	3.1
Chloroform	6.2	1.1	30	5.2
1,1,1-Trichloroethane	ND	1.1	ND	5.8
Cyclohexane	ND	1.1	ND	3.6
Carbon Tetrachloride	ND	1.1	ND	6.6
Benzene	2.9	1.1	9.3	3.4
1,2-Dichloroethane	ND	1.1	ND	4.3
n-Heptane	ND	1.1	ND	4.3
Trichloroethene	1.1	1.1	5.7	5.7
1,2-Dichloropropane	ND	1.1	ND	4.9
Bromodichloromethane	ND	1.1	ND	7.1
cis-1,3-Dichloropropene	ND	1.1	ND	4.8

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SV-53	Diln Fac:	2.110
Lab ID:	282480-008	Batch#:	240422
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/21/16

Analyte	Result (V)	RL	Result (M)	RL
4-Methyl-2-Pentanone	ND	1.1	ND	4.3
Toluene	2.6	1.1	9.6	4.0
trans-1,3-Dichloropropene	ND	1.1	ND	4.8
1,1,2-Trichloroethane	ND	1.1	ND	5.8
Tetrachloroethene	2.8	1.1	19	7.2
2-Hexanone	ND	1.1	ND	4.3
Dibromochloromethane	ND	1.1	ND	9.0
1,2-Dibromoethane	ND	1.1	ND	8.1
Chlorobenzene	ND	1.1	ND	4.9
Ethylbenzene	ND	1.1	ND	4.6
m,p-Xylenes	1.9	1.1	8.3	4.6
o-Xylene	ND	1.1	ND	4.6
Styrene	ND	1.1	ND	4.5
Bromoform	ND	1.1	ND	11
1,1,2,2-Tetrachloroethane	ND	1.1	ND	7.2
4-Ethyltoluene	ND	1.1	ND	5.2
1,3,5-Trimethylbenzene	ND	1.1	ND	5.2
1,2,4-Trimethylbenzene	1.2	1.1	5.7	5.2
1,3-Dichlorobenzene	ND	1.1	ND	6.3
1,4-Dichlorobenzene	ND	1.1	ND	6.3
Benzyl chloride	ND	1.1	ND	5.5
1,2-Dichlorobenzene	ND	1.1	ND	6.3
1,2,4-Trichlorobenzene	ND	1.1	ND	7.8
Hexachlorobutadiene	ND	1.1	ND	11
Naphthalene	ND	4.2	ND	22

Surrogate	%REC	Limits
Bromofluorobenzene	93	80-121

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SV-54	Diln Fac:	1.990
Lab ID:	282480-009	Batch#:	240422
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/22/16

Analyte	Result (V)	RL	Result (M)	RL
Freon 12	2.7	1.0	14	4.9
Freon 114	ND	1.0	ND	7.0
Chloromethane	ND	1.0	ND	2.1
Vinyl Chloride	ND	1.0	ND	2.5
1,3-Butadiene	ND	1.0	ND	2.2
Bromomethane	ND	1.0	ND	3.9
Chloroethane	ND	1.0	ND	2.6
Trichlorofluoromethane	ND	1.0	ND	5.6
Acrolein	ND	4.0	ND	9.1
1,1-Dichloroethene	ND	1.0	ND	3.9
Freon 113	ND	1.0	ND	7.6
Acetone	7.1	4.0	17	9.5
Carbon Disulfide	1.4	1.0	4.4	3.1
Isopropanol	13	4.0	32	9.8
Methylene Chloride	ND	1.0	ND	3.5
trans-1,2-Dichloroethene	ND	1.0	ND	3.9
MTBE	ND	1.0	ND	3.6
n-Hexane	ND	1.0	ND	3.5
1,1-Dichloroethane	ND	1.0	ND	4.0
Vinyl Acetate	ND	1.0	ND	3.5
cis-1,2-Dichloroethene	ND	1.0	ND	3.9
2-Butanone	ND	1.0	ND	2.9
Ethyl Acetate	ND	1.0	ND	3.6
Tetrahydrofuran	ND	1.0	ND	2.9
Chloroform	ND	1.0	ND	4.9
1,1,1-Trichloroethane	ND	1.0	ND	5.4
Cyclohexane	ND	1.0	ND	3.4
Carbon Tetrachloride	ND	1.0	ND	6.3
Benzene	1.8	1.0	5.6	3.2
1,2-Dichloroethane	ND	1.0	ND	4.0
n-Heptane	ND	1.0	ND	4.1
Trichloroethene	ND	1.0	ND	5.3
1,2-Dichloropropane	ND	1.0	ND	4.6
Bromodichloromethane	ND	1.0	ND	6.7
cis-1,3-Dichloropropene	ND	1.0	ND	4.5

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SV-54	Diln Fac:	1.990
Lab ID:	282480-009	Batch#:	240422
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/22/16

Analyte	Result (V)	RL	Result (M)	RL
4-Methyl-2-Pentanone	ND	1.0	ND	4.1
Toluene	1.6	1.0	6.0	3.7
trans-1,3-Dichloropropene	ND	1.0	ND	4.5
1,1,2-Trichloroethane	ND	1.0	ND	5.4
Tetrachloroethene	6.1	1.0	41	6.7
2-Hexanone	ND	1.0	ND	4.1
Dibromochloromethane	ND	1.0	ND	8.5
1,2-Dibromoethane	ND	1.0	ND	7.6
Chlorobenzene	ND	1.0	ND	4.6
Ethylbenzene	ND	1.0	ND	4.3
m,p-Xylenes	1.1	1.0	4.7	4.3
o-Xylene	ND	1.0	ND	4.3
Styrene	ND	1.0	ND	4.2
Bromoform	ND	1.0	ND	10
1,1,2,2-Tetrachloroethane	ND	1.0	ND	6.8
4-Ethyltoluene	ND	1.0	ND	4.9
1,3,5-Trimethylbenzene	ND	1.0	ND	4.9
1,2,4-Trimethylbenzene	ND	1.0	ND	4.9
1,3-Dichlorobenzene	ND	1.0	ND	6.0
1,4-Dichlorobenzene	ND	1.0	ND	6.0
Benzyl chloride	ND	1.0	ND	5.2
1,2-Dichlorobenzene	ND	1.0	ND	6.0
1,2,4-Trichlorobenzene	ND	1.0	ND	7.4
Hexachlorobutadiene	ND	1.0	ND	11
Naphthalene	ND	4.0	ND	21

Surrogate	%REC	Limits
Bromofluorobenzene	97	80-121

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SV-55	Diln Fac:	2.130
Lab ID:	282480-010	Batch#:	240422
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/22/16

Analyte	Result (V)	RL	Result (M)	RL
Freon 12	ND	1.1	ND	5.3
Freon 114	ND	1.1	ND	7.4
Chloromethane	ND	1.1	ND	2.2
Vinyl Chloride	ND	1.1	ND	2.7
1,3-Butadiene	ND	1.1	ND	2.4
Bromomethane	ND	1.1	ND	4.1
Chloroethane	ND	1.1	ND	2.8
Trichlorofluoromethane	ND	1.1	ND	6.0
Acrolein	ND	4.3	ND	9.8
1,1-Dichloroethene	ND	1.1	ND	4.2
Freon 113	ND	1.1	ND	8.2
Acetone	15	4.3	36	10
Carbon Disulfide	38	1.1	120	3.3
Isopropanol	ND	4.3	ND	10
Methylene Chloride	ND	1.1	ND	3.7
trans-1,2-Dichloroethene	ND	1.1	ND	4.2
MTBE	ND	1.1	ND	3.8
n-Hexane	2.5	1.1	8.9	3.8
1,1-Dichloroethane	ND	1.1	ND	4.3
Vinyl Acetate	ND	1.1	ND	3.7
cis-1,2-Dichloroethene	ND	1.1	ND	4.2
2-Butanone	ND	1.1	ND	3.1
Ethyl Acetate	ND	1.1	ND	3.8
Tetrahydrofuran	ND	1.1	ND	3.1
Chloroform	ND	1.1	ND	5.2
1,1,1-Trichloroethane	ND	1.1	ND	5.8
Cyclohexane	ND	1.1	ND	3.7
Carbon Tetrachloride	ND	1.1	ND	6.7
Benzene	25	1.1	81	3.4
1,2-Dichloroethane	ND	1.1	ND	4.3
n-Heptane	3.0	1.1	12	4.4
Trichloroethene	ND	1.1	ND	5.7
1,2-Dichloropropane	ND	1.1	ND	4.9
Bromodichloromethane	ND	1.1	ND	7.1
cis-1,3-Dichloropropene	ND	1.1	ND	4.8

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SV-55	Diln Fac:	2.130
Lab ID:	282480-010	Batch#:	240422
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/22/16

Analyte	Result (V)	RL	Result (M)	RL
4-Methyl-2-Pentanone	ND	1.1	ND	4.4
Toluene	26	1.1	98	4.0
trans-1,3-Dichloropropene	ND	1.1	ND	4.8
1,1,2-Trichloroethane	ND	1.1	ND	5.8
Tetrachloroethene	ND	1.1	ND	7.2
2-Hexanone	ND	1.1	ND	4.4
Dibromochloromethane	ND	1.1	ND	9.1
1,2-Dibromoethane	ND	1.1	ND	8.2
Chlorobenzene	ND	1.1	ND	4.9
Ethylbenzene	2.1	1.1	8.9	4.6
m,p-Xylenes	8.7	1.1	38	4.6
o-Xylene	2.4	1.1	10	4.6
Styrene	ND	1.1	ND	4.5
Bromoform	ND	1.1	ND	11
1,1,2,2-Tetrachloroethane	ND	1.1	ND	7.3
4-Ethyltoluene	ND	1.1	ND	5.2
1,3,5-Trimethylbenzene	ND	1.1	ND	5.2
1,2,4-Trimethylbenzene	1.6	1.1	8.1	5.2
1,3-Dichlorobenzene	ND	1.1	ND	6.4
1,4-Dichlorobenzene	ND	1.1	ND	6.4
Benzyl chloride	ND	1.1	ND	5.5
1,2-Dichlorobenzene	ND	1.1	ND	6.4
1,2,4-Trichlorobenzene	ND	1.1	ND	7.9
Hexachlorobutadiene	ND	1.1	ND	11
Naphthalene	ND	4.3	ND	22

Surrogate	%REC	Limits
Bromofluorobenzene	112	80-121

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SV-56	Diln Fac:	2.120
Lab ID:	282480-011	Batch#:	240483
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/24/16

Analyte	Result (V)	RL	Result (M)	RL
Freon 12	ND	1.1	ND	5.2
Freon 114	ND	1.1	ND	7.4
Chloromethane	ND	1.1	ND	2.2
Vinyl Chloride	ND	1.1	ND	2.7
1,3-Butadiene	ND	1.1	ND	2.3
Bromomethane	ND	1.1	ND	4.1
Chloroethane	ND	1.1	ND	2.8
Trichlorofluoromethane	ND	1.1	ND	6.0
Acrolein	ND	4.2	ND	9.7
1,1-Dichloroethene	ND	1.1	ND	4.2
Freon 113	ND	1.1	ND	8.1
Acetone	30	4.2	70	10
Carbon Disulfide	33	1.1	100	3.3
Isopropanol	ND	4.2	ND	10
Methylene Chloride	ND	1.1	ND	3.7
trans-1,2-Dichloroethene	ND	1.1	ND	4.2
MTBE	ND	1.1	ND	3.8
n-Hexane	1.5	1.1	5.1	3.7
1,1-Dichloroethane	ND	1.1	ND	4.3
Vinyl Acetate	ND	1.1	ND	3.7
cis-1,2-Dichloroethene	ND	1.1	ND	4.2
2-Butanone	1.4	1.1	4.1	3.1
Ethyl Acetate	ND	1.1	ND	3.8
Tetrahydrofuran	ND	1.1	ND	3.1
Chloroform	1.4	1.1	6.7	5.2
1,1,1-Trichloroethane	ND	1.1	ND	5.8
Cyclohexane	ND	1.1	ND	3.6
Carbon Tetrachloride	ND	1.1	ND	6.7
Benzene	24	1.1	78	3.4
1,2-Dichloroethane	ND	1.1	ND	4.3
n-Heptane	2.5	1.1	10	4.3
Trichloroethene	ND	1.1	ND	5.7
1,2-Dichloropropane	ND	1.1	ND	4.9
Bromodichloromethane	ND	1.1	ND	7.1
cis-1,3-Dichloropropene	ND	1.1	ND	4.8

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SV-56	Diln Fac:	2.120
Lab ID:	282480-011	Batch#:	240483
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/24/16

Analyte	Result (V)	RL	Result (M)	RL
4-Methyl-2-Pentanone	ND	1.1	ND	4.3
Toluene	23	1.1	85	4.0
trans-1,3-Dichloropropene	ND	1.1	ND	4.8
1,1,2-Trichloroethane	ND	1.1	ND	5.8
Tetrachloroethene	ND	1.1	ND	7.2
2-Hexanone	ND	1.1	ND	4.3
Dibromochloromethane	ND	1.1	ND	9.0
1,2-Dibromoethane	ND	1.1	ND	8.1
Chlorobenzene	ND	1.1	ND	4.9
Ethylbenzene	2.3	1.1	9.8	4.6
m,p-Xylenes	10	1.1	43	4.6
o-Xylene	2.8	1.1	12	4.6
Styrene	ND	1.1	ND	4.5
Bromoform	ND	1.1	ND	11
1,1,2,2-Tetrachloroethane	ND	1.1	ND	7.3
4-Ethyltoluene	ND	1.1	ND	5.2
1,3,5-Trimethylbenzene	ND	1.1	ND	5.2
1,2,4-Trimethylbenzene	2.0	1.1	10	5.2
1,3-Dichlorobenzene	ND	1.1	ND	6.4
1,4-Dichlorobenzene	ND	1.1	ND	6.4
Benzyl chloride	ND	1.1	ND	5.5
1,2-Dichlorobenzene	ND	1.1	ND	6.4
1,2,4-Trichlorobenzene	ND	1.1	ND	7.9
Hexachlorobutadiene	ND	1.1	ND	11
Naphthalene	ND	4.2	ND	22

Surrogate	%REC	Limits
Bromofluorobenzene	103	80-121

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SHROUD	Diln Fac:	824.0
Lab ID:	282480-012	Batch#:	240537
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/26/16

Analyte	Result (V)	RL	Result (M)	RL
Freon 12	ND	410	ND	2,000
Freon 114	ND	410	ND	2,900
Chloromethane	ND	410	ND	850
Vinyl Chloride	ND	410	ND	1,100
1,3-Butadiene	ND	410	ND	910
Bromomethane	ND	410	ND	1,600
Chloroethane	ND	410	ND	1,100
Trichlorofluoromethane	ND	410	ND	2,300
Acrolein	ND	1,600	ND	3,800
1,1-Dichloroethene	ND	410	ND	1,600
Freon 113	ND	410	ND	3,200
Acetone	ND	1,600	ND	3,900
Carbon Disulfide	ND	410	ND	1,300
Isopropanol	39,000	1,600	95,000	4,100
Methylene Chloride	ND	410	ND	1,400
trans-1,2-Dichloroethene	ND	410	ND	1,600
MTBE	ND	410	ND	1,500
n-Hexane	ND	410	ND	1,500
1,1-Dichloroethane	ND	410	ND	1,700
Vinyl Acetate	ND	410	ND	1,500
cis-1,2-Dichloroethene	ND	410	ND	1,600
2-Butanone	ND	410	ND	1,200
Ethyl Acetate	ND	410	ND	1,500
Tetrahydrofuran	ND	410	ND	1,200
Chloroform	ND	410	ND	2,000
1,1,1-Trichloroethane	ND	410	ND	2,200
Cyclohexane	ND	410	ND	1,400
Carbon Tetrachloride	ND	410	ND	2,600
Benzene	ND	410	ND	1,300
1,2-Dichloroethane	ND	410	ND	1,700
n-Heptane	ND	410	ND	1,700
Trichloroethene	ND	410	ND	2,200
1,2-Dichloropropane	ND	410	ND	1,900
Bromodichloromethane	ND	410	ND	2,800
cis-1,3-Dichloropropene	ND	410	ND	1,900

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Field ID:	SHROUD	Diln Fac:	824.0
Lab ID:	282480-012	Batch#:	240537
Matrix:	Air	Sampled:	10/21/16
Units (V):	ppbv	Received:	10/21/16
Units (M):	ug/m3	Analyzed:	10/26/16

Analyte	Result (V)	RL	Result (M)	RL
4-Methyl-2-Pentanone	ND	410	ND	1,700
Toluene	ND	410	ND	1,600
trans-1,3-Dichloropropene	ND	410	ND	1,900
1,1,2-Trichloroethane	ND	410	ND	2,200
Tetrachloroethene	ND	410	ND	2,800
2-Hexanone	ND	410	ND	1,700
Dibromochloromethane	ND	410	ND	3,500
1,2-Dibromoethane	ND	410	ND	3,200
Chlorobenzene	ND	410	ND	1,900
Ethylbenzene	ND	410	ND	1,800
m,p-Xylenes	ND	410	ND	1,800
o-Xylene	ND	410	ND	1,800
Styrene	ND	410	ND	1,800
Bromoform	ND	410	ND	4,300
1,1,2,2-Tetrachloroethane	ND	410	ND	2,800
4-Ethyltoluene	ND	410	ND	2,000
1,3,5-Trimethylbenzene	ND	410	ND	2,000
1,2,4-Trimethylbenzene	ND	410	ND	2,000
1,3-Dichlorobenzene	ND	410	ND	2,500
1,4-Dichlorobenzene	ND	410	ND	2,500
Benzyl chloride	ND	410	ND	2,100
1,2-Dichlorobenzene	ND	410	ND	2,500
1,2,4-Trichlorobenzene	ND	410	ND	3,100
Hexachlorobutadiene	ND	410	ND	4,400
Naphthalene	ND	1,600	ND	8,600

Surrogate	%REC	Limits
Bromofluorobenzene	95	80-121

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Batch QC Report

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Matrix:	Air	Batch#:	240422
Units (V):	ppbv	Analyzed:	10/21/16
Diln Fac:	1.000		

Type: BS Lab ID: QC856744

Analyte	Spiked	Result (V)	%REC	Limits
Freon 12	10.00	8.798	88	70-130
Freon 114	10.00	9.287	93	70-130
Chloromethane	10.00	8.078	81	70-130
Vinyl Chloride	10.00	8.972	90	70-130
1,3-Butadiene	10.00	8.410	84	70-130
Bromomethane	10.00	8.673	87	70-130
Chloroethane	10.00	9.576	96	70-130
Trichlorofluoromethane	10.00	9.695	97	70-130
Acrolein	10.00	8.106	81	70-130
1,1-Dichloroethene	10.00	11.08	111	70-130
Freon 113	10.00	10.26	103	70-130
Acetone	10.00	8.052	81	70-130
Carbon Disulfide	10.00	8.221	82	70-130
Isopropanol	10.00	8.028	80	70-130
Methylene Chloride	10.00	8.799	88	70-130
trans-1,2-Dichloroethene	10.00	11.19	112	70-130
MTBE	10.00	10.01	100	70-130
n-Hexane	10.00	8.959	90	70-130
1,1-Dichloroethane	10.00	9.745	97	70-130
Vinyl Acetate	10.00	13.08 b	131 *	70-130
cis-1,2-Dichloroethene	10.00	9.643	96	70-130
2-Butanone	10.00	12.13	121	70-130
Ethyl Acetate	10.00	8.369	84	70-130
Tetrahydrofuran	10.00	10.50	105	70-130
Chloroform	10.00	9.142	91	70-130
1,1,1-Trichloroethane	10.00	9.886	99	70-130
Cyclohexane	10.00	10.34	103	70-130
Carbon Tetrachloride	10.00	9.003	90	70-130
Benzene	10.00	10.80	108	70-130
1,2-Dichloroethane	10.00	10.44	104	70-130
n-Heptane	10.00	9.874	99	70-130
Trichloroethene	10.00	9.258	93	70-130

*= Value outside of QC limits; see narrative
b= See narrative
RPD= Relative Percent Difference
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Batch QC Report

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Matrix:	Air	Batch#:	240422
Units (V):	ppbv	Analyzed:	10/21/16
Diln Fac:	1.000		

Analyte	Spiked	Result (V)	%REC	Limits
1,2-Dichloropropane	10.00	10.84	108	70-130
Bromodichloromethane	10.00	10.39	104	70-130
cis-1,3-Dichloropropene	10.00	10.89	109	70-130
4-Methyl-2-Pentanone	10.00	12.29	123	70-130
Toluene	10.00	9.810	98	70-130
trans-1,3-Dichloropropene	10.00	10.17	102	70-130
1,1,2-Trichloroethane	10.00	11.40	114	70-130
Tetrachloroethene	10.00	10.31	103	70-130
2-Hexanone	10.00	11.52	115	70-130
Dibromochloromethane	10.00	9.378	94	70-130
1,2-Dibromoethane	10.00	10.15	102	70-130
Chlorobenzene	10.00	8.129	81	70-130
Ethylbenzene	10.00	9.269	93	70-130
m,p-Xylenes	20.00	20.82	104	70-130
o-Xylene	10.00	10.27	103	70-130
Styrene	10.00	9.271	93	70-130
Bromoform	10.00	9.541	95	70-130
1,1,2,2-Tetrachloroethane	10.00	9.292	93	70-130
4-Ethyltoluene	10.00	10.37	104	70-130
1,3,5-Trimethylbenzene	10.00	9.479	95	70-130
1,2,4-Trimethylbenzene	10.00	10.31	103	70-130
1,3-Dichlorobenzene	10.00	9.752	98	70-130
1,4-Dichlorobenzene	10.00	8.782	88	70-130
Benzyl chloride	10.00	9.033	90	70-130
1,2-Dichlorobenzene	10.00	8.739	87	70-130
1,2,4-Trichlorobenzene	10.00	11.67	117	70-130
Hexachlorobutadiene	10.00	11.67	117	70-130
Naphthalene	10.00	12.94	129	70-130

Surrogate	%REC	Limits
Bromofluorobenzene	108	70-130

*= Value outside of QC limits; see narrative
b= See narrative
RPD= Relative Percent Difference
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Batch QC Report

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Matrix:	Air	Batch#:	240422
Units (V):	ppbv	Analyzed:	10/21/16
Diln Fac:	1.000		

Type: BSD Lab ID: QC856745

Analyte	Spiked	Result (V)	%REC	Limits	RPD	Lim
Freon 12	10.00	8.929	89	70-130	1	25
Freon 114	10.00	9.238	92	70-130	1	25
Chloromethane	10.00	8.807	88	70-130	9	25
Vinyl Chloride	10.00	9.383	94	70-130	4	25
1,3-Butadiene	10.00	8.323	83	70-130	1	25
Bromomethane	10.00	9.005	90	70-130	4	25
Chloroethane	10.00	9.623	96	70-130	0	25
Trichlorofluoromethane	10.00	9.573	96	70-130	1	25
Acrolein	10.00	7.618	76	70-130	6	25
1,1-Dichloroethene	10.00	10.85	109	70-130	2	25
Freon 113	10.00	9.929	99	70-130	3	25
Acetone	10.00	7.801	78	70-130	3	25
Carbon Disulfide	10.00	8.108	81	70-130	1	25
Isopropanol	10.00	7.981	80	70-130	1	25
Methylene Chloride	10.00	8.753	88	70-130	1	25
trans-1,2-Dichloroethene	10.00	10.87	109	70-130	3	25
MTBE	10.00	9.559	96	70-130	5	25
n-Hexane	10.00	8.868	89	70-130	1	25
1,1-Dichloroethane	10.00	9.667	97	70-130	1	25
Vinyl Acetate	10.00	12.72 b	127	70-130	3	25
cis-1,2-Dichloroethene	10.00	9.120	91	70-130	6	25
2-Butanone	10.00	11.57	116	70-130	5	25
Ethyl Acetate	10.00	8.028	80	70-130	4	25
Tetrahydrofuran	10.00	10.62	106	70-130	1	25
Chloroform	10.00	9.024	90	70-130	1	25
1,1,1-Trichloroethane	10.00	9.529	95	70-130	4	25
Cyclohexane	10.00	9.945	99	70-130	4	25
Carbon Tetrachloride	10.00	8.742	87	70-130	3	25
Benzene	10.00	10.62	106	70-130	2	25
1,2-Dichloroethane	10.00	10.25	103	70-130	2	25
n-Heptane	10.00	9.858	99	70-130	0	25
Trichloroethene	10.00	9.138	91	70-130	1	25

*= Value outside of QC limits; see narrative
b= See narrative
RPD= Relative Percent Difference
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Batch QC Report

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Matrix:	Air	Batch#:	240422
Units (V):	ppbv	Analyzed:	10/21/16
Diln Fac:	1.000		

Analyte	Spiked	Result (V)	%REC	Limits	RPD	Lim
1,2-Dichloropropane	10.00	10.75	108	70-130	1	25
Bromodichloromethane	10.00	10.12	101	70-130	3	25
cis-1,3-Dichloropropene	10.00	10.52	105	70-130	3	25
4-Methyl-2-Pentanone	10.00	12.09	121	70-130	2	25
Toluene	10.00	10.01	100	70-130	2	25
trans-1,3-Dichloropropene	10.00	10.19	102	70-130	0	25
1,1,2-Trichloroethane	10.00	11.07	111	70-130	3	25
Tetrachloroethene	10.00	10.52	105	70-130	2	25
2-Hexanone	10.00	11.76	118	70-130	2	25
Dibromochloromethane	10.00	8.966	90	70-130	4	25
1,2-Dibromoethane	10.00	9.887	99	70-130	3	25
Chlorobenzene	10.00	8.306	83	70-130	2	25
Ethylbenzene	10.00	9.297	93	70-130	0	25
m,p-Xylenes	20.00	20.87	104	70-130	0	25
o-Xylene	10.00	9.920	99	70-130	3	25
Styrene	10.00	9.095	91	70-130	2	25
Bromoform	10.00	9.385	94	70-130	2	25
1,1,2,2-Tetrachloroethane	10.00	9.392	94	70-130	1	25
4-Ethyltoluene	10.00	9.918	99	70-130	4	25
1,3,5-Trimethylbenzene	10.00	9.114	91	70-130	4	25
1,2,4-Trimethylbenzene	10.00	10.19	102	70-130	1	25
1,3-Dichlorobenzene	10.00	9.812	98	70-130	1	25
1,4-Dichlorobenzene	10.00	9.159	92	70-130	4	25
Benzyl chloride	10.00	8.945	89	70-130	1	25
1,2-Dichlorobenzene	10.00	8.912	89	70-130	2	25
1,2,4-Trichlorobenzene	10.00	11.86	119	70-130	2	25
Hexachlorobutadiene	10.00	11.61	116	70-130	1	25
Naphthalene	10.00	12.37	124	70-130	5	25

Surrogate	%REC	Limits
Bromofluorobenzene	104	70-130

*= Value outside of QC limits; see narrative
b= See narrative
RPD= Relative Percent Difference
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Batch QC Report

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Type:	BLANK	Units (M):	ug/m3
Lab ID:	QC856746	Diln Fac:	1.000
Matrix:	Air	Batch#:	240422
Units (V):	ppbv	Analyzed:	10/21/16

Analyte	Result (V)	RL	Result (M)	RL
Freon 12	ND	0.50	ND	2.5
Freon 114	ND	0.50	ND	3.5
Chloromethane	ND	0.50	ND	1.0
Vinyl Chloride	ND	0.50	ND	1.3
1,3-Butadiene	ND	0.50	ND	1.1
Bromomethane	ND	0.50	ND	1.9
Chloroethane	ND	0.50	ND	1.3
Trichlorofluoromethane	ND	0.50	ND	2.8
Acrolein	ND	2.0	ND	4.6
1,1-Dichloroethene	ND	0.50	ND	2.0
Freon 113	ND	0.50	ND	3.8
Acetone	ND	2.0	ND	4.8
Carbon Disulfide	ND	0.50	ND	1.6
Isopropanol	ND	2.0	ND	4.9
Methylene Chloride	ND	0.50	ND	1.7
trans-1,2-Dichloroethene	ND	0.50	ND	2.0
MTBE	ND	0.50	ND	1.8
n-Hexane	ND	0.50	ND	1.8
1,1-Dichloroethane	ND	0.50	ND	2.0
Vinyl Acetate	ND	0.50	ND	1.8
cis-1,2-Dichloroethene	ND	0.50	ND	2.0
2-Butanone	ND	0.50	ND	1.5
Ethyl Acetate	ND	0.50	ND	1.8
Tetrahydrofuran	ND	0.50	ND	1.5
Chloroform	ND	0.50	ND	2.4
1,1,1-Trichloroethane	ND	0.50	ND	2.7
Cyclohexane	ND	0.50	ND	1.7
Carbon Tetrachloride	ND	0.50	ND	3.1
Benzene	ND	0.50	ND	1.6
1,2-Dichloroethane	ND	0.50	ND	2.0
n-Heptane	ND	0.50	ND	2.0
Trichloroethene	ND	0.50	ND	2.7
1,2-Dichloropropane	ND	0.50	ND	2.3
Bromodichloromethane	ND	0.50	ND	3.4
cis-1,3-Dichloropropene	ND	0.50	ND	2.3

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Batch QC Report

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Type:	BLANK	Units (M):	ug/m3
Lab ID:	QC856746	Diln Fac:	1.000
Matrix:	Air	Batch#:	240422
Units (V):	ppbv	Analyzed:	10/21/16

Analyte	Result (V)	RL	Result (M)	RL
4-Methyl-2-Pentanone	ND	0.50	ND	2.0
Toluene	ND	0.50	ND	1.9
trans-1,3-Dichloropropene	ND	0.50	ND	2.3
1,1,2-Trichloroethane	ND	0.50	ND	2.7
Tetrachloroethene	ND	0.50	ND	3.4
2-Hexanone	ND	0.50	ND	2.0
Dibromochloromethane	ND	0.50	ND	4.3
1,2-Dibromoethane	ND	0.50	ND	3.8
Chlorobenzene	ND	0.50	ND	2.3
Ethylbenzene	ND	0.50	ND	2.2
m,p-Xylenes	ND	0.50	ND	2.2
o-Xylene	ND	0.50	ND	2.2
Styrene	ND	0.50	ND	2.1
Bromoform	ND	0.50	ND	5.2
1,1,2,2-Tetrachloroethane	ND	0.50	ND	3.4
4-Ethyltoluene	ND	0.50	ND	2.5
1,3,5-Trimethylbenzene	ND	0.50	ND	2.5
1,2,4-Trimethylbenzene	ND	0.50	ND	2.5
1,3-Dichlorobenzene	ND	0.50	ND	3.0
1,4-Dichlorobenzene	ND	0.50	ND	3.0
Benzyl chloride	ND	0.50	ND	2.6
1,2-Dichlorobenzene	ND	0.50	ND	3.0
1,2,4-Trichlorobenzene	ND	0.50	ND	3.7
Hexachlorobutadiene	ND	0.50	ND	5.3
Naphthalene	ND	2.0	ND	10

Surrogate	%REC	Limits
Bromofluorobenzene	91	70-130

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Batch QC Report

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Matrix:	Air	Batch#:	240483
Units (V):	ppbv	Analyzed:	10/24/16
Diln Fac:	1.000		

Type: BS Lab ID: QC856985

Analyte	Spiked	Result (V)	%REC	Limits
Freon 12	10.00	9.143	91	70-130
Freon 114	10.00	9.214	92	70-130
Chloromethane	10.00	8.824	88	70-130
Vinyl Chloride	10.00	9.488	95	70-130
1,3-Butadiene	10.00	8.550	86	70-130
Bromomethane	10.00	9.105	91	70-130
Chloroethane	10.00	10.13	101	70-130
Trichlorofluoromethane	10.00	9.353	94	70-130
Acrolein	10.00	7.693	77	70-130
1,1-Dichloroethene	10.00	11.30	113	70-130
Freon 113	10.00	9.906	99	70-130
Acetone	10.00	7.938	79	70-130
Carbon Disulfide	10.00	8.280	83	70-130
Isopropanol	10.00	8.254	83	70-130
Methylene Chloride	10.00	8.810	88	70-130
trans-1,2-Dichloroethene	10.00	11.09	111	70-130
MTBE	10.00	9.800	98	70-130
n-Hexane	10.00	8.669	87	70-130
1,1-Dichloroethane	10.00	9.776	98	70-130
Vinyl Acetate	10.00	12.69	127	70-130
cis-1,2-Dichloroethene	10.00	9.412	94	70-130
2-Butanone	10.00	11.91	119	70-130
Ethyl Acetate	10.00	8.059	81	70-130
Tetrahydrofuran	10.00	10.99	110	70-130
Chloroform	10.00	9.129	91	70-130
1,1,1-Trichloroethane	10.00	9.865	99	70-130
Cyclohexane	10.00	10.35	103	70-130
Carbon Tetrachloride	10.00	8.782	88	70-130
Benzene	10.00	11.01	110	70-130
1,2-Dichloroethane	10.00	10.66	107	70-130
n-Heptane	10.00	9.915	99	70-130
Trichloroethene	10.00	9.226	92	70-130
1,2-Dichloropropane	10.00	11.00	110	70-130
Bromodichloromethane	10.00	10.36	104	70-130

RPD= Relative Percent Difference
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Batch QC Report

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Matrix:	Air	Batch#:	240483
Units (V):	ppbv	Analyzed:	10/24/16
Diln Fac:	1.000		

Analyte	Spiked	Result (V)	%REC	Limits
cis-1,3-Dichloropropene	10.00	10.81	108	70-130
4-Methyl-2-Pentanone	10.00	12.44	124	70-130
Toluene	10.00	9.919	99	70-130
trans-1,3-Dichloropropene	10.00	10.32	103	70-130
1,1,2-Trichloroethane	10.00	11.44	114	70-130
Tetrachloroethene	10.00	10.67	107	70-130
2-Hexanone	10.00	12.00	120	70-130
Dibromochloromethane	10.00	9.396	94	70-130
1,2-Dibromoethane	10.00	10.01	100	70-130
Chlorobenzene	10.00	8.107	81	70-130
Ethylbenzene	10.00	9.121	91	70-130
m,p-Xylenes	20.00	21.04	105	70-130
o-Xylene	10.00	10.18	102	70-130
Styrene	10.00	9.095	91	70-130
Bromoform	10.00	9.668	97	70-130
1,1,2,2-Tetrachloroethane	10.00	9.491	95	70-130
4-Ethyltoluene	10.00	10.55	106	70-130
1,3,5-Trimethylbenzene	10.00	9.598	96	70-130
1,2,4-Trimethylbenzene	10.00	10.40	104	70-130
1,3-Dichlorobenzene	10.00	9.817	98	70-130
1,4-Dichlorobenzene	10.00	9.248	92	70-130
Benzyl chloride	10.00	9.265	93	70-130
1,2-Dichlorobenzene	10.00	9.056	91	70-130
1,2,4-Trichlorobenzene	10.00	12.32	123	70-130
Hexachlorobutadiene	10.00	12.19	122	70-130
Naphthalene	10.00	13.03	130	70-130

Surrogate	%REC	Limits
Bromofluorobenzene	109	70-130

RPD= Relative Percent Difference
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Batch QC Report

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Matrix:	Air	Batch#:	240483
Units (V):	ppbv	Analyzed:	10/24/16
Diln Fac:	1.000		

Type: BSD Lab ID: QC856986

Analyte	Spiked	Result (V)	%REC	Limits	RPD	Lim
Freon 12	10.00	9.415	94	70-130	3	25
Freon 114	10.00	9.470	95	70-130	3	25
Chloromethane	10.00	9.220	92	70-130	4	25
Vinyl Chloride	10.00	9.706	97	70-130	2	25
1,3-Butadiene	10.00	8.777	88	70-130	3	25
Bromomethane	10.00	9.217	92	70-130	1	25
Chloroethane	10.00	10.57	106	70-130	4	25
Trichlorofluoromethane	10.00	9.619	96	70-130	3	25
Acrolein	10.00	7.368	74	70-130	4	25
1,1-Dichloroethene	10.00	11.56	116	70-130	2	25
Freon 113	10.00	9.897	99	70-130	0	25
Acetone	10.00	7.826	78	70-130	1	25
Carbon Disulfide	10.00	8.347	83	70-130	1	25
Isopropanol	10.00	7.547	75	70-130	9	25
Methylene Chloride	10.00	8.868	89	70-130	1	25
trans-1,2-Dichloroethene	10.00	11.04	110	70-130	0	25
MTBE	10.00	9.534	95	70-130	3	25
n-Hexane	10.00	8.610	86	70-130	1	25
1,1-Dichloroethane	10.00	9.823	98	70-130	0	25
Vinyl Acetate	10.00	12.25	123	70-130	4	25
cis-1,2-Dichloroethene	10.00	9.362	94	70-130	1	25
2-Butanone	10.00	11.55	116	70-130	3	25
Ethyl Acetate	10.00	7.956	80	70-130	1	25
Tetrahydrofuran	10.00	10.60	106	70-130	4	25
Chloroform	10.00	8.934	89	70-130	2	25
1,1,1-Trichloroethane	10.00	9.704	97	70-130	2	25
Cyclohexane	10.00	10.07	101	70-130	3	25
Carbon Tetrachloride	10.00	8.628	86	70-130	2	25
Benzene	10.00	10.68	107	70-130	3	25
1,2-Dichloroethane	10.00	10.62	106	70-130	0	25
n-Heptane	10.00	9.822	98	70-130	1	25
Trichloroethene	10.00	9.125	91	70-130	1	25
1,2-Dichloropropane	10.00	10.79	108	70-130	2	25
Bromodichloromethane	10.00	10.20	102	70-130	2	25

RPD= Relative Percent Difference
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Batch QC Report

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Matrix:	Air	Batch#:	240483
Units (V):	ppbv	Analyzed:	10/24/16
Diln Fac:	1.000		

Analyte	Spiked	Result (V)	%REC	Limits	RPD	Lim
cis-1,3-Dichloropropene	10.00	10.63	106	70-130	2	25
4-Methyl-2-Pentanone	10.00	12.09	121	70-130	3	25
Toluene	10.00	9.643	96	70-130	3	25
trans-1,3-Dichloropropene	10.00	10.08	101	70-130	2	25
1,1,2-Trichloroethane	10.00	11.34	113	70-130	1	25
Tetrachloroethene	10.00	10.40	104	70-130	3	25
2-Hexanone	10.00	11.56	116	70-130	4	25
Dibromochloromethane	10.00	9.057	91	70-130	4	25
1,2-Dibromoethane	10.00	9.954	100	70-130	1	25
Chlorobenzene	10.00	8.084	81	70-130	0	25
Ethylbenzene	10.00	9.119	91	70-130	0	25
m,p-Xylenes	20.00	21.07	105	70-130	0	25
o-Xylene	10.00	10.12	101	70-130	1	25
Styrene	10.00	8.827	88	70-130	3	25
Bromoform	10.00	9.503	95	70-130	2	25
1,1,2,2-Tetrachloroethane	10.00	9.420	94	70-130	1	25
4-Ethyltoluene	10.00	10.16	102	70-130	4	25
1,3,5-Trimethylbenzene	10.00	9.235	92	70-130	4	25
1,2,4-Trimethylbenzene	10.00	10.45	104	70-130	0	25
1,3-Dichlorobenzene	10.00	9.671	97	70-130	1	25
1,4-Dichlorobenzene	10.00	9.114	91	70-130	1	25
Benzyl chloride	10.00	8.917	89	70-130	4	25
1,2-Dichlorobenzene	10.00	9.165	92	70-130	1	25
1,2,4-Trichlorobenzene	10.00	11.82	118	70-130	4	25
Hexachlorobutadiene	10.00	11.71	117	70-130	4	25
Naphthalene	10.00	12.80	128	70-130	2	25

Surrogate	%REC	Limits
Bromofluorobenzene	104	70-130

RPD= Relative Percent Difference
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Batch QC Report

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Type:	BLANK	Units (M):	ug/m3
Lab ID:	QC856987	Diln Fac:	1.000
Matrix:	Air	Batch#:	240483
Units (V):	ppbv	Analyzed:	10/24/16

Analyte	Result (V)	RL	Result (M)	RL
Freon 12	ND	0.50	ND	2.5
Freon 114	ND	0.50	ND	3.5
Chloromethane	ND	0.50	ND	1.0
Vinyl Chloride	ND	0.50	ND	1.3
1,3-Butadiene	ND	0.50	ND	1.1
Bromomethane	ND	0.50	ND	1.9
Chloroethane	ND	0.50	ND	1.3
Trichlorofluoromethane	ND	0.50	ND	2.8
Acrolein	ND	2.0	ND	4.6
1,1-Dichloroethene	ND	0.50	ND	2.0
Freon 113	ND	0.50	ND	3.8
Acetone	ND	2.0	ND	4.8
Carbon Disulfide	ND	0.50	ND	1.6
Isopropanol	ND	2.0	ND	4.9
Methylene Chloride	ND	0.50	ND	1.7
trans-1,2-Dichloroethene	ND	0.50	ND	2.0
MTBE	ND	0.50	ND	1.8
n-Hexane	ND	0.50	ND	1.8
1,1-Dichloroethane	ND	0.50	ND	2.0
Vinyl Acetate	ND	0.50	ND	1.8
cis-1,2-Dichloroethene	ND	0.50	ND	2.0
2-Butanone	ND	0.50	ND	1.5
Ethyl Acetate	ND	0.50	ND	1.8
Tetrahydrofuran	ND	0.50	ND	1.5
Chloroform	ND	0.50	ND	2.4
1,1,1-Trichloroethane	ND	0.50	ND	2.7
Cyclohexane	ND	0.50	ND	1.7
Carbon Tetrachloride	ND	0.50	ND	3.1
Benzene	ND	0.50	ND	1.6
1,2-Dichloroethane	ND	0.50	ND	2.0
n-Heptane	ND	0.50	ND	2.0
Trichloroethene	ND	0.50	ND	2.7
1,2-Dichloropropane	ND	0.50	ND	2.3
Bromodichloromethane	ND	0.50	ND	3.4
cis-1,3-Dichloropropene	ND	0.50	ND	2.3

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Batch QC Report

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Type:	BLANK	Units (M):	ug/m3
Lab ID:	QC856987	Diln Fac:	1.000
Matrix:	Air	Batch#:	240483
Units (V):	ppbv	Analyzed:	10/24/16

Analyte	Result (V)	RL	Result (M)	RL
4-Methyl-2-Pentanone	ND	0.50	ND	2.0
Toluene	ND	0.50	ND	1.9
trans-1,3-Dichloropropene	ND	0.50	ND	2.3
1,1,2-Trichloroethane	ND	0.50	ND	2.7
Tetrachloroethene	ND	0.50	ND	3.4
2-Hexanone	ND	0.50	ND	2.0
Dibromochloromethane	ND	0.50	ND	4.3
1,2-Dibromoethane	ND	0.50	ND	3.8
Chlorobenzene	ND	0.50	ND	2.3
Ethylbenzene	ND	0.50	ND	2.2
m,p-Xylenes	ND	0.50	ND	2.2
o-Xylene	ND	0.50	ND	2.2
Styrene	ND	0.50	ND	2.1
Bromoform	ND	0.50	ND	5.2
1,1,2,2-Tetrachloroethane	ND	0.50	ND	3.4
4-Ethyltoluene	ND	0.50	ND	2.5
1,3,5-Trimethylbenzene	ND	0.50	ND	2.5
1,2,4-Trimethylbenzene	ND	0.50	ND	2.5
1,3-Dichlorobenzene	ND	0.50	ND	3.0
1,4-Dichlorobenzene	ND	0.50	ND	3.0
Benzyl chloride	ND	0.50	ND	2.6
1,2-Dichlorobenzene	ND	0.50	ND	3.0
1,2,4-Trichlorobenzene	ND	0.50	ND	3.7
Hexachlorobutadiene	ND	0.50	ND	5.3
Naphthalene	ND	2.0	ND	10

Surrogate	%REC	Limits
Bromofluorobenzene	93	70-130

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Batch QC Report

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Matrix:	Air	Batch#:	240537
Units (V):	ppbv	Analyzed:	10/25/16
Diln Fac:	1.000		

Type: BS Lab ID: QC857205

Analyte	Spiked	Result (V)	%REC	Limits
Freon 12	10.00	8.611	86	70-130
Freon 114	10.00	8.892	89	70-130
Chloromethane	10.00	8.488	85	70-130
Vinyl Chloride	10.00	9.109	91	70-130
1,3-Butadiene	10.00	8.375	84	70-130
Bromomethane	10.00	8.814	88	70-130
Chloroethane	10.00	9.722	97	70-130
Trichlorofluoromethane	10.00	9.266	93	70-130
Acrolein	10.00	7.591	76	70-130
1,1-Dichloroethene	10.00	11.03	110	70-130
Freon 113	10.00	9.706	97	70-130
Acetone	10.00	7.995	80	70-130
Carbon Disulfide	10.00	8.097	81	70-130
Isopropanol	10.00	8.118	81	70-130
Methylene Chloride	10.00	8.806	88	70-130
trans-1,2-Dichloroethene	10.00	11.06	111	70-130
MTBE	10.00	9.694	97	70-130
n-Hexane	10.00	8.536	85	70-130
1,1-Dichloroethane	10.00	9.621	96	70-130
Vinyl Acetate	10.00	12.72	127	70-130
cis-1,2-Dichloroethene	10.00	9.384	94	70-130
2-Butanone	10.00	11.82	118	70-130
Ethyl Acetate	10.00	8.272	83	70-130
Tetrahydrofuran	10.00	10.73	107	70-130
Chloroform	10.00	8.839	88	70-130
1,1,1-Trichloroethane	10.00	9.689	97	70-130
Cyclohexane	10.00	10.19	102	70-130
Carbon Tetrachloride	10.00	8.544	85	70-130
Benzene	10.00	10.98	110	70-130
1,2-Dichloroethane	10.00	10.55	105	70-130
n-Heptane	10.00	10.46	105	70-130
Trichloroethene	10.00	9.057	91	70-130
1,2-Dichloropropane	10.00	10.83	108	70-130
Bromodichloromethane	10.00	10.20	102	70-130

RPD= Relative Percent Difference
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Batch QC Report

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Matrix:	Air	Batch#:	240537
Units (V):	ppbv	Analyzed:	10/25/16
Diln Fac:	1.000		

Analyte	Spiked	Result (V)	%REC	Limits
cis-1,3-Dichloropropene	10.00	10.87	109	70-130
4-Methyl-2-Pentanone	10.00	12.68	127	70-130
Toluene	10.00	9.624	96	70-130
trans-1,3-Dichloropropene	10.00	10.54	105	70-130
1,1,2-Trichloroethane	10.00	10.91	109	70-130
Tetrachloroethene	10.00	9.666	97	70-130
2-Hexanone	10.00	11.58	116	70-130
Dibromochloromethane	10.00	8.644	86	70-130
1,2-Dibromoethane	10.00	9.575	96	70-130
Chlorobenzene	10.00	8.168	82	70-130
Ethylbenzene	10.00	9.157	92	70-130
m,p-Xylenes	20.00	21.08	105	70-130
o-Xylene	10.00	9.780	98	70-130
Styrene	10.00	8.732	87	70-130
Bromoform	10.00	9.147	91	70-130
1,1,2,2-Tetrachloroethane	10.00	9.163	92	70-130
4-Ethyltoluene	10.00	10.18	102	70-130
1,3,5-Trimethylbenzene	10.00	9.249	92	70-130
1,2,4-Trimethylbenzene	10.00	10.03	100	70-130
1,3-Dichlorobenzene	10.00	9.561	96	70-130
1,4-Dichlorobenzene	10.00	8.792	88	70-130
Benzyl chloride	10.00	9.043	90	70-130
1,2-Dichlorobenzene	10.00	8.663	87	70-130
1,2,4-Trichlorobenzene	10.00	11.64	116	70-130
Hexachlorobutadiene	10.00	11.13	111	70-130
Naphthalene	10.00	12.33	123	70-130

Surrogate	%REC	Limits
Bromofluorobenzene	112	70-130

RPD= Relative Percent Difference
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Batch QC Report

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Matrix:	Air	Batch#:	240537
Units (V):	ppbv	Analyzed:	10/25/16
Diln Fac:	1.000		

Type: BSD Lab ID: QC857206

Analyte	Spiked	Result (V)	%REC	Limits	RPD	Lim
Freon 12	10.00	8.798	88	70-130	2	25
Freon 114	10.00	9.089	91	70-130	2	25
Chloromethane	10.00	8.851	89	70-130	4	25
Vinyl Chloride	10.00	9.471	95	70-130	4	25
1,3-Butadiene	10.00	8.508	85	70-130	2	25
Bromomethane	10.00	9.050	91	70-130	3	25
Chloroethane	10.00	9.880	99	70-130	2	25
Trichlorofluoromethane	10.00	9.566	96	70-130	3	25
Acrolein	10.00	7.706	77	70-130	2	25
1,1-Dichloroethene	10.00	10.99	110	70-130	0	25
Freon 113	10.00	9.874	99	70-130	2	25
Acetone	10.00	8.193	82	70-130	2	25
Carbon Disulfide	10.00	8.335	83	70-130	3	25
Isopropanol	10.00	8.394	84	70-130	3	25
Methylene Chloride	10.00	9.048	90	70-130	3	25
trans-1,2-Dichloroethene	10.00	11.12	111	70-130	1	25
MTBE	10.00	9.733	97	70-130	0	25
n-Hexane	10.00	8.734	87	70-130	2	25
1,1-Dichloroethane	10.00	9.677	97	70-130	1	25
Vinyl Acetate	10.00	12.75	128	70-130	0	25
cis-1,2-Dichloroethene	10.00	9.318	93	70-130	1	25
2-Butanone	10.00	11.75	117	70-130	1	25
Ethyl Acetate	10.00	8.102	81	70-130	2	25
Tetrahydrofuran	10.00	11.01	110	70-130	3	25
Chloroform	10.00	8.930	89	70-130	1	25
1,1,1-Trichloroethane	10.00	9.414	94	70-130	3	25
Cyclohexane	10.00	10.02	100	70-130	2	25
Carbon Tetrachloride	10.00	8.451	85	70-130	1	25
Benzene	10.00	10.54	105	70-130	4	25
1,2-Dichloroethane	10.00	10.24	102	70-130	3	25
n-Heptane	10.00	10.46	105	70-130	0	25
Trichloroethene	10.00	8.963	90	70-130	1	25
1,2-Dichloropropane	10.00	10.67	107	70-130	1	25
Bromodichloromethane	10.00	10.09	101	70-130	1	25

RPD= Relative Percent Difference
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Batch QC Report

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Matrix:	Air	Batch#:	240537
Units (V):	ppbv	Analyzed:	10/25/16
Diln Fac:	1.000		

Analyte	Spiked	Result (V)	%REC	Limits	RPD	Lim
cis-1,3-Dichloropropene	10.00	10.59	106	70-130	3	25
4-Methyl-2-Pentanone	10.00	12.48	125	70-130	2	25
Toluene	10.00	9.419	94	70-130	2	25
trans-1,3-Dichloropropene	10.00	10.00	100	70-130	5	25
1,1,2-Trichloroethane	10.00	10.56	106	70-130	3	25
Tetrachloroethene	10.00	9.632	96	70-130	0	25
2-Hexanone	10.00	11.56	116	70-130	0	25
Dibromochloromethane	10.00	8.386	84	70-130	3	25
1,2-Dibromoethane	10.00	9.346	93	70-130	2	25
Chlorobenzene	10.00	8.057	81	70-130	1	25
Ethylbenzene	10.00	9.059	91	70-130	1	25
m,p-Xylenes	20.00	20.64	103	70-130	2	25
o-Xylene	10.00	9.888	99	70-130	1	25
Styrene	10.00	8.878	89	70-130	2	25
Bromoform	10.00	8.843	88	70-130	3	25
1,1,2,2-Tetrachloroethane	10.00	9.019	90	70-130	2	25
4-Ethyltoluene	10.00	9.921	99	70-130	3	25
1,3,5-Trimethylbenzene	10.00	9.186	92	70-130	1	25
1,2,4-Trimethylbenzene	10.00	9.913	99	70-130	1	25
1,3-Dichlorobenzene	10.00	9.466	95	70-130	1	25
1,4-Dichlorobenzene	10.00	8.882	89	70-130	1	25
Benzyl chloride	10.00	9.035	90	70-130	0	25
1,2-Dichlorobenzene	10.00	8.917	89	70-130	3	25
1,2,4-Trichlorobenzene	10.00	11.67	117	70-130	0	25
Hexachlorobutadiene	10.00	11.42	114	70-130	3	25
Naphthalene	10.00	12.40	124	70-130	1	25

Surrogate	%REC	Limits
Bromofluorobenzene	107	70-130

RPD= Relative Percent Difference
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Batch QC Report

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Type:	BLANK	Units (M):	ug/m3
Lab ID:	QC857207	Diln Fac:	1.000
Matrix:	Air	Batch#:	240537
Units (V):	ppbv	Analyzed:	10/25/16

Analyte	Result (V)	RL	Result (M)	RL
Freon 12	ND	0.50	ND	2.5
Freon 114	ND	0.50	ND	3.5
Chloromethane	ND	0.50	ND	1.0
Vinyl Chloride	ND	0.50	ND	1.3
1,3-Butadiene	ND	0.50	ND	1.1
Bromomethane	ND	0.50	ND	1.9
Chloroethane	ND	0.50	ND	1.3
Trichlorofluoromethane	ND	0.50	ND	2.8
Acrolein	ND	2.0	ND	4.6
1,1-Dichloroethene	ND	0.50	ND	2.0
Freon 113	ND	0.50	ND	3.8
Acetone	ND	2.0	ND	4.8
Carbon Disulfide	ND	0.50	ND	1.6
Isopropanol	ND	2.0	ND	4.9
Methylene Chloride	ND	0.50	ND	1.7
trans-1,2-Dichloroethene	ND	0.50	ND	2.0
MTBE	ND	0.50	ND	1.8
n-Hexane	ND	0.50	ND	1.8
1,1-Dichloroethane	ND	0.50	ND	2.0
Vinyl Acetate	ND	0.50	ND	1.8
cis-1,2-Dichloroethene	ND	0.50	ND	2.0
2-Butanone	ND	0.50	ND	1.5
Ethyl Acetate	ND	0.50	ND	1.8
Tetrahydrofuran	ND	0.50	ND	1.5
Chloroform	ND	0.50	ND	2.4
1,1,1-Trichloroethane	ND	0.50	ND	2.7
Cyclohexane	ND	0.50	ND	1.7
Carbon Tetrachloride	ND	0.50	ND	3.1
Benzene	ND	0.50	ND	1.6
1,2-Dichloroethane	ND	0.50	ND	2.0
n-Heptane	ND	0.50	ND	2.0
Trichloroethene	ND	0.50	ND	2.7
1,2-Dichloropropane	ND	0.50	ND	2.3
Bromodichloromethane	ND	0.50	ND	3.4
cis-1,3-Dichloropropene	ND	0.50	ND	2.3

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Batch QC Report

Volatile Organics in Air

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	EPA TO-15
Type:	BLANK	Units (M):	ug/m3
Lab ID:	QC857207	Diln Fac:	1.000
Matrix:	Air	Batch#:	240537
Units (V):	ppbv	Analyzed:	10/25/16

Analyte	Result (V)	RL	Result (M)	RL
4-Methyl-2-Pentanone	ND	0.50	ND	2.0
Toluene	ND	0.50	ND	1.9
trans-1,3-Dichloropropene	ND	0.50	ND	2.3
1,1,2-Trichloroethane	ND	0.50	ND	2.7
Tetrachloroethene	ND	0.50	ND	3.4
2-Hexanone	ND	0.50	ND	2.0
Dibromochloromethane	ND	0.50	ND	4.3
1,2-Dibromoethane	ND	0.50	ND	3.8
Chlorobenzene	ND	0.50	ND	2.3
Ethylbenzene	ND	0.50	ND	2.2
m,p-Xylenes	ND	0.50	ND	2.2
o-Xylene	ND	0.50	ND	2.2
Styrene	ND	0.50	ND	2.1
Bromoform	ND	0.50	ND	5.2
1,1,2,2-Tetrachloroethane	ND	0.50	ND	3.4
4-Ethyltoluene	ND	0.50	ND	2.5
1,3,5-Trimethylbenzene	ND	0.50	ND	2.5
1,2,4-Trimethylbenzene	ND	0.50	ND	2.5
1,3-Dichlorobenzene	ND	0.50	ND	3.0
1,4-Dichlorobenzene	ND	0.50	ND	3.0
Benzyl chloride	ND	0.50	ND	2.6
1,2-Dichlorobenzene	ND	0.50	ND	3.0
1,2,4-Trichlorobenzene	ND	0.50	ND	3.7
Hexachlorobutadiene	ND	0.50	ND	5.3
Naphthalene	ND	2.0	ND	10

Surrogate	%REC	Limits
Bromofluorobenzene	90	70-130

ND= Not Detected
RL= Reporting Limit
Result M= Result in mass units
Result V= Result in volume units

Curtis & Tompkins, Ltd.

Fixed Gas Analysis

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	ASTM D1946
Matrix:	Air	Sampled:	10/21/16
Units:	ppmv	Received:	10/21/16
Units (Mol %):	MOL %		

Field ID: SV-46 | Diln Fac: 2.070
Type: SAMPLE | Batch#: 240420
Lab ID: 282480-001 | Analyzed: 10/21/16

Analyte	Result	RL	Result (Mol %)	RL
Carbon Dioxide	7,600	2,100	0.76	0.21
Oxygen	20,000	2,100	2.0	0.21
Methane	9,300	2,100	0.93	0.21

Field ID: SV-47 | Diln Fac: 1.910
Type: SAMPLE | Batch#: 240420
Lab ID: 282480-002 | Analyzed: 10/21/16

Analyte	Result	RL	Result (Mol %)	RL
Carbon Dioxide	6,900	1,900	0.69	0.19
Oxygen	25,000	1,900	2.5	0.19
Methane	8,600	1,900	0.86	0.19

Field ID: SV-48 | Diln Fac: 2.180
Type: SAMPLE | Batch#: 240420
Lab ID: 282480-003 | Analyzed: 10/21/16

Analyte	Result	RL	Result (Mol %)	RL
Carbon Dioxide	9,400	2,200	0.94	0.22
Oxygen	24,000	2,200	2.4	0.22
Methane	ND	2,200	ND	0.22

Field ID: SV-49 | Diln Fac: 2.200
Type: SAMPLE | Batch#: 240420
Lab ID: 282480-004 | Analyzed: 10/21/16

Analyte	Result	RL	Result (Mol %)	RL
Carbon Dioxide	56,000	2,200	5.6	0.22
Oxygen	17,000	2,200	1.7	0.22
Methane	3,300	2,200	0.33	0.22

Field ID: SV-50 | Diln Fac: 2.210
Type: SAMPLE | Batch#: 240420
Lab ID: 282480-005 | Analyzed: 10/21/16

Analyte	Result	RL	Result (Mol %)	RL
Carbon Dioxide	37,000	2,200	3.7	0.22
Oxygen	24,000	2,200	2.4	0.22
Methane	3,500	2,200	0.35	0.22

ND= Not Detected
RL= Reporting Limit
Result Mol %= Result in Mole Percent

Curtis & Tompkins, Ltd.

Fixed Gas Analysis

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	ASTM D1946
Matrix:	Air	Sampled:	10/21/16
Units:	ppmv	Received:	10/21/16
Units (Mol %):	MOL %		

Field ID: SV-55 | Diln Fac: 2.130
Type: SAMPLE | Batch#: 240666
Lab ID: 282480-010 | Analyzed: 10/27/16

Analyte	Result	RL	Result (Mol %)	RL
Carbon Dioxide	7,900	2,100	0.79	0.21
Oxygen	140,000	2,100	14	0.21
Methane	ND	2,100	ND	0.21

Field ID: SV-56 | Diln Fac: 2.120
Type: SAMPLE | Batch#: 240420
Lab ID: 282480-011 | Analyzed: 10/21/16

Analyte	Result	RL	Result (Mol %)	RL
Carbon Dioxide	10,000	2,100	1.0	0.21
Oxygen	150,000	2,100	15	0.21
Methane	ND	2,100	ND	0.21

Type: BLANK | Batch#: 240420
Lab ID: QC856737 | Analyzed: 10/21/16
Diln Fac: 1.000

Analyte	Result	RL	Result (Mol %)	RL
Carbon Dioxide	ND	1,000	ND	0.10
Oxygen	ND	1,000	ND	0.10
Methane	ND	1,000	ND	0.10

Type: BLANK | Batch#: 240666
Lab ID: QC857730 | Analyzed: 10/27/16
Diln Fac: 1.000

Analyte	Result	RL	Result (Mol %)	RL
Carbon Dioxide	ND	1,000	ND	0.10
Oxygen	ND	1,000	ND	0.10
Methane	ND	1,000	ND	0.10

ND= Not Detected
RL= Reporting Limit
Result Mol %= Result in Mole Percent

Curtis & Tompkins, Ltd.

Batch QC Report

Fixed Gas Analysis

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	ASTM D1946
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC856736	Batch#:	240420
Matrix:	Air	Analyzed:	10/21/16
Units:	ppmv		

Analyte	Spiked	Result	%REC	Limits
Carbon Dioxide	2,000	1,823	91	70-130
Oxygen	2,000	1,763	88	70-130
Methane	2,000	1,846	92	70-130

Curtis & Tompkins, Ltd.

Batch QC Report

Fixed Gas Analysis

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	ASTM D1946
Field ID:	ZZZZZZZZZZ	Units (Mol %):	MOL %
Type:	SDUP	Diln Fac:	1.920
MSS Lab ID:	282350-001	Batch#:	240420
Lab ID:	QC856738	Sampled:	10/19/16
Matrix:	Air	Received:	10/19/16
Units:	ppmv	Analyzed:	10/21/16

Analyte	MSS Result	Result	RL	Result (Mol %)	RL	RPD	Lim
Carbon Dioxide	59,010	58,990	1,920	5.899	0.1920	0	30
Oxygen	11,750	11,700	1,920	1.170	0.1920	0	30
Methane	7,604	7,545	1,920	0.7545	0.1920	1	30

RL= Reporting Limit
RPD= Relative Percent Difference
Result Mol %= Result in Mole Percent

Curtis & Tompkins, Ltd.

Batch QC Report

Fixed Gas Analysis

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	ASTM D1946
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC857729	Batch#:	240666
Matrix:	Air	Analyzed:	10/27/16
Units:	ppmv		

Analyte	Spiked	Result	%REC	Limits
Carbon Dioxide	2,000	1,835	92	70-130
Oxygen	2,000	1,775	89	70-130
Methane	2,000	1,868	93	70-130

Curtis & Tompkins, Ltd.

Batch QC Report

Fixed Gas Analysis

Lab #:	282480	Location:	Bockman
Client:	Pangea Environmental	Prep:	METHOD
Project#:	2030.001	Analysis:	ASTM D1946
Field ID:	SV-55	Units (Mol %):	MOL %
Type:	SDUP	Diln Fac:	2.130
MSS Lab ID:	282480-010	Batch#:	240666
Lab ID:	QC857731	Sampled:	10/21/16
Matrix:	Air	Received:	10/21/16
Units:	ppmv	Analyzed:	10/27/16

Analyte	MSS Result	Result	RL	Result (Mol %)	RL	RPD	Lim
Carbon Dioxide	7,948	7,946	2,130	0.7946	0.2130	0	30
Oxygen	139,800	139,700	2,130	13.97	0.2130	0	30
Methane	<2,130	ND	2,130	ND	0.2130	NC	30

NC= Not Calculated
ND= Not Detected
RL= Reporting Limit
RPD= Relative Percent Difference
Result Mol %= Result in Mole Percent