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BY:__

Mr. Doug Cieslak Wisconsin Department of Natural Resources 141 NW Barstow St, Room 180 Waukesha, WI 53188

> Re: Soil Vapor Extraction Pilot Study Report Martino's Master Dry Cleaners 7513 41st Avenue Kenosha, Wisconsin 53142 BRRTS# 02-30-552188

Dear Mr. Cieslak:

Environmental Forensic Investigations, Inc. (EnviroForensics) is pleased to submit this Soil Vapor Extraction Pilot Study Report for the Martino's Master Dry Cleaners (Martino's) site located at 7513 41st Avenue in Kenosha, Wisconsin. As we previously discussed, the remedial strategy for the site includes implementation of soil vapor extraction (SVE) to treat unsaturated soil in the source area. We expect to begin construction of the SVE system this month and begin operation early next year. Documentation of system construction will be submitted in accordance with Chapter NR 724.15

Sincerely, Environmental Forensic Investigations, Inc.

Rob Hoverman, PG Senior Project Manager

enclosures

Brian Kappen, PG Project Manager

Document: 6165-1148 Environmental Forensic Investigations, Inc. N16 W23390 Stone Ridge Dr, Suite G, Waukesha, WI 53188 Phone: 262-290-4001 • Fax 317-972-7875



SOIL VAPOR EXTRACTION PILOT STUDY REPORT

MARTINO'S MASTER DRY CLEANERS 7513 41st AVENUE KENOSHA, WISCONSIN WDNR BRRTS# 02-30-552188

November 2, 2016

Prepared For:

Mr. Dan Martino, Sr. Martino's Master Dry Cleaners 7513 41st Avenue Kenosha, Wisconsin 53142

Prepared By:

Environmental Forensic Investigations, Inc. N16 W23390 Stone Ridge Drive, Suite G Waukesha, WI 53188 Phone: (414) 982-3988 <u>www.enviroforensics.com</u>

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EXECUTIVE SUMMARY

Environmental Forensic Investigations, Inc. (EnviroForensics) has prepared this *Soil Vapor Extraction Pilot Study Report* on behalf of Dan Martino, Sr., d/b/a Martino's Master Dry Cleaners, for the Martino's Master Dry Cleaners facility located at 7513 41st Avenue in Kenosha, Wisconsin (Site). The Site operates as a plant-on-premises dry cleaning facility.

A soil vapor extraction (SVE) pilot study has been performed to identify the feasibility of SVE for remediation of unsaturated soils impacted by dry cleaning solvents at the Site. The stated objectives upon implementation were to:

- Measure vacuum conditions in the shallow subsurface environment via monitoring points and existing groundwater monitoring wells while inducing a vacuum with one (1) pilot SVE extraction point;
- Assess the effectiveness of the pilot SVE system by monitoring changes in subsurface vacuum over the duration of the pilot test; and
- Determine a radius of influence for the SVE extraction point.

The pilot study included installation of one (1) SVE extraction point and four (4) vacuum monitoring points to facilitate pilot testing. A 24-hour SVE pilot test was performed, with applied vacuum incrementally increased during testing to gauge subsurface response to applied vacuum. Applied vacuums, subsurface vacuums, extraction flow rates, and extraction air contaminant concentrations were monitored during testing. Existing shallow groundwater monitoring wells were also monitored for vacuum response during testing.

The results indicate that SVE is a potentially viable remedial alternative for unsaturated soils at the Site. It may also provide additional benefit for mitigation of vapor intrusion at the Site building during implementation, and would require multiple SVE extraction points to achieve this goal.



1.0 INTRODUCTION

Environmental Forensic Investigations, Inc. (EnviroForensics) has prepared this *Soil Vapor Extraction Pilot Study Report* on behalf of Dan Martino, Sr., d/b/a Martino's Master Dry Cleaners (Martino's), for the Martino's facility located at 7513 41st Avenue in Kenosha, Wisconsin (Site). The general Site location is depicted on **Figure 1**.

The Site encompasses approximately 0.36 acres and contains a single slab-on-grade building which occupies 5,154 square feet. The Site building is situated at the south end of a "strip mall" and adjoins the building to the north. The remainder of the strip mall building is divided into separate properties with different owners. The general layout of the Site and surrounding area, including Site features, is depicted on **Figure 2**. Utilities noted during the Site reconnaissance include water, sewer, natural gas, telephone, and electrical lines. Asphalt driveway and parking areas surround the Site building, and maintained grass areas are present along 41st and 40th Avenues. The Site is bound by 41st Avenue to the west, 40th Avenue to the east, and commercial properties to the north and south. Land use surrounding the Site consists of mixed residential and commercial properties.

The lithological sequence encountered at the Site consists of clay and silt beneath surface fill materials to a depth of 6 to 7 feet below ground surface (bgs), followed by primarily fine-grained sand to a depth of 17 to 19 feet bgs. The water table is encountered at depths ranging from approximately 10 to 12 feet bgs at the Site. The direction of groundwater flow is toward the southeast.

The primary contaminants of concern at the Site are the dry cleaning solvent tetrachloroethene (PCE) and its daughter products including trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE) and vinyl chloride. Petroleum–related compounds including benzene, ethylbenzene, trimethylbenzenes, naphthalene, and xylenes are also present in the subsurface due to releases from a gasoline service station formerly located on the north adjacent property.



2.0 SVE PILOT STUDY ACTIVITIES

Pilot study activities performed include SVE well and monitoring point installation, SVE pilot testing, and analysis of the SVE pilot test data. This section provides a summary of the SVE field activities performed.

2.1 SVE Extraction Point Installation

In March of 2016 EnviroForensics mobilized to the Site and installed one (1) SVE pilot study extraction point (SVE-1) and two (2) double-nested vacuum monitoring points (MP-1s/d and MP-2s/d). The locations of the SVE extraction point and vacuum monitoring points are depicted on **Figure 2**. The points were installed using hollow-stem auger drilling methods in 8-inch diameter boreholes.

SVE-1 was constructed of 4-inch diameter, Schedule 40 PVC, with a 0.020-inch slotted Vee-Wire[®] screen from 4 to 9 feet bgs. A filter pack consisting of coarse sand was installed at SVE-1 from 4 to 9 feet bgs. Hydrated bentonite chips were installed from 3 to 4 feet bgs, and 2 feet of bentonite-cement grout was installed above the bentonite chips. The SVE extraction point was finished at grade with a flush-mount, steel vault set within a concrete pad.

The two (2) pairs of vacuum monitoring points (MP-1s/d and MP-2s/d) were installed at distances of 20 and 40 feet, respectively, from SVE-1 to gauge applied vacuum levels in the subsurface. Each monitoring point was constructed with 1-inch diameter, Schedule 40 PVC, 0.010-inch slotted well screen, and coarse sand filter pack. The screen for each shallow point (MP-1s and MP-2s) was installed at 3 to 6 feet bgs. The screen for each deep point (MP-1d and MP-2d) was installed at 7 to 10 feet bgs. The filter pack (spanning the screen interval) was installed at each monitoring point. Hydrated bentonite chips were installed from 6-7 feet bgs to seal the two screened intervals. Hydrated bentonite chips were also installed from 2 to 3 feet bgs, and bentonite-cement grout was installed from 1-2 feet bgs. The vacuum monitoring points were finished at grade with a flush-mounted steel vault set within a concrete pad.

A summary of construction information for the SVE extraction point and vacuum monitoring points, as well as other existing monitoring wells used during the pilot study, is provided in **Table 1**. Boring logs for the existing monitoring wells and soil borings within the SVE radius of influence (ROI) are provided in **Appendix A**.

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In addition to the SVE-1 and MP points, existing groundwater monitoring wells MW-1 through MW-8 were utilized during the pilot test to gauge vacuum influence in the surrounding area and beneath the Site building. These consisted of 1 and 2-inch diameter PVC wells screened from approximately 6-16 feet bgs.

2.2 SVE Pilot Test Implementation

SVE testing was performed on March 22 and 23, 2016 using a mobile, claw-type vacuum pump capable of producing a flow rate of 180 actual cubic feet per minute (ACFM) at 20 inches of mercury (inHg). The vacuum system was piped to the SVE extraction point using 2-inch suction hose. A generalized process and instrumentation diagram for the extraction system is depicted on **Figures 3** and **4**.

Approximately 24 hours of continuous testing was performed over the course of three (3) testing steps (steps 1 through 3), with applied vacuum and flow rate varied for each step by adjusting the integrated dilution valve. System vacuum, as measured at the air-water separator, was adjusted during each step at 6, 14, and 20 inHg, which corresponded to applied vacuums at the SVE wellhead of 6, 11, and 17 inHg. A summary of each step and the recorded vacuum is included in **Table 2**.

During each step, volumetric flow rates, applied vacuums, recorded vacuums, and influent air total volatile organic compound (VOC) concentrations were monitored at fixed intervals. Influent flow rates were monitored using an anemometer. Subsurface vacuums were monitored using a magnehelic gauge at the SVE extraction point, and a hand-held digital manometer at the vacuum monitoring points and groundwater monitoring wells. Site groundwater levels were evaluated prior to testing to confirm that vacuum monitoring point screens were exposed above the water table, to ensure the vacuum measurements collected represented unsaturated soil conditions.

Influent air samples were field-screened using a photoionization detector (PID) for the presence of VOCs at a sampling port before the vacuum pump, located as indicated on **Figure 4**. Influent air samples were also collected from this port into laboratory-supplied Summa canisters, which were submitted to Envision Air Laboratories in Indianapolis, Indiana for analysis of VOCs using United States (U.S.) Environmental Protection Agency (EPA) Method TO-15. The TO-15 samples were collected two (2) hours following the start of steps 1 and 2, whereas the TO-15 sample for step 3 was collected approximately 16 hours after the start of that step.



3.0 PILOT STUDY RESULTS

Pilot study data was analyzed to determine the following parameters:

- 1. System flow rates
- 2. VOC mass removal rates
- 3. Subsurface vacuum response

Vacuum, flow rate, and PID data collected at the remediation system during testing are presented in **Table 3** and graphically depicted on **Chart 1**. Subsurface vacuum data is presented in **Table 4** and graphically depicted on **Chart 2**. No measurable subsurface moisture was collected during testing.

3.1 System Flow Rates

System flow rates varied from a minimum of 38 standard cubic feet per minute (SCFM) during Step 1 at an applied vacuum of 6 in Hg to a maximum of 62 SCFM during Step 3 at an applied vacuum of 20 inHg. A summary of the flow rates is presented in **Table 3** and graphically depicted in **Chart 1**.

3.2 VOC Mass Removal Rates

PCE concentrations ranged from 63 micrograms per cubic meter ($\mu g/m^3$) during Step 1 to 480 $\mu g/m^3$ during Step 2. TCE concentrations ranged from below laboratory detection limits to 74.2 $\mu g/m^3$. 1,2,4-Trimethylbenzene concentrations ranged from below laboratory detection limits to 267 $\mu g/m^3$. 1,3,5-Trimethylbenzene concentrations ranged from below laboratory detection limits to 139 $\mu g/m^3$. Isooctane concentrations ranged from below laboratory detection limits to 9,490 $\mu g/m^3$. Vinyl chloride concentrations ranged from below laboratory detection limits to 531 $\mu g/m^3$. A copy of the laboratory analytical report is provided in **Appendix B** and the results are summarized on **Table 5**.

Coupling effluent vapor concentrations with the effluent flow rates over the test duration for each period indicates that the VOC mass removal rate would be approximately 19.9 pounds per year per extraction well, during full scale system operation. The total VOC mass removed during testing was 0.038 pounds. The chlorinated VOC (cVOC) mass (i.e., the portion of the total mass attributed to PCE and its daughter products) removed during the pilot study was calculated to be approximately 0.002 pounds, which would be approximately 0.73 pounds per extraction well per

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year of system operation. This result appears to be biased low due to the sub-optimal placement of the pilot test extraction well. Additional cVOC mass recovery would be expected during fullscale system implementation due to the placement of additional extraction wells in the source area soils. A summary of effluent concentrations and calculated mass removal rates is provided in **Table 5**.

3.3 Subsurface Vacuum Response

A maximum observed monitoring point influence of 4.795 inches of water (in-H2O) vacuum was detected during Step 3 at monitoring well MW-1, approximately 10 feet away from SVE-1. The observed vacuum responses in the monitoring points varied throughout the duration of the pilot study, most likely due to subsurface anomalies, heterogeneity of the subsurface lithology, and different construction methodology for the selected monitoring points. Monitoring wells and vacuum monitoring points that were determined to be non-standard with regard to vadose zone screen length, vadose zone soil type, and linear vacuum responses were not utilized during calculation of the estimated SVE ROI. Additionally, anomalous fluctuations were observed in the vacuums recorded at most test points during the pilot study, regardless of applied vacuums. In order to mitigate the large variances in this data set, the recorded vacuums were averaged for each point during each step. Subsurface vacuum response versus time for each monitoring point is graphically depicted in **Chart 2** and tabulated in **Table 4**.

A subset of the pilot study monitoring point network was utilized for the ROI calculations (MP-1s, MP-2s, MW-1, and MW-6). As previously discussed, these points exhibited the lithologic and construction criteria desired to best assess the SVE ROI in the upper silty soils. In order to evaluate the generalized SVE ROI for this Site, a best-fit statistical distribution was identified for Step 1, Step 2, and Step 3 to describe the attenuation of subsurface vacuum with respect to distance from SVE-1.

The vacuum versus distance data for Step 3 exhibited an exponential distribution and had the highest coefficient of determination (\mathbb{R}^2) (0.88). This data indicated that step 3 provided the most linear, and therefore predictable, subsurface vacuum response. The minimum subsurface vacuum identified for determining an effective ROI for vapor capture is 0.1 in-H₂O. Using this minimum standard, the estimated vapor capture ROI for an applied vacuum of 20 inHg is approximately 32.5 feet. The data points and trend lines are presented in **Table 6** and **Chart 3a** through **3c**. The calculated ROI for each step of the pilot study are depicted in **Figure 2**.



4.0 CONCLUSIONS AND RECOMMENDATIONS

SVE is a viable remedial alternative for unsaturated soils at the Site and will likely promote reduction of the groundwater plume. It may also provide additional benefit for mitigation of vapor intrusion at the Site building during implementation, but would require multiple SVE extraction points to achieve this goal. EnviroForensics is preparing to implement SVE and will determine if additional groundwater treatment is required to facilitate Site regulatory closure. SVE design for remedial implementation at the property will consider the ROIs, flow rates, and other information identified in this report as well as Site-specific considerations such as local VOC concentrations, access limitations, lithologic heterogeneities, and subsurface utility corridors that may affect the vacuum propagation or influence the design criteria.



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TABLE 1 Monitoring Point Construction Information

Soil Vapor Extraction Pilot Study Report

Martino's Master Dry Cleaners

Kenosha, Wisconsin

WDNR BRRTS No. 02-30-552188

Monitoring Point I.D.	Date Installed	Drilling Method	Well Diameter (inches)	Screened Interval (feet bgs)
SVE-1	3/17/2016	Hollow Stem Auger	4	4-9
MP-1s	3/17/2016	Hollow Stem Auger	1	3-6
MP-1d	3/17/2016	Hollow Stem Auger	1	7-10
MP-2s	3/17/2016	Hollow Stem Auger	1	3-6
MP-2d	3/17/2016	Hollow Stem Auger	1	7-10
MW-1	9/1/2011	Hollow Stem Auger	2	7.1-17.1
MW-2	9/1/2011	Hollow Stem Auger	2	7.3-17.3
MW-3	9/1/2011	Hollow Stem Auger	2	6.2-16.2
MW-5	9/1/2011	Hollow Stem Auger	2	6.8-16.8
MW-6	9/1/2011	Hollow Stem Auger	2	5.6-15.6
MW-7	9/1/2011	Hollow Stem Auger	2	6.9-16.9
MW-8	12/2/2013	Hollow Stem Auger	2	8.1-18.1

bgs = below ground surface



SVE Pilot Study Testing Regime

Soil Vapor Extraction Pilot Study Report

Martino's Master Dry Cleaners

Kenosha, Wisconsin

WDNR BRRTS No. 02-30-552188

Step	Time Start	Time Stop	Hour Start	Hour Stop	Step Duration (hours)	System Vacuum (inH _g)	Wellhead Vacuum (inH _g)
1	3/22/2016 09:20	3/22/2016 14:04	0.0	4.7	4.7	6	6
2	3/22/2016 14:04	3/22/2016 16:50	4.7	7.5	2.8	14	11
3	3/22/2016 16:50	3/23/2016 09:00	7.5	23.7	16.2	20	17



SVE Pilot Study System Data

Soil Vapor Extraction Pilot Study Report

Martino's Master Dry Cleaners

Kenosha, Wisconsin

WDNR BRRTS No. 02-30-552188

Step	Date and Time	Test Hour	System Influent Vacuum (inHg)	System Influent Flow Rate (SCFM)	System Influent Temperature (°C)	System Influent VOC Concentration (ppm)
	3/22/16 9:50	0.5	6	42	51	2.0
	3/22/16 10:20	1.0	6	42	52	2.0
1	3/22/16 10:50	1.5	6	42	53	2.1
1	3/22/16 11:20	2.0	6	41	54	2.6
	3/22/16 12:20	3.0	6	39	56	3.3
	3/22/16 13:20	4.0	6	38	59	3.4
	3/22/16 14:20	5.0	14	48	59	4.5
n	3/22/16 14:50	5.5	14	48	59	5.4
Z	3/22/16 15:50	6.5	14	49	60	8.7
	3/22/16 16:50	7.5	14	49	61	10.5
	3/23/16 7:30	22.2	20	59	47	23.0
3	3/23/16 8:30	23.2	20	62	41	20.1
	3/23/16 9:00	23.7	20	62	41	15.7

inHg = vacuum in inches of mercury (measured at air-water separator)

CFM = cubic feet per minute

ppm = parts per million by volume

VOC = Volatile organic compound

SVE Pilot Study Subsurface Data

Soil Vapor Extraction Pilot Study Report

Martino's Master Dry Cleaners

Kenosha, Wisconsin

WDNR BRRTS No. 02-30-552188

Step	Date and Time	Influent Flow Rate (cfm)	Test Hour	SVE-1	MP-1s	MP-1d	MP-2s	MP-2d	MW-1	MW-2	MW-3	MW-5	MW-6	MW-7	MW-8
	Distance fro	m SVE-1 (ft)		0	20	20	40	40	10	40	60	112	28	45	72
	3/22/16 9:50	42	0.0	6	0.111	0.095	0.346	0.329	1.055	0.230	0.000	0.009	1.003	0.150	0.127
	3/22/16 10:20	42	0.5	6	0.047	0.126	0.018	0.017	1.072	0.855	0.802	0.031	0.010	0.741	0.307
1	3/22/16 10:50	42	1.0	6	0.103	0.126	0.067	0.245	0.651	0.848	1.030	0.003	0.016	0.010	0.643
1	3/22/16 11:20	41	1.5	6	0.166	0.330	0.024	0.014	1.172	0.003	0.015	0.102	0.001	0.009	0.787
	3/22/16 12:20	39	2.5	6	0.170	0.320	0.007	0.017	1.487	1.303	0.053	0.849	0.026	0.185	0.407
	3/22/16 13:20	38	3.5	6	0.157	0.288	0.008	0.014	0.850	0.021	0.010	0.533	0.013	0.007	0.039
	3/22/16 14:20	48	4.5	11	0.429	0.901	0.010	0.011	1.530	0.483	0.043	0.069	0.063	0.203	0.314
2	3/22/16 14:50	48	5.0	11	0.455	0.937	0.007	0.011	2.043	0.423	0.056	0.147	0.090	0.009	0.132
2	3/22/16 15:50	49	6.0	11	0.292	0.774	0.021	0.010	1.826	0.644	0.397	0.013	0.067	0.114	0.020
	3/22/16 16:50	49	7.0	11	0.477	0.957	0.037	0.009	3.061	0.349	0.063	0.054	0.043	0.020	0.247
	3/23/16 7:30	59	21.7	17	0.751	1.603	0.057	0.002	4.795	0.114	0.167	0.727	0.065	0.124	0.083
3	3/23/16 8:30	62	22.7	17	0.784	1.588	0.058	0.003	2.984	0.122	0.191	0.484	0.078	0.071	0.061
	3/23/16 9:00	62	23.2	17	0.779	1.570	0.059	0.002	4.153	0.118	0.173	0.312	0.071	0.098	0.067
	Maximu	n vacuum:		17	0.784	1.603	0.346	0.329	4.795	1.303	1.030	0.849	1.003	0.741	0.787

All values are vacuum readings, in units of inches water column

SVE Pilot Study Mass Removal Estimates

Soil Vapor Extraction Pilot Study Report Martino's Master Dry Cleaners

Kenosha, Wisconsin

WDNR BRRTS No. 02-30-552188

Step 1; Sample EF-1; Flow rate = 40.7 SCFM; Duration = 4.7 Hours									
Analyte	Concentration (μg/m ³)	Removal Rate (lb/hour)	Removal Rate (lb/year)	Removal Rate (tons/year)	Mass Removed (lb)				
Tetrachloroethene	63	0.00001	0.1	0.000	0.00005				
Trichloroethene	< 10.7	< 0	< 0	< 0	NA				
cis-1,2-Dichloroethene	< 45.4	< 0.00001	< 0.1	< 0.00005	NA				
trans-1,2-Dichloroethene	< 396	< 0.00006	< 0.5	< 0.00025	NA				
1,2,4-Trimethylbenzene	< 49.2	< 0.00001	< 0.09	< 0.00005	NA				
1,3,5-Trimethylbenzene	< 49.2	< 0.00001	< 0.09	< 0.00005	NA				
Isooctane	< 4670	< 0.00085	< 7.45	< 0.00373	NA				
Vinyl Chloride	< 12.8	< 0.000002	< 0.02	< 0.00001	NA				

Step 2; Sample EF-2; Flow rate = 48.5 SCFM; Duration = 2.8 Hours

Analyte	Concentration (µg/m ³)	Removal Rate (lb/hour)	Removal Rate (lb/year)	Removal Rate (tons/year)	Mass Removed (lb)
Tetrachloroethene	480	0.00009	0.8	0.000	0.00024
Trichloroethene	14.0	0.00000	0.0	0.0000	0.00001
cis-1,2-Dichloroethene	< 198	< 0.00004	< 0.4	< 0.0002	NA
trans-1,2-Dichloroethene	< 396	< 0.00007	< 0.6	< 0.0003	NA
1,2,4-Trimethylbenzene	267	0.00005	0	0.000	0.00013
1,3,5-Trimethylbenzene	139	0.00003	0	0.000	0.00007
Isooctane	< 4670	< 0.00085	< 7.45	< 0.00373	NA
Vinyl Chloride	531	0.00010	1	0.000	0.00027

Step:3; Sample EF-3; Flow rate = 61 SCFM; Duration = 16.2 Hours									
Analyte	Concentration (µg/m ³)	Removal Rate (lb/hour)	Removal Rate (lb/year)	Removal Rate (tons/year)	Mass Removed (lb)				
Tetrachloroethene	323	0.00007	0.6	0.000	0.00119				
Trichloroethene	74.2	0.00002	0.1	0.0001	0.00027				
cis-1,2-Dichloroethene	< 198	< 0.00005	< 0.4	< 0.0002	NA				
trans-1,2-Dichloroethene	< 396	< 0.00009	< 0.8	< 0.0004	NA				
1,2,4-Trimethylbenzene	< 49.2	< 0.00001	< 0.09	< 0.00005	NA				
1,3,5-Trimethylbenzene	< 49.2	< 0.00001	< 0.09	< 0.00005	NA				
Isooctane	9,490	0.00217	19.0	0.0095	0.03506				
Vinyl Chloride	78.0	0.00002	0	0.000	0.00029				

Total estimated mass removed (lb):	0.038
Total estimated cVOC mass removed (lb):	0.002

Notes:

Duration = Length of time applied to mass removal estimate

Removal Rate = concentration multiplied by duration

NA = Not Available

Mass Removed = Estimated mass removed through SVE system during representative pilot study periods

SCFM = Standard cubic feet per minute

 $\mu g = microgram$

m = meter

lb = pound



1

TABLE 6Radius of Influence Calculation DataSoil Vapor Extraction Pilot Study Report

Martino's Master Dry Cleaners

Kenosha, Wisconsin

WDNR BRRTS No. 02-30-552188

Monitoring Point	Distance from	Av	verage Vacuum (in	H ₂ O)
I.D.	SVE-1 (feet)	Step 1	Step 2	Step 3
MP-1s	20	0.129	0.413	0.771
MP-2s	40	0.025	0.019	0.058
MW-1	10	1.046	2.115	3.977
MW-6	28	0.013	0.066	0.071

- inH_2O = inches of water column





FIGURES

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Legend

		Property boundary	
	-00	Fence line	
	GAS	Underground gas utility	line
	WTR	Underground water utili	ty line
-		Underground sanitary ut	ility line
		Underground storm utili	ty line
	OVHD	Over head electrical utili	ity line
	UGE	Underground electrical u	utility line
	UGT	Underground cable telev	vision utility line
	MW-5 💠	Monitoring well location	1
	SVE-1	SVE extraction well loca	ation
	MP-1 🛇	Nested SVE monitoring	points
		Proposed SVE trailer and	a generator location
		vacuum (23 ft)	gappileu
		0.1 in H ₂ O ROI at 14 in H	Hg applied
		vacuum (28 ft)	
		0.1 in H_2O ROI at 20 in H	Hg applied
		vacuum (32 ft)	
			1
			4
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_			٩
1	SOIL VA	APOR EXTRACTION PIL	LOT STUDY
		MARCH 22. 2016	ION
		Martino's Cleaners	
		7513 41st Avenue	
+		Kenosha, WI	
	ENVIRO	herensics	Figure
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1	ьо2 N. Capitol Ave., S Env	te. 210 • Indianapolis, IN 46204 iroForensics.com	6165







CHARTS

Document: 6165-1024

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APPENDIX A

Boring Logs

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Document: 6165-1024

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SOIL BORING LOG INFORMATION Form 4400-122 Rev. 7-98

Route To:

Watershed/Wastewater 🔲 Waste Management 🔲 Remediation/Revelopment [x] Other

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This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

SOIL BORING LOG INFORMATION Form 4400-122

Rev. 7-98

Route To:

Watershed/Wastewater 🔲 Waste Management 🔲 Remediation/Revelopment [x] Other

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SOIL BORING LOG INFORMATION Form 4400-122 Rev. 7-98

Route To:

Watershed/Wastewater 🔲 Waste Management 🗍 Remediation/Revelopment 🗍 Other 🔲 _____

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This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

State of Wisconsin Department of Natural Resources

SOIL BORING LOG INFORMATION Form 4400-122

Rev. 7-98

Route To:

Watershed/Wastewater 🔲 Waste Management 🔲 Remediation/Revelopment D Other

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SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To:

Watershod/Wastewater Waste Management Remediation/Revelopment Other

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SOIL BORING LOG INFORMATION Rev. 7-98

Fax:

Form 4400-122

Route To:

Watershed/Wastewater Remediation/Redevelopment Waste Management Other

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730 Facili	IY ID 106700	0		Kenosha	1	20	ode	Civil	Town/C	ity/ or	village					
-250				Kenosna		30	1	Kei		T	1	Sail	Duore	tion		[
Sai												5011	Prope		Ι	-
	t. & (in)	nts	cet	Soil/Re	ock Description		ł				ve					
er /pe	ı At ered	Cou	In F	And Ge	ologic Origin For		s	.9	l g		th	ure 1t		ity		ents
d Ty	ngtl	MO	pth	Eac	h Major Unit		sc	aph	ell agra	D/FI	mpi	oistu	quid	astic lex	500	D/ Mun
<u>ž</u> u	J Z	BI	De				Þ	5	<u>n a r</u>	H H	<u>ठ छ</u>	Σ̈́Ŭ	ĒĒ	Pla II	P	<u>×ŭ</u>
CS	60		-	(0'-2') FILL(Fill):	FILL Asphalt road	base			X	1.7					1	
					laterial.		fill		X							
			- 1						×			ļ				
									X							
				(2'-16') SILT(ML):Black to brown S	ILT,										
			_	with Sand, some G	ravel, Cobbles, trac	e				0.7						
			-3	(a) 10' Color beco	plastic, dry. Satura	ctea @										
			_	11'.	mes reduisir brown	U				1						ĺ
			-4													
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Ce -	60		-5							10						
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	v certify	/ that t	he infor	mation on this form is tru	ie and correct to the best	st of my k	nowled	ge.		I	<u> </u>	1	1	i		
Signat	ure		41101		Firm En-	roForm	nine									
5					E E E E E E E E E E E E E E E E E E E	NULOIGUE	nus –									Tel.

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

Borin	g Numl	ber	SB-	10 Use only as an attachment to Form 4400-	122.							Pa	ge 2	of	3
Saı	nple										Soil	Prop	erties	1	-
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic	Log	Wcll Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
CS	60			(2'-16') SILT(ML):Black to brown SILT, with Sand, some Gravel, Cobbles, trace Clay, soft, slightly plastic, dry. Saturacted @ 10'. Color becomes reddish brown @ 11'. (continued)	ML				59.0						
			- 17 - 17 - 18 - 18 - 19	medium grained, SAND. Well graded and loose. Addition of some clay @ 19'.	SW				2.0						
CS	60		20	(19.5'-28') CLAY(CL):Gray CLAY. Very stiff, hightly plastic, and moist. 3" Greyish green Sand layer, fine to coarse grained, wet.											
CS	60		23 24 25 26 27 27		CL										
CS	60		-28 -29 -30 -31 -32	(28'-33') SAND(SP):Grayish green, fine to medium grained, SAND. Well graded, very dense, some Silt, and trace fine to medium grained gravel.	SP										

Borin	g Numł	ber	SB-	10 Use only as an attachment to Form 4400-	122.						Pag	ge 3	of	3
Sar	nple									Soil	Prope	erties		
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Wcll Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			-		SP									
cs [–]	60		-33 -34 -35 -36 -37 -38	(33'-43') SILT and CLAY(CL-ML): Grayish green SILT and CLAY with fine to coarse grained Sand, some Gravel. Very dense, moist, slightly plastic.	CL-MI									
CS	36		-39											
				EOB @ 43'bgs										

SOIL BORING LOG INFORMATION Rev. 7-98

Form 4400-122

Route To: Watershed/Wastewater

Remediation/Redevelopment

Waste Management Oth

Uther	

													Pa	ge 1	of	2
Facilit	y/Proje	ct Nan	ne			Licen	License/Permit/Monitoring Number					Boring Number				
616	5 Mai	tinos	41st	Ave.		02-	02-30-552188				IMW-8				La Mathad	
Doring		u ву:	iname (of crew chief (first, fast) a	and Firm	Date	Date Drilling Started Date Drill				ng Cor	npieteo		Dn	ning Method	
On-	iy Nap Site F	nviro	nmen	tal			12/	2/2013				12/2/	2013			irect Push
WIUn	ique W	vell No		DNR Well ID No.	Common Well Name	Final	Static W	ater Lev	el	Surfac	e Eleva	tion	2015	B	orehole	Diameter
	•				MW-8	6	629.4 Fe	eet MS	L		539.4	Feet N	A SL		2.3	inches
Local Grid Origin 📋 (estimated: 🗌) or Boring Location 🖾			1	_	0	,		Local (Grid Lo	cation						
State Plane 213,655 N, 2,577,378 E S/C/N				Lat						N	I		ШΕ			
	1/4	of		1/4 of Section ,	T N, R	L	.ong		<u> </u>			Feet				Feet 🛛 W
Facilit	9 ID 06700	00		County		County	Code	Civil T	own/Ci	ity/ or V	/illage					
250			1	Kenosna		30		Keno		1	1	0.1	D			
San	ipie											5011	Prope		I	1
	t. &	nts	eet	Soil/H	Rock Description						ke					
er /pe	n Att ered	Coun	In F	And G	eologic Origin For		s		E E	A	essi th	ure at		Ξī		ents
d T _y	ngth cov) MC	pth	Ea	ch Major Unit		sc	aphi	cll agra	O/FI	mpi	oistu	nit	lex lex	003)Q
aŭ N	Le Re	Bl	ñ				ā	ڭ ئ	D K	PII	<u>5 5</u>	žΰ	Ei Ei	Pl ⁵ Inc	đ	2 X Ů
CS	60		F	(0'-0.5') ASPHA	LT:ASPHALT cove	er.	AS			18.1						
			E,	(0.25'-3') FILL:F	FILL material, inclue	ding							1			
				Gravel and Sand.												
			È.				Fill									
			F^2							38.7						
			E													
			-3	(3'-4.5') SANDY	SILT:Black SILT	with		m								
			F	SAND, soft plasti	c, moist.	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	М									
			-4				MIL			00 6						
			E				GP			99.0				- 		
H			- 5	(4.5'-4.7') COBB	LE: COBBLE layer	r,	$\int \frac{\mathbf{u}}{\mathbf{u}}$	1								
CS	60		-	(4 7'-7 5') SAND	I ight Brown SANI) fine	<u>_</u>									
			Ē	to medium grained	l. poorly graded. son	ne Silt	t.									
			E	moist, dense.	,1 ,0 ,		Ś SP			100.0						
			F													
			F7													
			E	(7.5'-12') SAND:	Dark grav SAND, fi	ne to										
	ĺ		-8	coarse grained, we	ll graded, dense, mo	oist,				497.3						
			-	petroleum odor at	7.5.											
- 11			-9													
	Ì		E													
			- 10				SW		Ţ							
CS	60									340.8						
	3		E													
			-12													
I hereby	y certify	y that t	he info	rmation on this form is t	rue and correct to the be	st of my	y knowled	lge.								

		5
Signature	Firm EnviroForensic	s Tel:
		Fax:

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

Borir	ig Numb	ber	MW	Use only as an attachment to Form 4400-	122.						Pa	ge 2	of	2
Sai	nple									Soil	Prop	erties	-	ļ
Number nd Type	ength Att. & kecovered (in)	slow Counts	Jepth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	JSCS	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
S S S S S S S S S S S S S S S S S S S	Definition of the second secon	Blow Co	ч 	Each Major Unit (12'-18') SAND:Light Brown SAND, fine to medium grained, poorly graded, some Silt, dense, saturated. (18'-20') SILTY CLAY:Brown CLAY with SILT, stiff, slightly moist, slightly plastic.	SP CL	Graphic	Well Diagram	ПЕ Па 128.0 114.6 17.1 3.6	Compres	Moisture Content	Liquid	Plasticity Index	P 200	RQD
												Ì		



APPENDIX B

Laboratory Report

Document: 6165-1024



Mr. Oran Day Enviroforensics 602 N. Capitol Ave. Suite 210 Indianapolis, IN 46204

April 8, 2016

EnvisionAir Project Number: 2016-264 Client Project Name: 6165 – Martino's 41st Ave

Dear Mr. Day,

Please find the attached analytical report for the samples received March 28, 2016. All test methods performed were fully compliant with local, state, and federal EPA methods unless otherwise noted. The project was analyzed as requested on the enclosed chain of custody record. Please review the comments section for additional information about your results or Quality Control data.

Feel free to contact me if you have any questions or comments regarding your analytical report or service.

Thank you for your business. EnvisionAir looks forward to working with you on your next project.

Yours Sincerely,

tanty a. Hunnicutt

Stan Hunnicutt

Project Manager EnvisionAir, LLC



Canister Pressure / Vacuum

Client Name: ENVIROFORENSICS

Project ID: 6165 / MARTINO'S 41ST AVE
Client Project Manager: ORAN DAY

EnvisionAir Project Number: 2016-264

Sample Summary

START START Lab Date Time End Date End Time Date Time Initial Field Final Field Received Laboratory Sample Number: Sample Description: Matrix: Collected: Collected: Collected: Received: Received <u>(in. Hg)</u> (in. Hg) (in. Hg) 16-966 6165-EF-1 А 3/22/16 12:05 3/22/16 12:06 3/28/16 11:50 -27.5 -5 -5 16-967 6165-EF-2 А 3/22/16 15:57 3/22/16 15:58 3/28/16 11:50 -27 -5 -5 16-968 6165-EF-3 А 3/23/16 8:27 3/23/16 8:28 3/28/16 11:50 -27 -5 -5

Page 2 of 15



Client Name:	ENVIROFORENSICS			
Project ID:	6165 / MARTINO'S 41	ST AVE		
Client Project Manager:	ORAN DAY			
EnvisionAir Project Number:	2016-264			
Analytical Method: Analytical Batch:	TO-15 040216AIR			
Client Sample ID:	6165-EF-1	Sample Collection START Date/Time:	3/22/16	12:05
Envision Sample Number: Sample Matrix:	16-966 AIR	Sample Collection END Date/Time: Sample Received Date/Time:	3/22/16 3/28/16	12:06 11:50
Compounds	Sample Results ug/m ³	Reporting Limit ug/m ³	Flag	
4-Ethyltoluene	< 4920	4920	2	
4-Methyl-2-pentanone (MIBK)	< 20500	20500	2	
1 1 1-Trichloroethane	< 5460	5460	2	
1 1 2 2-Tetrachloroethane	< 3.36	3 36	12	
1 1 2-Trichloroethane	< 2.10	2 10	1.2	
1 1-Dichloroethane	< 10.5	40.5	2	
1 1-Dichloroethene	< 1980	1980	2	
1,1-Dichlorobonzono	< 7.42	7 42	2	
1,2,4-Themotoberizene	< 10.2	1.42	2	
1,2,4-minethyldenzene	< 45.2	49.2	10	
1,2-dibioindetriane (EDB)	< 0.32	601	1,2	
1,2-Dichloropenzene	< 001	60 T	2	
	< 4.05	4.05	2	
1,2-Dichloropropane	< 4.62	4.62	2	
1,3,5-1 rimetnyibenzene	< 49.2	49.2	2	
1,3-Butadiene	< 2.21	2.21	2	
1,3-Dichlorobenzene	< 601	601	2	
1,4-Dichlorobenzene	< 6.01	6.01	2	
	< 18.0	18.0	2	
2-Butanone (MEK)	< 29500	29500	2	
2-Hexanone	< 205	205	2	
Acetone	< 23800	23800	2	
Benzene	< 16.0	16.0	2	
Benzyl Chloride	< 4.14	4.14	1,2	
Bromodichloromethane	< 5.36	5.36	1,2	
Bromoform	< 103	103	2	
Bromomethane	< 38.8	38.8	2	
Carbon Disulfide	< 3110	3110	2	
Carbon Tetrachloride	< 6.29	6.29	2	
Chlorobenzene	< 230	230	2	
Chloroethane	< 132	132	2	

.



Compounds	Sample Results ug/m ³	Reporting Limit ug/m ³	Flag
Chloroform	< 8.30	8.30	2
Chloromethane	< 206	206	2
cis-1,2-Dichloroethene	< 198	198	2
cis-1,3-Dichloropropene	< 45.4	45.4	2
Cyclohexane	< 55100	55100	2
Dibromochloromethane	< 8.52	8.52	2
Dichlorodifluoromethane	< 495	495	2
Ethyl Acetate	< 18000	18000	2
Ethylbenzene	< 86.8	86.8	2
Hexachloro-1,3-butadiene	< 10.7	10.7	2
Isooctane	< 4670	4670	2
m,p-Xylene	< 434	434	2
Methylene Chloride	< 417	417	2
Methyl-tert-butyl ether	< 361	361	2
N-Heptane	< 4100	4100	2
N-Hexane	< 1760	1760	2
o-Xylene	< 434	434	2
Propylene	< 1720	1720	2
Styrene	< 4260	4260	2
Tetrachloroethene	63.1	31.9	2
Tetrahydrofuran	< 2950	2950	2
Toluene	< 37700	37700	2
trans-1,2-Dichloroethene	< 396	396	2
trans-1,3-Dichloropropene	< 45.4	45.4	2
Trichlorethene	< 10.7	10.7	2
Trichlorofluoromethane	< 5620	5620	2
Vinyl Acetate	< 1760	1760	2
Vinyl Bromide	< 4.37	4.37	2
Vinyl Chloride	< 12.8	12.8	2
4-bromofluorobenzene (surroga	ite) 111%		
Analysis Date/Time:	4-2-16/19:09		
Analyst Initials	tjg		



ENVIROPORENSICS			
6165 / MARTINO'S 41	ST AVE		
ORAN DAY			
2016-264			
TO-15 040216AIR			
6165-EF-2	Sample Collection START Date/Time:	3/22/16	15:57
16-967 AIR	Sample Collection END Date/Time: Sample Received Date/Time:	3/22/16 3/28/16	15:58 11:50
Sample Results ug/m³	Reporting Limit ug/m ³	Flag	
< 4920	4920	2	
< 20500	20500	2	
< 5460	5460	2	
< 3.36	3.36	1,2	
< 2.10	2.10	1,2	
< 40.5	40.5	2	
< 1980	1980	2	
< 7.42	7.42	2	
267	49.2	2	
< 0.32	0.32	1,2	
< 601	601	2	
< 4.05	4.05	2	
< 4.62	4.62	2	
139	49.2	2	
< 2.21	2.21	2	
< 601	601	2	
< 6.01	6.01	2	
< 18.0	18.0	2	
< 29500	29500	2	
< 205	205	2	
< 23800	23800	2	
< 16.0	16.0	2	
< 4.14	4.14	1,2	
< 5.36	5.36	1,2	
< 103	103	2	
< 38.8	38.8	2	
< 3110	3110	2	
< 6.29	6.29	2	
< 230	230	2	
	6165 / MARTINO'S 413 ORAN DAY 2016-264 TO-15 040216AIR 6165-EF-2 16-967 AIR Sample Results ug/m ³ < 4920 < 20500 < 5460 < 3.36 < 2.10 < 40.5 < 1980 < 7.42 267 < 0.32 < 601 < 4.05 < 4.62 139 < 2.21 < 601 < 4.62 139 < 2.21 < 601 < 4.05 < 4.62 139 < 2.21 < 601 < 3.88 < 3110 < 6 29	6165 / MARTINO'S 41ST AVE ORAN DAY 2016-264 TO-15 040216AIR 6165-EF-2 Sample Collection START Date/Time: Sample Collection END Date/Time: Sample Results ug/m ³ 16-967 AIR Reporting Limit ug/m ³ \$4920 4920 \$20500 20500 \$20500 200500 \$40.5 44920 \$40.5 40.5 \$1980 1980 \$7.42 7.42 267 49.2 \$0.32 0.32 \$601 601 \$4.05 4.05 \$4.02 49.2 \$2.21 2.21 \$2.21 2.21 \$4.02 49.2 \$2.21 2.21 \$4.02 49.2 \$2.21 2.21 \$2.21 2.21 \$601 601 \$610 601 \$2.25 205 \$2.25 205 \$2.26 205 \$2.21 2.21 \$2.21 2.21 \$2.21 2.21	6165 / MARTINO'S 41ST AVE ORAN DAY 2016-264 TO-15 040216AIR 6165-EF-2 Sample Collection START Date/Time: 3/22/16 Sample Collection END Date/Time: 3/28/16 16-967 AIR Sample Received Date/Time: 3/28/16 Sample Results ug/m³ Reporting Limit ug/m³ Flag < 4920

ENVISIONAIR

<u>Compounds</u>	Sample Results ug/m ³	Reporting Limit ug/m ³	Flag
Chloroform	< 8.30	8.30	2
Chloromethane	< 206	206	2
cis-1,2-Dichloroethene	< 198	198	2
cis-1,3-Dichloropropene	< 45.4	45.4	2
Cyclohexane	< 55100	55100	2
Dibromochloromethane	< 8.52	8.52	2
Dichlorodifluoromethane	< 495	495	2
Ethyl Acetate	< 18000	18000	2
Ethylbenzene	< 86.8	86.8	2
Hexachloro-1,3-butadiene	< 10.7	10.7	2
Isooctane	< 4670	4670	2
m,p-Xylene	< 434	434	2
Methylene Chloride	< 417	417	2
Methyl-tert-butyl ether	< 361	361	2
N-Heptane	< 4100	4100	2
N-Hexane	< 1760	1760	2
o-Xylene	< 434	434	2
Propylene	< 1720	1720	2
Styrene	< 4260	4260	2
Tetrachloroethene	480	31.9	2
Tetrahydrofuran	< 2950	2950	2
Toluene	< 37700	37700	2
trans-1,2-Dichloroethene	< 396	396	2
trans-1,3-Dichloropropene	< 45.4	45.4	2
Trichlorethene	14.0	10.7	2
Trichlorofluoromethane	< 5620	5620	2
Vinyl Acetate	< 1760	1760	2
Vinyl Bromide	< 4.37	4.37	2
Vinyl Chloride	531	51.1	3
4-bromofluorobenzene (surroga	ate) 105%		
Analysis Date/Time:	4-2-16/19:47		
Analyst Initials	tjg	· .	



Client Name:	ENVIROFORENSICS			
Project ID:	6165 / MARTINO'S 41	ST AVE		
Client Project Manager:	ORAN DAY			
EnvisionAir Project Number:	2016-264			
Analytical Method: Analytical Batch:	TO-15 040416CAIR			
Client Sample ID:	6165-EF-3	Sample Collection START Date/Time:	3/23/16	8:27
Envision Sample Number: Sample Matrix:	16-968 AIR	Sample Collection END Date/Time: Sample Received Date/Time:	3/23/16 3/28/16	8:28 11:50
<u>Compounds</u>	Sample Results ug/m ³	Reporting Limit ug/m ³	<u>Flag</u>	
4-Ethyltoluene	< 4920	4920	2	
4-Methyl-2-pentanone (MIBK)	< 20500	20500	2	
1,1,1-Trichloroethane	< 5460	5460	2	
1,1,2,2-Tetrachloroethane	< 3.36	3.36	1,2	
1,1,2-Trichloroethane	< 2.10	2.10	1,2	
1,1-Dichloroethane	< 40.5	40.5	2	
1,1-Dichloroethene	< 1980	1980	2	
1,2,4-Trichlorobenzene	< 7.42	7.42	2	
1,2,4-Trimethylbenzene	< 49.2	49.2	2	
1,2-dibromoethane (EDB)	< 0.32	0.32	1,2	
1,2-Dichlorobenzene	< 601	601	2	
1,2-Dichloroethane	< 4.05	4.05	2	
1,2-Dichloropropane	< 4.62	4.62	2	
1,3,5-Trimethylbenzene	< 49.2	49.2	2	
1,3-Butadiene	< 2.21	2.21	2	
1,3-Dichlorobenzene	< 601	601	2	
1,4-Dichlorobenzene	< 6.01	6.01	2	
1,4-Dioxane	< 18.0	18.0	2	
2-Butanone (MEK)	< 29500	29500	2	
2-Hexanone	< 205	205	2	
Acetone	< 23800	23800	2	
Benzene	< 16.0	16.0	2	
Benzyl Chloride	< 4.14	4.14	1,2	
Bromodichloromethane	< 5.36	5.36	1,2	
Bromoform	< 103	103	2	
Bromomethane	< 38.8	38.8	2	
Carbon Disulfide	< 3110	3110	2	
Carbon Tetrachloride	< 6.29	6.29	2	
Chlorobenzene	< 230	230	2	
Chloroethane	< 132	132	2	



<u>Compounds</u>	Sample Results ug/m ³	Reporting Limit ug/m ³	<u>Flag</u>
Chloroform	< 8.30	8.30	2
Chloromethane	< 206	206	2
cis-1,2-Dichloroethene	< 198	198	2
cis-1,3-Dichloropropene	< 45.4	45.4	2
Cyclohexane	< 55100	55100	2
Dibromochloromethane	< 8.52	8.52	2
Dichlorodifluoromethane	< 495	495	2
Ethyl Acetate	< 18000	18000	2
Ethylbenzene	< 86.8	86.8	2
Hexachloro-1,3-butadiene	< 10.7	10.7	2
Isooctane	9,490	187000	4,5
m,p-Xylene	< 434	434	2
Methylene Chloride	< 417	417	2
Methyl-tert-butyl ether	< 361	361	2
N-Heptane	< 4100	4100	2
N-Hexane	< 1760	1760	2
o-Xylene	< 434	434	2
Propylene	< 1720	1720	2
Styrene	< 4260	4260	2
Tetrachloroethene	323	31.9	2
Tetrahydrofuran	< 2950	2950	2
Toluene	< 37700	37700	2
trans-1,2-Dichloroethene	< 396	396	2
trans-1,3-Dichloropropene	< 45.4	45.4	2
Trichlorethene	74.2	10.7	2
Trichlorofluoromethane	< 5620	5620	2
Vinyl Acetate	< 1760	1760	2
Vinyl Bromide	< 4.37	4.37	2
Vinyl Chloride	78.0	12.8	2
4-bromofluorobenzene (surroga	ate) 97%		
Analysis Date/Time:	4-5-16/13:49		
Analyst Initials	tjg		



Analytical Report

TO-15 Quality Control Data

EnvisionAir Batch Number:	040216AIR		
Method Blank (MB):	MB Results (ppbv)	Reporting Limit (ppbv)	<u>Flags</u>
4-Ethyltoluene	< 100	100	
4-Methyl-2-pentanone (MIBK)	< 500	500	
1,1,1-Trichloroethane	< 100	100	
1,1,2,2-Tetrachloroethane	< 0.049	0.049	1
1,1,2-I richloroethane	< 0.038	0.038	1
1,1-Dichloroethane	< 1	1	
1,1-Dichloroethene	< 50	50	
1,2,4-Tricniorobenzene	< 0.1	0.1	
1,2,4-1 hmeinyibenzene	< 1	1	4
1,2-dibromoetnane (EDB)	< 0.0041	0.0041	1
1,2-Dichloropenzene	< 10	10	
1,2-Dichloropropago	< 0.1	0.1	
1,2-Dichloroproparie	< 0.1	0.1	
1,3,5-Thillethyldenzene	< 1	1	
1,3-Dulaulerie	< 10	0.1	
1,3-Dichlorobenzene	< 0.1	0.1	
1,4-Dichiolobenzene	< 0.1	0.1	
2 Butanone (MEK)	< 1000	1000	
2-Hexanone	< 5	5	
Acetone	< 1000	1000	
Benzene	< 0.5	0.5	
Benzyl Chloride	< 0.08	0.08	1
Bromodichloromethane	< 0.08	0.08	1
Bromoform	< 1	1	
Bromomethane	< 1	1	
Carbon Disulfide	< 100	100	
Carbon Tetrachloride	< 0.1	0.1	
Chlorobenzene	< 5	5	
Chloroethane	< 5	5	
Chloroform	< 0.17	0.17	
Chloromethane	< 10	10	
cis-1,2-Dichloroethene	< 5	5	
cis-1,3-Dichloropropene	< 1	1	
Cyclohexane	< 1600	1600	
Dibromochloromethane	< 0.1	0.1	
Dichlorodifluoromethane	< 10	10	
Ethyl Acetate	< 500	500	
Ethylbenzene	< 2	2	
Hexachloro-1,3-butadiene	< 0.1	0.1	
Isooctane	< 100	100	
m,p-Xylene	< 10	10	
Methylene Chloride	< 12	12	
Methyl-tert-butyl ether	< 10	10	
N-Heptane	< 100	100	
N-Hexane	< 50	50	
o-Xylene	< 10	10	
Propylene	< 100	100	
Styrene	< 100	100	
Tetrachloroethene	< 0.47	0.47	
Tetrahydrofuran	< 100	100	



Analytical Report

Method Blank (MB):	MB Results (ppbv)	Reporting Limit (ppbv)	Flags	
Toluene	< 1000	1000		
trans-1,2-Dichloroethene	< 10	10		
trans-1,3-Dichloropropene	< 1	1		
Trichlorethene	< 0.2	0.2		
Trichlorofluoromethane	< 100	100		
Vinyl Acetate	< 50	50		
Vinyl Bromide	< 0.1	0.1		
Vinyl Chloride	< 0.5	0.5		
4-bromofluorobenzene (surrogate)	92%			
Analysis Date/Time:	4-2-16/12:50			
Analyst Initials	tjg			

			LCS/D	LCS	LCSD		
LCS/LCSD	LCS Results (ppbv)	LCSD Results (ppbv)	Conc(ppbv)	Rec.	Rec.	RPD	Flag
Propylene	9.13	9.71	10	91%	97%	6.2%	
Dichlorodifluoromethane	9.88	8.44	10	99%	84%	15.7%	
Chloromethane	9.42	11.1	10	94%	111%	16.4%	
Vinyl Chloride	10.5	9.41	10	105%	94%	10.9%	
1,3-Butadiene	9.67	10.1	10	97%	101%	4.4%	
Bromomethane	11.5	9.52	10	115%	95%	18.8%	
Chloroethane	11.1	10.2	10	111%	102%	8.5%	
Vinyl Bromide	10.4	9.85	10	104%	99%	5.4%	
Trichlorofluoromethane	10.6	8.89	10	106%	89%	17.5%	
Acetone	10.2	8.8	10	102%	88%	14.7%	
1,1-Dichloroethene	10.4	8.55	10	104%	86%	19.5%	
Methylene Chloride	9.71	7.9	10	97%	79%	20.6%	6
Carbon Disulfide	9.97	8.34	10	100%	83%	17.8%	
trans-1,2-Dichloroethene	11.3	9.24	10	113%	92%	20.1%	6
Methyl-tert-butyl ether	10.5	9.95	10	105%	100%	5.4%	
1,1-Dichloroethane	9.72	8	10	97%	80%	19.4%	
Vinyl Acetate	9.17	7.47	10	92%	75%	20.4%	6
N-Hexane	8.53	7.04	10	85%	70%	19.1%	
2-Butanone (MEK)	9.48	7.78	10	95%	78%	19.7%	
cis-1,2-Dichloroethene	10	8.19	10	100%	82%	19.9%	
Ethyl Acetate	8.77	8.7	10	88%	87%	0.8%	
Chloroform	10.3	8.48	10	103%	85%	19.4%	
Tetrahydrofuran	9.72	9.24	10	97%	92%	5.1%	
1,2-Dichloroethane	10.2	11.4	10	102%	114%	11.1%	
1,1,1-Trichloroethane	11.9	11.2	10	119%	112%	6.1%	
Carbon Tetrachloride	11.8	11.3	10	118%	113%	4.3%	
Benzene	9.84	9.41	10	98%	94%	4.5%	
Cyclohexane	9.03	8.69	10	90%	87%	3.8%	
1,2-Dichloropropane	9.48	9.06	10	95%	91%	4.5%	
Trichlorethene	10.8	10.3	10	108%	103%	4.7%	
Bromodichloromethane	11.4	10.9	10	114%	109%	4.5%	
1,4-Dioxane	11.8	11.1	10	118%	111%	6.1%	
Isooctane	10	9.5	10	100%	95%	5.1%	
N-Heptane	8.87	8.4	10	89%	84%	5.4%	
cis-1,3-Dichloropropene	10.8	10.2	10	108%	102%	5.7%	
4-Methyl-2-pentanone (MIBK)	9.27	8.81	10	93%	88%	5.1%	
trans-1,3-Dichloropropene	11.8	11	10	118%	110%	7.0%	
1,1,2-Trichloroethane	10.3	9.84	10	103%	98%	4.6%	
Toluene	9.88	9.49	10	99%	95%	4.0%	
2-Hexanone	9.67	9.36	10	97%	94%	3.3%	
Dibromochloromethane	11.9	10.7	10	119%	107%	10.6%	
1,2-dibromoethane (EDB)	11	9.9	10	110%	99%	10.5%	
Tetrachloroethene	11.5	10.5	10	115%	105%	9.1%	
Chlorobenzene	10.1	9.2	10	101%	92%	9.3%	
Ethylbenzene	9.68	8.88	10	97%	89%	8.6%	
m,p-Xylene	19.1	17.7	20	96%	89%	7.6%	
Bromoform	10.5	10.9	10	105%	109%	3.7%	



Analytical Report

LCS/LCSD	LCS Results (ppbv)	LCSD Results (ppbv)	LCS/D Conc(ppbv)	LCS Rec.	LCSD Rec.	RPD	Flag
Styrene	10.8	9.72	10	108%	97%	10.5%	
1,1,2,2-Tetrachloroethane	8.5	10.4	10	85%	104%	20.1%	6
o-Xylene	10.6	9.56	10	106%	96%	10.3%	
4-Ethyltoluene	9.76	8.99	10	98%	90%	8.2%	
1,3,5-Trimethylbenzene	9.12	8.39	10	91%	84%	8.3%	
1,2,4-Trimethylbenzene	9.82	8.93	10	98%	89%	9.5%	
1,3-Dichlorobenzene	10.7	9.52	10	107%	95%	11.7%	
Benzyl Chloride	10.1	11.2	10	101%	112%	10.3%	
1,4-Dichlorobenzene	11.6	10.5	10	116%	105%	10.0%	
1,2-Dichlorobenzene	10.6	9.63	10	106%	96%	9.6%	
1,2,4-Trichlorobenzene	11.2	10.2	10	112%	102%	9.3%	
Hexachloro-1,3-butadiene	8.51	8.3	10	85%	83%	2.5%	
4-bromofluorobenzene (surrogate)	93%	104%					
Analysis Date/Time:	4-2-16/13:56	4-2-16/14:38					
Analyst Initials	tjg	tjg					

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Analytical Report

TO-15 Quality Control Data

EnvisionAir Batch Number:	040416CAIR		
Method Blank (MB):	MB Results (ppbv)	Reporting Limit (ppbv)	Flags
4-Ethyltoluene	< 100	100	
4-Methyl-2-pentanone (MIBK)	< 500	500	
1,1,1-Trichloroethane	< 100	100	
1,1,2,2-Tetrachloroethane	< 0.049	0.049	1
1,1,2-Trichloroethane	< 0.038	0.038	1
1,1-Dichloroethane	< 1	1	
1,1-Dichloroethene	< 50	50	
1,2,4-Trichlorobenzene	< 0.1	0.1	
1,2,4-Trimethylbenzene	< 1	1	
1,2-dibromoethane (EDB)	< 0.0041	0.0041	1
1,2-Dichlorobenzene	< 10	10	
1,2-Dichloroethane	< 0.1	0.1	
1,2-Dichloropropane	< 0.1	0.1	
1,3,5-Trimethylbenzene	< 1	1	
1.3-Butadiene	< 0.1	0.1	
1.3-Dichlorobenzene	< 10	10	
1.4-Dichlorobenzene	< 0.1	0.1	
1.4-Dioxane	< 0.5	0.5	
2-Butanone (MEK)	< 1000	1000	
2-Hexanone	< 5	5	
Acetone	< 1000	1000	
Benzene	< 0.5	0.5	
Benzyl Chloride	< 0.08	0.08	1
Bromodichloromethane	< 0.08	0.08	1
Bromoform	< 1	1	•
Bromomethane	< 1	1	
Carbon Disulfide	< 100	100	
Carbon Tetrachloride	< 0.1	0.1	
Chlorobenzene	< 5	5	
Chloroethane	< 5	5	
Chloroform	< 0.17	0 17	
Chloromethane	< 10	10	
cis_1 2-Dichloroethene	< 10	5	
cis-1.3-Dichloropropene	< 1	1	
Cyclobeyape	< 1600	1600	
Dibromochloromethane	< 0.1	0.1	
Dichlorodifluoromethane	< 10	10	
Ethyl Acetate	< 500	500	
Ethylhonzono	< 300	300	
Heyachloro 1.3 butadiono	< 0.1	2	
legastano	< 100	0.1	
m n Xulana	< 100	100	
Mathylana Chlorida	< 10	10	
Methylene Chlonde	< 12	12	
N Hontono	< 100	10	
	< TOU	100	
	< DU	50	
D-Aylene	< 10 < 100	10	
Shirana	< 100	100	
Styrene	< 100	100	
Tetrachioroethene	< 0.4/	0.47	
retranydrofuran	< 100	100	



Analytical Report

Method Blank (MB): Toluene	<u>MB Results (ppbv)</u> < 1000	Reporting Limit (ppbv) 1000	<u>Flags</u>
trans-1,2-Dichloropropene	< 10	1	
Trichlorethene	< 0.2	0.2	
Trichlorofluoromethane	< 100	100	
Vinyl Acetate	< 50	50	
Vinyl Bromide	< 0.1	0.1	
Vinyl Chloride	< 0.5	0.5	
4-bromofluorobenzene (surrogate)	103%		
Analysis Date/Time:	4-4-16/21:50		
Analyst Initials	tjg		

LCS/LCSD LCS Results (ppby) LCSD Results (ppby) Control Net Ret				LCS/D	LCS	LCSD		
Propylene 10.5 6.5 10 105% 90% 15.9% Dichlorodfluoromethane 8.98 10.1 10 90% 101% 11.7% Chloromethane 9.73 8.93 10 97% 89% 8.6% Ving Chioromethane 9.73 8.08 8.67 10.97% 89% 7.4% Ja-Butadiene 9.73 10.8 10 97% 92% 8.4% Choromethane 10.1 9.96 10 101% 10.9% 1.4% Choromethane 11.1 11.5 10 93% 11.5% 11.4% 18.7% Acctone 6.34 10.5 10 93% 10.5% 11.7% 1.1:Dichicroethene 8.82 10.7 10.8% 10.5% 48.5% 6.4% 10.5% 10.5% 0.5% Methylene Chioride 8.82 10.7 10.8% 6.5% 6.5% 11.5% 10.5% 0.5% Methylene Chioride 8.56 10 91% 8.5% 6.	LCS/LCSD	LCS Results (ppbv)	LCSD Results (ppbv)	Conc(ppbv)	Rec.	Rec.	RPD	Flag
DickinocrifiLinormethane 9.88 10.1 9.97% 99% 8.86% Viny Chloride 9.73 8.93 10 97% 8.9% 8.4% 1.3-Butatiene 9.54 9.23 8.57 10 92% 8.9% 7.4% 1.3-Butatiene 9.73 10.8 10 97% 10.9% 10.4% Drommethane 9.73 10.8 10 97% 10.9% 11.4% Chloronethane 1.1 11.5 10 11.1% 13.5% 3.5% Acetone 9.34 10.5 10 83% 11.4% 10.9% 11.4% 24.9% 6 Methylene Chloride 8.82 11.4 10 88% 11.4% 24.9% 6 Carbon Disulifize 8.84 9.62 10 10 100% 10.9% 0.3% 1.1-Dichorethane 9.95 6.89 10 9.9% 0.3% 4.5% Liphichorethane 9.65 6.89 10	Propylene	10.5	8.95	10	105%	90%	15.9%	
Chloromethane 9.73 8.93 10 97% 89% 8.6% Viny Chloride 9.23 8.67 10 95% 92% 8.4% 1.3-Butadiene 9.73 10.68 10 97% 108% 104% Chloromethane 1.01 9.06 10 101% 100% 1.4% Chloromethane 1.11 11.5 10 93% 11.4% 15.7% Trichhorofluoromethane 9.34 10.5 10 93% 10.5% 11.7% 1.1-Dichhoromethane 8.82 10.7 0 88% 8.7% 4.3% Carbon Disulfide 8.82 10.7 0 88% 9.6% 6.3% trans-1.2-Dichloroethane 9.95 10 10 10.9% 9.5% 0.3% 1.1-Dichloroethane 9.13 8.56 10 101% 8.6% 6.4% Li-Dichloroethane 9.13 8.56 10 108% 8.4% 6.4% Li-Dichloroethane 9.13 8.56 10 108% 8.4% 6.4% <tr< td=""><td>Dichlorodifluoromethane</td><td>8.98</td><td>10.1</td><td>10</td><td>90%</td><td>101%</td><td>11.7%</td><td></td></tr<>	Dichlorodifluoromethane	8.98	10.1	10	90%	101%	11.7%	
Vinyl Chloride 9.23 8.57 10 92% 86% 7.4% J.Stutaliene 9.54 9.22 10 95% 92% 3.4% Bromomshnane 10.1 9.96 92% 1.4% 1.4% Ohloroethane 10.1 9.65 11.4 10 95% 1.4% Vinyl Bromide 9.45 11.4 10 85% 11.4% 18.7% Acetone 8.34 10.5 10 11% 1.4% </td <td>Chloromethane</td> <td>9.73</td> <td>8.93</td> <td>10</td> <td>97%</td> <td>89%</td> <td>8.6%</td> <td></td>	Chloromethane	9.73	8.93	10	97%	89%	8.6%	
1.3-Eudaiene 9.54 9.22 10 95% 92% 3.4% Dinomonethane 10.1 9.96 10 10% 10.4% Chloroethane 9.45 11.4 10 95% 11.4% 18.7% Tichlorofluoromethane 9.34 10.5 10 111% 11.5% 3.5% Acetone 9.34 10.5 10 85% 11.4% 24.9% 6 Methylene Chloride 8.82 10.7 10 88% 107% 19.3% Carbon Disulfide 8.82 10 10 100% 10% 5% Methylene Chloride 8.82 10 10 100% 6% 6.4% Vinyl Acetate 9.95 10 10 100% 6% 6.4% Vinyl Acetate 9.13 8.56 10 9% 9.4% 6.4% Vinyl Acetate 8.92 8.81 10 95% 4.6% 2.8 Chloroform 9.87 11 10 9% 8.4% 12.2% Chloroform 9.83	Vinyl Chloride	9.23	8.57	10	92%	86%	7.4%	
Bromomethane 9.73 10.8 10 97% 10.4% Chloroethane 10.1 9.65 11.4 10 95% 11.4% Mryl Bromide 9.45 11.1 11.5 10 111% 15% 3.5% Acetone 9.34 10.5 10 93% 10% 1.1.7% 1,1-Dichloroethene 8.88 11.4 10 89% 14% 2.4.9% 6 Methylene Chloride 8.82 10.7 10 88% 96% 8.5% Carbon Disulfide 8.84 9.62 10 80% 96% 0.3% trans-1.2-Dichloroethane 9.92 9.89 10 99% 0.3% Methyl-ter-buly ether 9.62 8.86 10 89% 6.4% Vinyl Acetate 0.62 8.91 0 90% 0.3% Carbon Tetrachydrofuran 0.2 9.4 10 10% 8.6% Lobioform 9.87 11.1 10	1,3-Butadiene	9.54	9.22	10	95%	92%	3.4%	
Chloroethane 10.1 9.86 10 101% 100% 1.4% Vinyl Bromide 9.45 11.4 10 95% 114% 18.7% Trichiorofluoromethane 9.34 10.5 10 111% 1.1% 2.4% 6 Acetone 9.34 10.5 10 83% 105% 11.7% 2.4% 6 Methylene Chloride 8.82 10.7 10 88% 107% 19.3% Carbon Disulfide 8.82 10.7 10 88% 10% 10.5% Carbon Disulfide 8.82 10 10 10% 9.7% 10 I.1-Dichloroethane 9.13 8.56 10 10% 89% 1.6% Vinyl Acetate 9.12 8.91 10 10% 89% 1.6% 2-Butanne (MEK) 9.77 8.37 10 89% 16.4% 1.2% Chloroform 9.87 11 10 99% 10.1% 1.6% <	Bromomethane	9.73	10.8	10	97%	108%	10.4%	
Vinyl Bromide 9,45 11.4 10 95% 11.4% 16.7% Trichlorofluoromethane 11.1 11.5 10 93% 105% 11.7% 1.1-Dichloroethene 8.88 11.4 10 89% 11.7% 2.5% Carbon Disulfide 8.82 10.7 10 88% 9.62 10 88% 9.5% Carbon Disulfide 8.84 9.62 10 80% 9.5% 0.5% Methyl-ter-bulyl ether 9.92 9.88 10 91% 89% 6.4% Vinyl Acetate 10.6 8.11 10 106% 89% 1.7.% N-Hexane 8.46 8.66 10 90% 89% 1.6% Cabloroethene 8.95 8.69 10 90% 87% 2.5% Chloroethane 9.63 11.1 10 99% 8.5% 1.5% Chloroform 9.37 11 10 90% 8.5% 1.5%	Chloroethane	10.1	9.96	10	101%	100%	1.4%	
Trichloroflurormethane 11.1 11.5 0 111% 115% 3.5% Acetone 9,34 10.5 10 93% 105% 10.5% 10.5% 10.5% 10.5% 114% 24.9% 6 Methylene Chloride 8.82 10.7 10 88% 95% 8.5% Carbon Disulfide 8.82 10 0 100% 90% 9.5% Methylene Chloride 9.95 10 0 100% 90% 0.3% Methyl-ent-butyl ether 9.92 8.88 10 91% 86% 6.4% Vinyl Acetate 10.6 8.91 10 105% 89% 1.6% 2-Butanone (MEK) 9.77 8.37 10 98% 84% 1.54% Chloroferm 9.67 11 10 89% 1.6% 1.54% Chloroform 9.67 11 10 99% 1.6% 1.2% Larshylorotane 9.83 11.15 10	Vinyl Bromide	9.45	11.4	10	95%	114%	18.7%	
Acetone 9.34 10.5 10 93% 105% 11.7% 1.1-Dichloroethene 8.88 11.4 10 89% 11.4% 24.9% 6 Carbon Disulfide 8.82 10.7 10 88% 107% 19.3% Carbon Disulfide 8.84 9.62 10 100% 100% 0.5% Methyl-tert-butyl ether 9.92 9.89 10 91% 8.6% 6.4% 1,1-Dichloroethane 9.13 8.56 10 91% 8.6% 6.4% Vinyl Acetate 10.6 8.91 1076% 89% 1.6% 2.9% S-Butanone (MEK) 9.77 8.37 10 90% 87% 2.9% Chloroform 9.67 11 10 89% 1.2% 1.2% Chloroform 9.67 11 10 99% 103% 18% 1.2% L-Dichloroethane 9.85 11.4 10 10.9% 11.4% 10.8% 16.5% 1,1-Dichoroethane 9.85 11.4 10 99% 1.2% </td <td>Trichlorofluoromethane</td> <td>11.1</td> <td>11.5</td> <td>10</td> <td>111%</td> <td>115%</td> <td>3.5%</td> <td></td>	Trichlorofluoromethane	11.1	11.5	10	111%	115%	3.5%	
1,1-Dichloroethene 8,88 11.4 10 89% 114% 24.9% 6 Methylene Chloride 8,82 10.7 10 88% 107% 19.3% Carbon Disulide 8,84 9,62 10 100% 100% 0.5% Methyl-ter-budy ether 9,95 10 10 100% 89% 0.3% 1,1-Dichloroethane 9,13 8,56 10 91% 88% 6.4% Vinyl Acetate 10,6 8,91 10 96% 89% 4.6% 2-Butanone (MEK) 9,77 8,37 10 98% 88% 1.2% Chloroform 9,87 11 10 99% 110 1.8% 2.9% Chloroform 9,87 11 10 99% 110% 1.8% 2.9% Lip-Dichoroethane 9,83 11.4 10 99% 110% 1.8% 2.9% Lip-Dichoroethane 9,83 11.4 10 99% 14.3% 4.8% Cyclohexane 8,99 10.3 10 10.1%	Acetone	9.34	10.5	10	93%	105%	11.7%	
Methylene Chloride 8.82 10.7 10 88% 107% 10.3% Carbon Disulfide 8.84 9.62 10 88% 96% 8.5% Itrans-1,2-Dichloroethene 9.95 10 10% 10% 0.5% Methyl-ter-butyl ether 9.92 9.89 10 99% 0.3% 1,1-Dichloroethane 9.13 8.56 10 99% 6.4% Vinyl Acetate 10.6 8.91 10 106% 89% 17.3% N-Hexane 8.46 8.86 10 85% 8.6% 12.4% 2-Butanone (MEK) 9.77 8.37 10 99% 12.4% Chloroform 9.87 11 10 99% 12.4% Chloroform 9.87 11 10 99% 15.7% 1,1-Dichloroethane 9.83 11.5 10 91% 15.7% 1,1-Dichloroethane 9.85 11.4 10 99% 14% 15.7% 1,2-Dichloroethane 9.83 11.5 10 91% 15.7% 1,2-Dichloroethane 9.85 11.4 10 99% 4.8% Carbon Tetrachlorde 9.85 11.4 10	1,1-Dichloroethene	8.88	11.4	10	89%	114%	24.9%	6
Carbon Disulfide 8.84 9.62 10 88 96% 8.5% trans-1,2-Dichloroethene 9.95 10 100% 100% 0.0% 0.5% Methyl-ter-budy lether 9.92 9.89 10 99% 8.3% 0.3% 1,1-Dichloroethane 9.13 8.56 10 91% 86% 6.4% Vinyl Acetate 10.6 8.91 10 106% 89% 4.6% 2-Butanone (MEK) 9.77 8.37 10 98% 84% 15.4% cis-1.2-Dichloroethane 8.92 8.61 10 99% 8.8% 1.2% Chloroform 9.87 11 10 99% 11.5% 15.7% 1,1-1-richloroethane 9.83 11.5 10 98% 14.6% Carbon Tetrachloride 10.1 11.6 10 111% 15.8% Benzene 9.03 8.61 10 90% 86% 4.8% Cyclohoroethane 9.73 10.6 10 91% 4.4% 1,2-Dichloroethane 9.73	Methylene Chloride	8.82	10.7	10	88%	107%	19.3%	
trans.1.2-Dichloroethene9.95101010%10%10%0.5%Methyl-lert-bulyl ether9.929.891099%0.3%0.3%1.1-Dichloroethane9.138.561091%84%6.4%Vinyl Acetate10.68.9110105%89%17.3%1098%4.6%2-Butanone (MEK)9.778.371098%84%15.4%2-Butanone (MEK)9.778.691090%87%2.9%Ethyl Acetate8.928.691099%84%15.4%2-Butanone (MEK)9.87111098%84%1.2%Chloroethane9.8311.51098%84%1.2%1,2-Dichloroethane9.8311.41098%115%15.7%1,1-Trichloroethane9.8311.41099%115%15.7%1,1-Trichloroethane9.8311.41099%4.6%Carbon Tetrachloride10.111.610101%116%13.8%Benzene9.038.611090%66%4.8%Cyclonexane9.778.31090%4.4%1,2-Dichloropropane9.249.381095%94%4.6%1,4-Dioxane9.778.31086%4.4%1,4-Dioxane9.778.31086%6.3%1,4-Dioknerehane9.669.581087%9.5% <tr<< td=""><td>Carbon Disulfide</td><td>8.84</td><td>9.62</td><td>10</td><td>88%</td><td>96%</td><td>8.5%</td><td></td></tr<<>	Carbon Disulfide	8.84	9.62	10	88%	96%	8.5%	
Methyl-kert-butyl ether 9.92 9.89 10 99% 99% 0.3% 1,1-Dichoroethane 9.13 8.56 10 91% 86% 6.4% Vinyl Acetate 10.6 8.91 10 106% 89% 1.7.3% N-Hexane 8.46 8.66 10 85% 89% 4.6% 2-Butanone (MEK) 9.77 8.37 10 99% 84% 15.4% cis1,2-Dichoroethene 8.95 8.69 10 90% 84% 1.2% Chloroform 9.87 11 10 99% 84% 1.2% Chloroform 9.87 11.4 10 99% 116% 1.3% Carbon Tetrachloride 9.83 11.4 10 99% 4.6% Carbon Tetrachloride 10.1 11.6 10 111% 116% 13.6% Cyclohexane 8.99 10.3 10 90% 84% 4.6% 1,2-Dichoropropane 9.24 8.39 10 92% 84% 9.6% 1,4-Dichoropropane 9.73 10.6 97% 96% 6.4% N-Heptane 8.6 9.23 10 84% 10.5% <t< td=""><td>trans-1,2-Dichloroethene</td><td>9.95</td><td>10</td><td>10</td><td>100%</td><td>100%</td><td>0.5%</td><td></td></t<>	trans-1,2-Dichloroethene	9.95	10	10	100%	100%	0.5%	
1,1-Dichloroethane 9,13 8.56 10 91% 86% 6.4% Vinyl Acetale 10.6 8.91 10 106% 89% 17.3% N-Hexane 8.46 8.86 10 85% 8.69 10 98% 84% 15.4% 2-Butanone (MEK) 9.77 8.37 10 98% 84% 12.4% Chlorofthene 8.95 8.69 10 99% 87% 2.9% Chloroftrm 9.87 11 10 99% 16% 10.8% 1,2-Dichloroethane 9.83 11.5 10 91% 8.6% 1.7% 1,1-Tichloroethane 9.85 11.4 10 99% 11% 14.6% Carbon Tetrachloride 10.1 11.6 10 101% 18% 86% Senzene 9.03 8.61 10 90% 86% 4.4% Cyclohexane 9.73 10.6 10 97% 86% 4.4% Bromodichloromethane 9.77 8.3 10 86% 2.2%	Methyl-tert-butyl ether	9.92	9.89	10	99%	99%	0.3%	
Vnyl Acetate 10.6 8.91 10 106% 89% 17.3% N-Hexane 8.46 8.66 10 85% 89% 4.6% 2-Butanone (MEK) 9.77 8.37 10 98% 84% 15.4% cis-1,2-Dichloroethene 8.95 8.69 10 90% 87% 2.9% Ethyl Acetate 8.92 8.81 10 88% 1.2% Chloroform 9.87 11 0 90% 81% 1.2% Chloroform 9.83 11.5 10 98% 115% 15.7% 1,1-1richloroethane 9.85 11.4 10 99% 14% 14.6% Carbon Tetrachloride 10.1 11.6 10 101% 18% 38% Cyclohexane 9.03 8.61 10 90% 4.8% Cyclohexane 9.24 8.39 10 92% 4.4% Bromodichloromethane 9.73 10.6 10 97%	1.1-Dichloroethane	9.13	8,56	10	91%	86%	6.4%	
N-Hexane 8.46 8.86 10 85% 89% 4.6% 2-Butanone (MEK) 9.77 8.37 10 98% 84% 15.4% cis-1,2-Dichloroethene 8.92 8.81 10 89% 88% 1.2% Chloroform 9.67 11 10 99% 11% 10.8% Tetrahydrofuran 10.2 9.4 10 102% 94% 8.2% 1,2-Dichloroethane 9.83 11.5 10 98% 11% 16.7% 1,1-Trichloroethane 9.85 11.4 10 99% 11% 1.8% Carbon Tetrachloride 10.1 11.6 10 101% 18.6% 1.8% L2-Dichloroephane 9.24 8.39 10 92% 4.4% 1.2% Cyclohexane 9.24 8.39 10 92% 84% 9.6% 1,2-Dichloropropane 9.24 8.39 10 92% 8.4% 1.6.3% 1,2-Dichoropropane	Vinvl Acetate	10.6	8.91	10	106%	89%	17.3%	
2-Butanone (MEK) 9.77 8.37 10 98% 84% 15.4% cis-1,2-Dichloroethene 8.95 8.69 10 90% 87% 2.9% Ethyl Acetate 8.92 8.81 10 89% 88% 1.2% Chloroform 9.87 11 10 99% 110% 10.8% 1,2-Dichloroethane 9.83 11.5 10 98% 8.4% 15.7% 1,1,1-Trichioroethane 9.85 11.4 10 99% 114% 14.6% Carbon Tetrachloride 10.1 11.6 10 101% 13.8% Benzene 9.03 8.61 10 90% 86% 4.8% Cyclohexane 8.99 10.3 10 90% 4.4% 13.6% 1,2-Dichloropropane 9.24 8.39 10 92% 84% 9.6% 1,2-Dichloropropane 9.77 8.3 10 95% 9.6% 1.55% 1,4-Dioxane 9.77	N-Hexane	8.46	8,86	10	85%	89%	4.6%	
cis-1,2-Dichloroethene 8.95 8.69 10 90% 87% 2.9% Ethyl Acetate 8.92 8.81 10 89% 88% 1.2% Chloroform 9.87 11 10 99% 110% 10.8% Tetrahydrofuran 10.2 9.4 10 102% 9.4% 8.2% 1,2-Dichloroethane 9.83 11.5 10 98% 115% 15.7% 1,1-Trichloroethane 9.85 11.4 10 99% 10% 8.3% Carbon Tetrachloride 10.1 11.6 10 101% 11.6% 10.8% Benzene 9.03 8.61 10 90% 8.6% 4.8% Cyclohexane 8.99 10.3 10 90% 4.4% Stomodichloromethane 9.73 10.6 10 97% 4.4% Bromodichloropropane 9.66 9.58 10 97% 4.8% I-Abitokane 9.77 8.3 10 86% 2.2% N-Heptane 8.66 9.58 10 97%	2-Butanone (MEK)	9.77	8.37	10	98%	84%	15.4%	
Ethyl Acetate 8.92 8.81 10 89% 88% 1.2% Chloroform 9.87 11 10 99% 110% 10.8% Tetrahydrofuran 10.2 9.4 10 102% 94% 8.2% 1,2-Dichloroethane 9.83 11.5 10 99% 114% 15.7% 1,1-Trichloroethane 9.85 11.4 10 99% 114% 16.8% Carbon Tetrachloride 10.1 11.6 10 101% 16% 13.8% Benzene 9.03 8.61 10 90% 13.6% 13.6% Cyclohexane 9.03 8.61 10 90% 13.6% 13.6% Bromodichloropropane 9.24 8.39 10 92% 84% 6.6% I_4-Dioxane 9.77 8.3 10 98% 83% 16.3% Isooctane 8.66 9.23 10 86% 0.8% 1.4% I_1,2-Dichloropropene 9.6	cis-1.2-Dichloroethene	8.95	8,69	10	90%	87%	2.9%	
Chloroform 9.87 11 10 99% 110% 10.8% Tetrahydrofuran 10.2 9.4 10 102% 94% 8.2% 1,2-Dichloroethane 9.83 11.5 10 98% 115% 15.7% 1,1,1-Trichloroethane 9.85 11.4 10 99% 116% 13.8% Carbon Tetrachloride 10.1 11.6 10 101% 116% 13.8% Benzene 9.03 8.61 10 90% 86% 4.8% Cyclohexane 8.99 10.3 10 90% 86% 4.8% Cyclohexane 9.45 9.88 10 95% 99% 4.4% Bromodichloromethane 9.73 10.6 10 97% 106% 8.6% 1,4-Dioxane 8.42 9.35 10 84% 94% 10.5% N-Heptane 8.6 9.23 10 86% 9.2% 7.1% cis-1,3-Dichloropropene 9.66 8.47 10 87% 8.5% 2.2% trans-1,3-Dichlor	Ethyl Acetate	8.92	8.81	10	89%	88%	1.2%	
Tetrahydrofuran10.29.410102%94%8.2%1,2-Dichloroethane9.8311.51098%115%15.7%1,1,1-Trichloroethane9.8511.41099%114%14.6%Carbon Tetrachloride10.111.610101%116%13.8%Benzene9.038.611090%86%4.8%Cyclohexane8.9910.31090%103%13.6%1,2-Dichloropropane9.248.391092%84%9.6%Trichlorethene9.7310.61097%106%8.6%1,4-Dioxane9.778.31098%83%16.3%Isoctane8.429.351084%94%10.5%N-Heptane8.669.581097%96%0.8%4-Methyl-2-pentanone (MIBK)8.668.471087%85%2.2%trans.1,3-Dichloropropene9.659.151097%92%5.3%Toluene8.989.331090%93%3.8%2-Hexanone8.928.651089%87%3.1%Dibromochloromethane10.411.310102%113%10.2%Chlorobenzene9.7810.21094%3.8%2-Hexanone9.7810.411.51094%4.2%Ethylbenzene9.7810.410.410.411.510.4%115% </td <td>Chloroform</td> <td>9.87</td> <td>11</td> <td>10</td> <td>99%</td> <td>110%</td> <td>10.8%</td> <td></td>	Chloroform	9.87	11	10	99%	110%	10.8%	
1,2-Dichloroethane9.8311.51098%115%15.7%1,1,1-Trichloroethane9.8511.41099%114%14.6%Carbon Tetrachloride10.111.610101%116%13.8%Benzene9.038.611090%10%13.6%Cyclohexane8.9910.31090%103%13.6%1,2-Dichloropropane9.248.391092%84%9.6%Trichlorethene9.459.881095%99%4.4%Bromodichloromethane9.778.31098%83%16.3%Iscoctane8.429.351084%94%10.5%N-Heptane8.669.581097%96%7.1%cis-1,3-Dichloropropene9.669.581087%85%2.2%trans-1,3-Dichloropropene10.210.710102%107%4.8%1,1,2-Trichloroethane9.659.151097%92%5.3%Toluene8.989.331090%93%3.8%2-Hexanone8.928.651089%87%3.1%Dibromochloromethane10.411.310102%113%10.2%Chlorobenzene9.3610.21098%87%3.1%Dibromochloromethane10.411.310102%14%10.2%Chlorobenzene9.3610.21098% <t< td=""><td>Tetrahydrofuran</td><td>10.2</td><td>9.4</td><td>10</td><td>102%</td><td>94%</td><td>8.2%</td><td></td></t<>	Tetrahydrofuran	10.2	9.4	10	102%	94%	8.2%	
1,1,1-Trichloroethane 9.85 11.4 10 99% 114% 14.6% Carbon Tetrachloride 10.1 11.6 10 101% 116% 13.8% Benzene 9.03 8.61 10 90% 16% 4.8% Cyclohexane 8.99 10.3 10 90% 103% 13.6% 1,2-Dichloropropane 9.24 8.39 10 92% 8.4% 9.6% Trichlorethene 9.45 9.88 10 97% 106% 8.6% 1,4-Dioxane 9.73 10.6 10 97% 106% 8.6% 1,4-Dioxane 9.77 8.3 10 98% 83% 16.3% Isocctane 8.42 9.35 10 84% 9.6% 1.5% N-Heptane 8.6 9.23 10 86% 2.2% 7.1% cis-1,3-Dichloropropene 9.66 9.58 10 97% 96% 0.8% 1,1,2-Trichloroethane 9.65 9.15 10 87% 2.2% 5.3% Toluene	1.2-Dichloroethane	9.83	11.5	10	98%	115%	15.7%	
Carbon Tetrachloride10.111.610101%11.6%13.8%Benzene9.038.611090%86%4.8%Cyclohexane8.9910.31090%10.3%13.6%1,2-Dichloropropane9.248.391092%84%9.6%Trichlorethene9.459.881095%99%4.4%Bromodichloromethane9.7310.61097%106%8.6%1,4-Dioxane9.778.31098%83%16.3%Isooctane8.429.351084%94%10.5%N-Heptane8.69.231086%2.2%1.4cis-1,3-Dichloropropene9.669.581097%96%0.8%4-Methyl-2-pentanone (MIBK)8.668.471087%8.5%2.2%trans-1,3-Dichloropropene10.210.710102%4.8%1,1,2-Trichloroethane9.659.151097%96%3.8%2-Hexanone8.928.651089%8.3%1.3%Dibromochloromethane10.411.310102%4.2%Chlorobenzene9.3610.21098%10.2%4.2%Chlorobenzene9.3610.21094%10.2%6.%Chlorobenzene9.7810.41098%104%6.1%Dibromochloromethane10.211.310102%4.2%	1.1.1-Trichloroethane	9.85	11.4	10	99%	114%	14.6%	
Benzene 9.03 8.61 10 90% 86% 4.8% Cyclohexane 8.99 10.3 10 90% 13.6% 1,2-Dichloropropane 9.24 8.39 10 92% 84% 9.6% Trichlorethene 9.45 9.88 10 95% 99% 4.4% Bromodichloromethane 9.73 10.6 10 97% 106% 8.6% 1,4-Dioxane 9.77 8.3 10 98% 83% 16.3% Isooctane 8.42 9.35 10 84% 94% 10.5% N-Heptane 8.6 9.23 10 86% 92% 7.1% cis-1,3-Dichloropropene 9.66 9.58 10 97% 96% 0.8% 4-Methyl-2-pentanone (MIBK) 8.66 8.47 10 87% 2.2% trans-1,3-Dichloropropene 10.2 10.7 10 102% 10% 1,1,2-Trichloroethane 9.65 9.15 10 97% 92% 5.3% Toluene 8.98 9.33 <td< td=""><td>Carbon Tetrachloride</td><td>10.1</td><td>11.6</td><td>10</td><td>101%</td><td>116%</td><td>13.8%</td><td></td></td<>	Carbon Tetrachloride	10.1	11.6	10	101%	116%	13.8%	
Cyclohexane8.9910.31090%103%13.6%1,2-Dichloropropane9.248.391092%84%9.6%Trichlorethene9.459.881095%99%4.4%Bromodichloromethane9.7310.61097%106%8.6%1,4-Dioxane9.778.31098%83%16.3%Isooctane8.429.351084%94%10.5%N-Heptane8.69.231086%92%7.1%cis-1,3-Dichloropropene9.669.581097%96%0.8%4-Methyl-2-pentanone (MIBK)8.668.471087%85%2.2%trans-1,3-Dichloropropene10.210.710102%107%4.8%1,1,2-Trichloroethane9.659.151097%98%3.8%2-Hexanone8.928.651089%8.7%3.1%Dibromochloromethane10.411.310104%113%8.3%1,2-dibromoethane (EDB)9.7810.21098%102%4.2%Tetrachloroethene10.211.310102%4.2%Chlorobenzene9.3610.21094%10.2%8.6%Ethylbenzene9.7810.41098%104%6.1%Bromoform10.411.510104%115%10.0%	Benzene	9.03	8.61	10	90%	86%	4.8%	
1,2-Dichloropropane9.248.391092%84%9.6%Trichlorethene9.459.881095%99%4.4%Bromodichloromethane9.7310.61097%106%8.6%1,4-Dioxane9.778.31098%83%16.3%Isooctane8.429.351084%94%10.5%N-Heptane8.69.231086%92%7.1%cis-1,3-Dichloropropene9.669.581097%96%0.8%4-Methyl-2-pentanone (MIBK)8.668.471087%85%2.2%trans-1,3-Dichloropropene10.210.710102%107%4.8%1,1,2-Trichloroethane9.659.151097%92%5.3%Toluene8.989.331090%93%3.8%2-Hexanone8.928.651089%87%3.1%Dibromochloromethane10.411.310104%113%8.3%1,2-dibromoethane (EDB)9.7810.21098%102%4.2%Chlorobenzene9.3610.21094%10.2%8.6%Ethylbenzene9.7810.41098%104%6.1%m,p-Xylene1920.72095%104%8.6%Bromoform10.411.510104%115%10.0%	Cvclohexane	8.99	10.3	10	90%	103%	13.6%	
Trichlorethene9.459.881095%99%4.4%Bromodichloromethane9.7310.61097%106%8.6%1,4-Dioxane9.778.31098%83%16.3%Isooctane8.429.351084%94%10.5%N-Heptane8.69.231086%92%7.1%cis-1,3-Dichloropropene9.669.581097%96%0.8%4-Methyl-2-pentanone (MIBK)8.668.471087%85%2.2%trans-1,3-Dichloropropene10.210.710102%107%4.8%1,1,2-Trichloropthane9.659.151097%92%5.3%Toluene8.989.331090%93%3.8%2-Hexanone8.928.651089%87%3.1%Dibromochloromethane10.411.310104%113%8.3%1,2-dibromoethane (EDB)9.7810.21098%10.2%4.2%Chlorobenzene9.3610.21094%10.2%10.2%Ethylbenzene9.7810.41098%104%6.1%m,p-Xylene1920.72095%104%8.6%	1.2-Dichloropropane	9.24	8.39	10	92%	84%	9.6%	
Bromodichloromethane9.7310.61097%106%8.6%1,4-Dioxane9.778.31098%83%16.3%Isooctane8.429.351084%94%10.5%N-Heptane8.69.231086%92%7.1%cis.1,3-Dichloropropene9.669.581097%96%0.8%4-Methyl-2-pentanone (MIBK)8.668.471087%85%2.2%trans-1,3-Dichloropropene10.210.710102%107%4.8%1,1,2-Trichloroethane9.659.151097%92%5.3%Toluene8.989.331090%93%3.8%2-Hexanone8.928.651089%87%3.1%Dibromochloromethane10.411.310104%113%8.3%1,2-dibromoethane (EDB)9.7810.21098%102%4.2%Tetrachloroethene10.211.310102%13%10.2%Chlorobenzene9.3610.21094%102%8.6%Ethylbenzene9.7810.41098%104%6.1%m,p-Xylene1920.72095%104%8.6%	Trichlorethene	9.45	9.88	10	95%	99%	4.4%	
1,4-Dioxane9.778.31098%83%16.3%Isooctane8.429.351084%94%10.5%N-Heptane8.69.231086%92%7.1%cis-1,3-Dichloropropene9.669.581097%96%0.8%4-Methyl-2-pentanone (MIBK)8.668.471087%85%2.2%trans-1,3-Dichloropropene10.210.710102%107%4.8%1,1,2-Trichloroethane9.659.151097%92%5.3%Toluene8.989.331090%93%3.8%2-Hexanone8.928.651089%87%3.1%Dibromochloromethane10.411.310104%113%8.3%1,2-dibromoethane (EDB)9.7810.21098%102%4.2%Tetrachloroethene10.211.310102%11.3%10.2%Chlorobenzene9.3610.21094%102%8.6%Ethylbenzene9.7810.41098%104%6.1%m,p-Xylene1920.72095%104%8.6%	Bromodichloromethane	9.73	10.6	10	97%	106%	8.6%	
Isooctane 8.42 9.35 10 84% 94% 10.5% N-Heptane 8.6 9.23 10 86% 92% 7.1% cis-1,3-Dichloropropene 9.66 9.58 10 97% 96% 0.8% 4-Methyl-2-pentanone (MIBK) 8.66 8.47 10 87% 85% 2.2% trans-1,3-Dichloropropene 10.2 10.7 10 102% 107% 4.8% 1,1,2-Trichloroethane 9.65 9.15 10 97% 92% 5.3% Toluene 8.98 9.33 10 90% 93% 3.8% 2-Hexanone 8.92 8.65 10 89% 87% 3.1% Dibromochloromethane (EDB) 9.78 10.2 10 98% 102% 4.2% Tetrachloroethene 10.2 11.3 10 102% 8.6% Ethylbenzene 9.36 10.2 10 94% 10.2% Chlorobenzene 9.78 10.4 10 98% 104% 6.1% m,p-Xylene 19	1.4-Dioxane	9.77	8.3	10	98%	83%	16.3%	
N-Heptane8.69.231086%92%7.1%cis-1,3-Dichloropropene9.669.581097%96%0.8%4-Methyl-2-pentanone (MIBK)8.668.471087%85%2.2%trans-1,3-Dichloropropene10.210.710102%107%4.8%1,1,2-Trichloroethane9.659.151097%92%5.3%Toluene8.989.331090%93%3.8%2-Hexanone8.928.651089%87%3.1%Dibromochloromethane10.411.310104%113%8.3%1,2-dibromoethane (EDB)9.7810.21098%102%4.2%Tetrachloroethene10.211.310102%113%10.2%Chlorobenzene9.3610.21094%102%8.6%Ethylbenzene9.7810.41098%104%6.6%Bromoform10.411.510104%115%10.0%	Isooctane	8.42	9.35	10	84%	94%	10.5%	
cis-1,3-Dichloropropene9.669.581097%96%0.8%4-Methyl-2-pentanone (MIBK)8.668.471087%85%2.2%trans-1,3-Dichloropropene10.210.710102%107%4.8%1,1,2-Trichloroethane9.659.151097%92%5.3%Toluene8.989.331090%93%3.8%2-Hexanone8.928.651089%87%3.1%Dibromochloromethane10.411.310104%113%8.3%1,2-dibromoethane (EDB)9.7810.21098%102%4.2%Tetrachloroethene10.211.310102%113%10.2%Chlorobenzene9.3610.21094%102%8.6%Ethylbenzene9.7810.41098%104%6.1%m,p-Xylene1920.72095%104%8.6%Bromoform10.411.510104%115%10.0%	N-Heptane	8.6	9.23	10	86%	92%	7.1%	
4-Methyl-2-pentanone (MIBK) 8.66 8.47 10 87% 85% 2.2% trans-1,3-Dichloropropene 10.2 10.7 10 102% 107% 4.8% 1,1,2-Trichloroethane 9.65 9.15 10 97% 92% 5.3% Toluene 8.98 9.33 10 90% 93% 3.8% 2-Hexanone 8.92 8.65 10 89% 87% 3.1% Dibromochloromethane 10.4 11.3 10 104% 113% 8.3% 1,2-dibromoethane (EDB) 9.78 10.2 10 98% 102% 4.2% Tetrachloroethene 10.2 11.3 10 102% 113% 10.2% Chlorobenzene 9.36 10.2 10 94% 102% 8.6% Ethylbenzene 9.78 10.4 10 98% 104% 6.1% m,p-Xylene 19 20.7 20 95% 104% 8.6% Bromoform 10.4 11.5 10 104% 115% 10.0% <td>cis-1 3-Dichloropropene</td> <td>9.66</td> <td>9.58</td> <td>10</td> <td>97%</td> <td>96%</td> <td>0.8%</td> <td></td>	cis-1 3-Dichloropropene	9.66	9.58	10	97%	96%	0.8%	
Trans-1,3-Dichloropropene10.210.710102%107%4.8%1,1,2-Trichloroethane9.659.151097%92%5.3%Toluene8.989.331090%93%3.8%2-Hexanone8.928.651089%87%3.1%Dibromochloromethane10.411.310104%113%8.3%1,2-dibromoethane (EDB)9.7810.21098%102%4.2%Tetrachloroethene10.211.310102%113%10.2%Chlorobenzene9.3610.21094%102%8.6%Ethylbenzene9.7810.41098%104%6.1%m,p-Xylene1920.72095%104%8.6%Bromoform10.411.510104%115%10.0%	4-Methyl-2-pentanone (MIBK)	8.66	8.47	10	87%	85%	2.2%	
1,1,2-Trichloroethane9.659.151097%92%5.3%Toluene8.989.331090%93%3.8%2-Hexanone8.928.651089%87%3.1%Dibromochloromethane10.411.310104%113%8.3%1,2-dibromoethane (EDB)9.7810.21098%102%4.2%Tetrachloroethane10.211.310102%11.3%10.2%Chlorobenzene9.3610.21094%102%8.6%Ethylbenzene9.7810.41098%104%6.1%m,p-Xylene1920.72095%104%8.6%Bromoform10.411.510104%115%10.0%	trans-1 3-Dichloropropene	10.2	10.7	10	102%	107%	4.8%	
Toluene8.989.331090%93%3.8%2-Hexanone8.928.651089%87%3.1%Dibromochloromethane10.411.310104%113%8.3%1,2-dibromoethane (EDB)9.7810.21098%102%4.2%Tetrachloroethene10.211.310102%113%10.2%Chlorobenzene9.3610.21094%102%8.6%Ethylbenzene9.7810.41098%104%6.1%m,p-Xylene1920.72095%104%8.6%Bromoform10.411.510104%115%10.0%	1 1 2-Trichloroethane	9.65	9.15	10	97%	92%	5.3%	
2-Hexanone 8.92 8.65 10 89% 87% 3.1% Dibromochloromethane 10.4 11.3 10 104% 113% 8.3% 1,2-dibromoethane (EDB) 9.78 10.2 10 98% 102% 4.2% Tetrachloroethene 10.2 11.3 10 102% 113% 10.2% Chlorobenzene 9.36 10.2 10 94% 102% 8.6% Ethylbenzene 9.78 10.4 10 98% 104% 6.1% m,p-Xylene 19 20.7 20 95% 104% 8.6% Bromoform 10.4 11.5 10 104% 11.5 10.0%	Toluene	8.98	9.33	10	90%	93%	3.8%	
Dibromochloromethane 10.2 11.3 10 10.4% 11.3% 8.3% 1,2-dibromoethane (EDB) 9.78 10.2 10 98% 102% 4.2% Tetrachloroethane 10.2 11.3 10 102% 4.2% Chlorobenzene 9.36 10.2 10 94% 102% 8.6% Ethylbenzene 9.78 10.4 10 98% 104% 6.1% m,p-Xylene 19 20.7 20 95% 104% 8.6% Bromoform 10.4 11.5 10 104% 115% 10.0%	2-Hexanone	8 92	8 65	10	89%	87%	3.1%	
1,2-dibromoethane (EDB)9.7810.21098%102%4.2%Tetrachloroethene10.211.310102%113%10.2%Chlorobenzene9.3610.21094%102%8.6%Ethylbenzene9.7810.41098%104%6.1%m,p-Xylene1920.72095%104%8.6%Bromoform10.411.510104%115%10.0%	Dibromochloromethane	10.4	11.3	10	104%	113%	8.3%	
Tetrachloroethene 10.2 11.3 10 102% 113% 10.2% Chlorobenzene 9.36 10.2 10 94% 102% 8.6% Ethylbenzene 9.78 10.4 10 98% 104% 6.1% m,p-Xylene 19 20.7 20 95% 104% 8.6% Bromoform 10.4 11.5 10 104% 115% 10.0%	1 2-dibromoethane (EDB)	9 78	10.2	10	98%	102%	4.2%	
Chlorobenzene 9.36 10.2 10 94% 102% 8.6% Ethylbenzene 9.78 10.4 10 98% 104% 6.1% m,p-Xylene 19 20.7 20 95% 104% 8.6% Bromoform 10.4 11.5 10 104% 115% 10.0%	Tetrachloroethene	10.2	11.3	10	102%	113%	10.2%	
Ethylbenzene 9.78 10.4 10 98% 104% 6.1% m,p-Xylene 19 20.7 20 95% 104% 8.6% Bromoform 10.4 11.5 10 104% 115% 10.0%	Chlorobenzene	9.36	10.2	10	94%	102%	8.6%	
Instruction Instruction <thinstruction< th=""> <thinstruction< th=""></thinstruction<></thinstruction<>	Ethylbenzene	9.78	10.4	10	98%	104%	6.1%	
Bromoform 10.4 11.5 10 104% 115% 10.0%	m.p-Xvlene	19	20.7	20	95%	104%	8.6%	
	Bromoform	10.4	11.5	10	104%	115%	10.0%	



Analytical Report

			LCS/D	LCS	LCSD		
LCS/LCSD	LCS Results (ppbv)	LCSD Results (ppbv)	Conc(ppbv)	Rec.	Rec.	<u>RPD</u>	Flag
Styrene	9.76	10.3	10	98%	103%	5.4%	
1,1,2,2-Tetrachloroethane	8.6	8.35	10	86%	84%	2.9%	
o-Xylene	9.39	9.99	10	94%	100%	6.2%	
4-Ethyltoluene	9.07	9.94	10	91%	99%	9.2%	
1,3,5-Trimethylbenzene	9.01	9.93	10	90%	99%	9.7%	
1,2,4-Trimethylbenzene	9.17	10.1	10	92%	101%	9.7%	
1,3-Dichlorobenzene	10.5	11.4	10	105%	114%	8.2%	
Benzyl Chloride	11.3	11.9	10	113%	119%	5.2%	
1,4-Dichlorobenzene	10.7	11.4	10	107%	114%	6.3%	
1,2-Dichlorobenzene	10.3	11.5	10	103%	115%	11.0%	
1,2,4-Trichlorobenzene	8.88	8.79	10	89%	88%	1.0%	
Hexachloro-1,3-butadiene	10.2	10.2	10	102%	102%	0.0%	
4-bromofluorobenzene (surrogate)	102%	100%					
Analysis Date/Time:	4-4-16/19:53	4-5-16/05:58					
Analyst Initials	tjg	tjg					



Flag Number	<u>Comments</u>	
1	Reporting limit is supported by MDL. TJG	
2	Reported value is from a 10x dilution. TJG 4-8-16	
3	Reported value is from a 40x dilution. TJG 4-8-16	
4	Reported value is from a 400x dilution. TJG 4-8-16	
5	Reported value is below the reporting limit, but above the MDL. 4-8-16	
6	RPD is biased high but recoveries are within control. TJG 4-8-16	

Page 15 of 15

EnvisionAir Proj#: 2016-264 Page _____ of ____

CHAIN OF CUSTODY RECORD

7

EnvisionAir | 1441Sadlier Circle West Drive | Indianapolis, IN 46239 | Phone: (317) 351-0885 | Fax: (317) 351-0882

Client: EnviroFormate	.	P.O. Nu	umber: 2	01627	76		10		TED		EDC				
Report 602N Capital.	Ave	Project	Name or N	Number: Le	165										
Address: Ste 210 Indianag	UI	Mart	no13 41	E Ave				/	/ /		/ 18800	912871			
Report To: O: Day		Sample	d by: M.	Stattain	ih.					/ /		S-FN		SIN	NAIR
Phone:	70	QA/QC	Required: Leve	(circle if appli I III Lev	cable) el IV		/	. . .	 &				M V B		
Invoice Address:		Report ug/m	ing Units n 3) mg/m	eeded: (circ ³ PPBV	ie) PPMV						Soil-Gas: X		Manay An	vision-air o	om
Desired TAT: (Please Circle-One 1 day 2 days 3 days Std (5	bus. days)	Media type	: 1LC = 1 Liter (5LC = 6 Liter (TB = Tediar I TD = Therma	Canister Canister Bag I Descrption Tub	e	\	3/ E		/		Indoor-Air: D	Canister	Pressure /	Vision-an .e.	5111
Air Sample ID	Media Type (see code above)	Coll. Date (Grab/Comp (Start)	Coll. Time (Grab/Comp Start)	Coll: Date (Comp. End)	Coll. Time					Canister Serial #	Flow Controller Serial #	Initial Field (in. Hg)	Final Field (in. Hg)	Lab Received (in. Hg)	EnvisionAir Sample Number
12105-EF-1	ILC	3/22	1205	3/22	1206	Х				84051		-225	-5	-5	16-966
6163-ET-2	ILC	3/22	1557	3/22	1558	X				83736		-27	-5	-5	16-967
6165-EF-3	ILC	3/23	0827	3/23	0333	X				33737	م تحد م	-27	-5	-5	16-968
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BJK

Production Work	c Order Form
Project/Phase:6165.23a	Due Date: $11/3/2016$
Originator: <u>B. Kappen</u>	- Date/Time In:
Hours Budgeted:/	
Description of Work: □ - Draft 叔 - Final □ Word Process Job □Photocopying Job Ⅹ Repo	ort Production Job 🗆 Electronic Filing Only
Finishing: \Box 3-Ring Binder \Box Clipped \Box CD	Appendix Tabs 🗆 Yes 🔎 No
EnviroForensics Color Cover Page: Ves X No Back Page: Yes X No	Spine: I Yes □ No comb-bind
Other Instructions: Match Pages	ize and color. Some 1/x/7.
Number of: Hard Copies CD Copies	File Copy
Single-Sided: Double-Sided: Entire	ReportAppendices)
> Text, tables, figures, charts. SUBMITTAL INST	Z > Appendies A+B
Fax/Email To:	Fax Number: Email:
Regular Mail:	00 am) 7 10:00 am) etween 8:00 to 3:30 pm)
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To Be Completed by Technical Administrative A Signed "Deliverable Review Form" attached: Final Document Review/Check (to Styles Guio Letter of Transmittal Completed (if required) Document Tracking Log Updated: Save Final document and "Deliverable Review	ssistant Only: le): solution: by Form" electronically, and delete all drafts column by the sector of the s