



# R.E.A.C.T.

*Roxbury Environmental Action Coalition*

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## RE: Air Test Results

R.E.A.C.T. has facilitated an ambient air test to better understand potential exposure from various pollutants emanating from the Former Fenimore Landfill. Two air collection canisters and a vapor monitoring badge were placed next to the township monitor (ROX4) located on Mountain Road at approximately 10:40pm on October 1, 2013. The collection duration was 8 hours.

Upon sampling completion, the canisters were immediately returned to two NJDEP approved labs for analysis.

The following tests were performed:

### Integrated Analytical Laboratories (IAL)

- NJDEP Low Level USEPA Method TO-15 for Volatile Organic Compounds (VOC's) - Includes 62 common air contaminants plus additional via a library search scan
- EPA Method TO-11A for Formaldehyde - Formaldehyde is an intermediate product in the decomposition process of C&D material. Exposure effects include nose bleeds, and it is a known carcinogen
- EPA Method 18 for Methane, a common landfill gas

### EMSL Analytical

- Sulfur Dioxide (SO<sub>2</sub>) by Method ASTM D5504 – in order to obtain background levels prior to scrubber / flare operation
- Full Sulfur Gas Panel analysis including the following toxins: Hydrogen Sulfide, Carbonyl Sulfide, Methyl Mercaptan, Ethyl Mercaptan, Dimethyl Sulfide

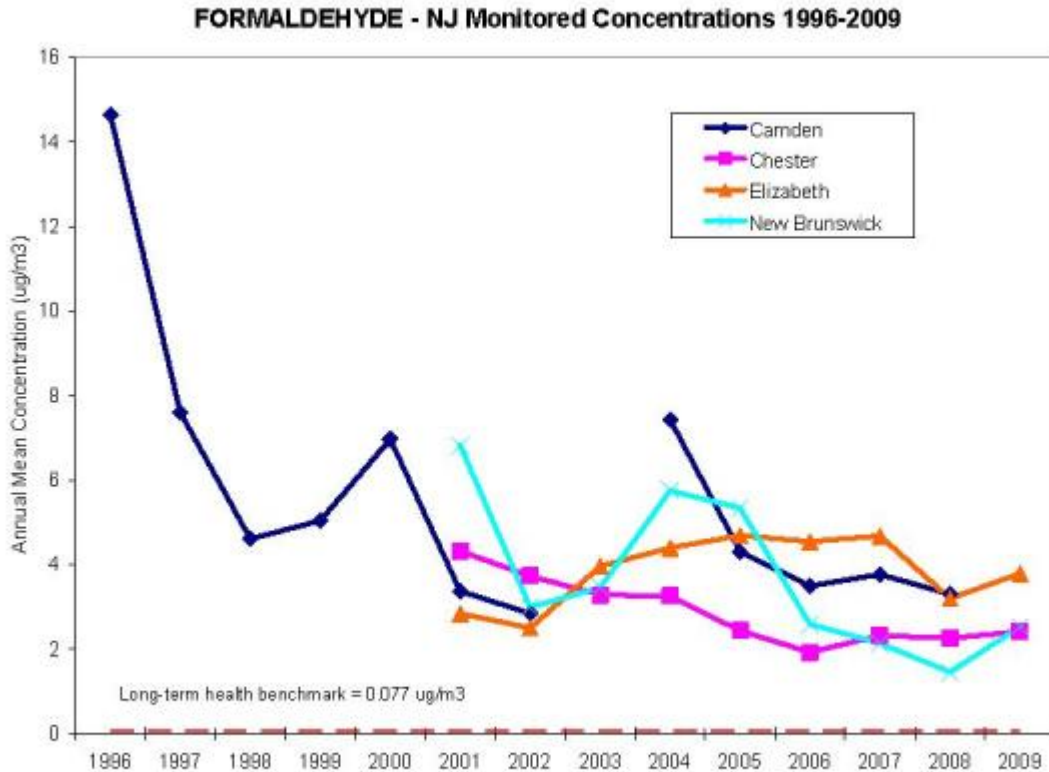
Laboratory reports are included at the end of this document and are summarized on the next two pages. The interpretations that follow were provided by the Laboratory Director(s), and do not express or imply any opinions of R.E.A.C.T.

### Integrated Analytical Laboratories - Method TO-15 for VOC's

All VOC's that were detected are below the NJDEP screening levels for indoor air. There are no NJDEP standards for ambient air and these were the standards that the NJDEP used when they performed the sampling in August. The following components were detected: acetone, dichlorodifluoromethane, ethanol, methylene chloride.

### Integrated Analytical Laboratories - Method TO-11A for Formaldehyde

Formaldehyde was detected at an average concentration of 7.7 ug/m<sup>3</sup>. The long term health benchmark for formaldehyde in NJ is 0.077ug/m<sup>3</sup>, which means the REACT results are 100x over the NJDEP health benchmark. The chart below shows formaldehyde concentrations that are routinely monitored in other towns. Note that the concentrations expressed on the chart are annual averages and the test performed in Roxbury was an 8 hour average.



### Integrated Analytical Laboratories - Method 18 for Methane

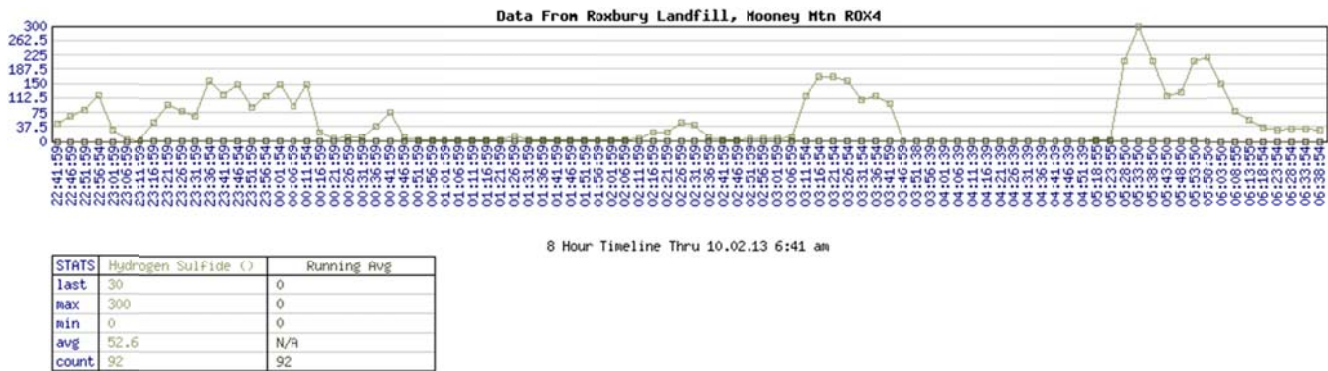
Methane was detected at an average concentration of 3.24 ppm. Natural atmospheric makeup of methane is 0.0001745% or 1.745 ppm. The explosive, i.e. dangerous, levels for methane are ~5-15%, which is 50,000ppm to 150,000ppm. Landfills typically produce methane as organic matter

decomposes. This process is accelerated when a cap is present because deprives the ground of oxygen. It was recommend that the NJDEP start continually monitoring methane concentrations via soil gas samples.

**EMSL Analytical – Sulfur Dioxide and Sulfur Gas Panel per ASTM D5504**

Sulfur dioxide (SO2), hydrogen sulfide (H2S), as well as the other sulfur compounds were reported as ND=Non Detect.

HOWEVER, during the 8 hour test, the ROX4 monitor measured an average hydrogen sulfide concentration of 52.6 ppb, with a maximum of 300 ppb. One of the reasons why the canister was placed next to this monitor was to compare results for H2S.



Upon follow-up conversations with EMSL, it was confirmed that proper vacuum levels were recorded on the canister indicating the sample was not compromised. EMSL indicated that the analytical method ATSM D5504 was performed within the allowed time frame for sulfur gases.

Upon further conversations with the EMSL and other labs, it was concluded that sulfur gases are difficult to collect in suma-canisters. The integrity of the sample is time sensitive, and also depends on the integrity of an inert coating on the inside of the canister; a coating that can't be inspected prior to the test due to the nature of the canisters construction.

EMSL promised to perform a stability study introducing sulfur standards and a high level sample into canisters, tedlar bags and glass bottles and run them as close to immediately as possible and then periodically for 3 days to track the loss of compounds over time. After evaluating these results they plan on sampling in the field with a meter and then collecting into the best vessel determined from the first test and comparing results. Once this investigation is completed, R.E.A.C.T. will redo this test.

Please note that the NJ Department of Health recently sampled area schools for sulfur dioxide (SO2) and other sulfur compounds using similar canisters that were also sent to EMSL to analyze.

Chemical	CAS Number	Molecular Weight	Lab Result	Q	Corrected Results	Retention Time NT Only	QAS Decision	Foot-notes
<b>Method TO-15</b>			<b>ppbv</b>		<b>ug/m3</b>			
Acetone	67-64-1	58.08	1.1		3			
Allyl Chloride	107-05-1	76.53	0.20	U	0.6			
Benzene	71-43-2	78.11	0.20	U	0.6			
Bromodichloromethane	75-27-4	163.8	0.20	U	1			
Bromoform	75-25-2	252.8	0.20	U	2			
Bromomethane	74-83-9	94.94	0.20	U	0.8			
1,3-Butadiene	106-99-0	54.09	0.20	U	0.4			
Chlorobenzene	108-90-7	112.6	0.20	U	0.9			
Chloroethane	75-00-3	64.52	0.20	U	0.5			
Chloroform	67-66-3	119.4	0.20	U	1			
Chloromethane	74-87-3	50.49	0.20	U	0.4			
Carbon disulfide	75-15-0	76.14	0.20	U	0.6			
Carbon tetrachloride	56-23-5	153.8	0.20	U	1			
2-Chlorotoluene	95-49-8	126.6	0.20	U	1			
Cyclohexane	110-82-7	84.16	0.20	U	0.7			
Dibromochloromethane	124-48-1	208.3	0.20	U	2			
1,2-Dibromoethane	106-93-4	187.9	0.20	U	2			
1,2-Dichlorobenzene	95-50-1	147.0	0.20	U	1			
1,3-Dichlorobenzene	541-73-1	147.0	0.20	U	1			
1,4-Dichlorobenzene	106-46-7	147.0	0.20	U	1			
Dichlorodifluoromethane	75-71-8	120.9	0.43		2			
1,1-Dichloroethane	75-34-3	98.96	0.20	U	0.8			
1,2-Dichloroethane	107-06-2	98.96	0.20	U	0.8			
1,1-Dichloroethene	75-35-4	96.94	0.20	U	0.8			
1,2-Dichloroethene (cis)	156-59-2	96.94	0.20	U	0.8			
1,2-Dichloroethene (trans)	156-60-5	96.94	0.20	U	0.8			
1,2-Dichloropropane	78-87-5	113.0	0.20	U	0.9			
1,3-Dichloropropene (cis)	10061-01-5	111.0	0.20	U	0.9			
1,3-Dichloropropene (trans)	10061-02-6	111.0	0.20	U	0.9			
1,2-Dichlorotetrafluoroethane	76-14-2	170.9	0.20	U	1			
1,4-Dioxane	123-91-1	88.12	0.20	U	0.7			
Ethanol	64-17-5	46.07	0.57		1			
Ethylbenzene	100-41-4	106.2	0.20	U	0.9			
4-Ethyltoluene	622-96-8	120.2	0.20	U	1			
n-Heptane	142-82-5	100.2	0.20	U	0.8			
1,3-Hexachlorobutadiene	87-68-3	260.8	0.20	U	2			
n-Hexane	110-54-3	86.17	0.20	U	0.7			
Isopropanol	67-63-0	60.10	0.20	U	0.5			
Methylene chloride	75-09-2	84.94	0.28		1			
Methyl ethyl ketone	78-93-3	72.11	0.20	U	0.6			
Methyl isobutyl ketone	108-10-1	100.2	0.20	U	0.8			
Methyl methacrylate	80-62-6	100.1	0.20	U	0.8			
Methyl tert-butyl ether	1634-04-4	88.15	0.20	U	0.7			
Styrene	100-42-5	104.1	0.20	U	0.9			
Tert-butyl alcohol	75-65-0	74.12	0.20	U	0.6			
1,1,2,2-Tetrachloroethane	79-34-5	167.9	0.20	U	1			

Chemical	CAS Number	Molecular Weight	Lab Result	Q	Corrected Results	Retention Time NT Only	QAS Decision	Foot-notes
Tetrachloroethene	127-18-4	165.8	0.20	U	1			
Tetrahydrofuran	109-99-9	72.11	0.20	U	0.6			
Toluene	108-88-3	92.14	0.20	U	0.8			
1,2,4-Trichlorobenzene	120-82-1	181.5	0.20	U	2			
1,1,1-Trichloroethane	71-55-6	133.4	0.20	U	1			
1,1,2-Trichloroethane	79-00-5	133.4	0.20	U	1			
Trichloroethene	79-01-6	131.4	0.20	U	1			
Trichlorofluoromethane	75-69-4	137.4	0.20	U	1			
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	187.4	0.20	U	2			
1,2,4-Trimethylbenzene	95-63-6	120.2	0.20	U	1			
1,3,5-Trimethylbenzene	108-67-8	120.2	0.20	U	1			
2,2,4-Trimethylpentane	540-84-1	114.2	0.20	U	0.9			
Vinyl bromide	593-60-2	106.9	0.20	U	0.9			
Vinyl chloride	75-01-4	62.50	0.20	U	0.5			
Xylenes (m&p)	179601-23-1	106.2	0.40	U	2			
Xylenes (o)	95-47-6	106.2	0.20	U	0.9			
Volatile Tentatively Identified Compounds (upto 30 compounds)								

Sample Name:		NJDEP SCREENING LEVELS				RAL		Backyard 01		
Lab ID:		Soil Gas		Indoor Air		Indoor Air		E13-09671-01		
Date Sampled:		(SGSL)		(IASL)				10/01/2013		
		Res	Non-Res	Res	Non-Res	Res	Non-Res	Conc	RL	
Compound	CAS	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	Q	ug/m3	ug/m3
Acetone	67-64-1	1600000	6800000	32000	140000	64000	280000		3	0.5
Dichlorodifluoromethane	75-71-8	5200	22000	100	440	200	880		2	1
Ethanol	64-17-5	NS	NS	NS	NS	NS	NS		1	0.4
Methylene chloride	75-09-2	4800	61000	96	1200	1300	5200		1	0.7

**BOLD Conc** Indicates a concentration that exceeds the NJDEP Vapor Intrusion Screening Levels

**BOLD Conc** Indicates a concentration that exceeds the NJDEP Rapid Action Levels

ND = Analyzed for but Not Detected at the RL

NS = No Standard Available

D = Extra dilution required for this compound

E = Concentration exceeds upper level of calibration range for instrument

RAL = Rapid Action Limit, used for indoor air (IA) only

\*Exceedances are based on the residential (lower) standards

**Integrated Analytical Laboratories**  
*Formaldehyde by EPA Method TO-11A*

Summary of Results

REACT

Report Date: 10/15/2013  
Date Received: 10/2/2013  
Job Number: E13-09671  
Date Analyzed: 10/3/2013  
Data File, Badge Front: AD101.0005  
Data File, Badge Back: AD101.0007

Project: Air Sampling  
Location: NJ

Analysis: Formaldehyde by EPA Method TO-11A

Instrument ID: HPLC-AD  
HPLC Column: C18 Zorbax  
Matrix-Units: Air (ug/ml)

Sample ID: Backyard 2  
IAL ID: E13-09671-02

<b>Analyte</b>	<b>Q</b>			
		<u>ug/sample</u>	<u>mg/m3</u>	<u>ppmV</u>
Formaldehyde		0.106	0.00777	0.00633
Reporting Limit		0.10		

**Integrated Analytical Laboratories**  
**Summary of Results**

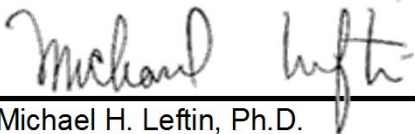
REACT

Report Date: 10/15/2013  
Job Number: E13-09671  
Date Received: 10/2/2013  
Date Analyzed: 10/15/2013

Project: Air Sampling  
Site: NJ

Analysis: US EPA Method 18 for Methane

<b>Sample ID</b>	<b>IAL ID</b>	<b>Methane ppm(v)</b>	<b>Reporting Limit ppm(v)</b>
Backyard 1	E13-09671-01	3.24	1.00



Michael H. Leftin, Ph.D.  
Laboratory Director

Analyst: J. Walukiewicz

E13-09671





# Air Analysis Data Summary

ASTM D5504

Sulfur Gases by GC/SCD

<b>Client Project Name:</b> Air Sampling	<b>EMSL ID:</b> 491300957-1
<b>Client Sample ID:</b> Backyard 03	<b>Tedlar/ Canister ID:</b> E2313
<b>Primary Lab File ID:</b> S1478.D	<b>Dilution Lab File ID:</b> NA
<b>Analysis Date:</b> 10/04/2013	<b>Analysis Date:</b> NA
<b>Sample Vol(ml):</b> 1	<b>Sample Vol(ml):</b> NA
<b>Dilution Factor:</b> 1.4	<b>Dilution Factor:</b> NA

Target Compounds	CAS#	MW	Result ppbv	RL ppbv	Q	Result ug/m3	RL ug/m3
Hydrogen Sulfide	7783-06-4	34.08	ND	5.6		ND	7.8
Sulfur Dioxide	7446-09-5	64.07	ND	14		ND	37
Carbonyl Sulfide	463-58-1	60.05	ND	5.6		ND	14
Methyl Mercaptan	74-93-1	48.11	ND	5.6		ND	11
Ethyl Mercaptan	75-08-1	62.13	ND	5.6		ND	14
Dimethyl Sulfide	75-18-3	62.13	ND	5.6		ND	14

### Qualifier Definitions

B = Compound also found in method blank.

ND= Non Detect

E= Estimated concentration. For screening purposes only.

D= Result reported from diluted analysis.

Analyte	Odor Characteristic <sup>2</sup>	Lowest Validated Odor Threshold <sup>2</sup>	OSHA PEL (general industry-ceiling) <sup>1</sup>	NIOSH REL (ceiling) <sup>1</sup>	ACGIH TLV (TWA) <sup>1</sup>
Hydrogen Sulfide	Rotten eggs, flatus	1ppb	20ppm	10ppm	1ppm
Carbonyl Sulfide	Burnt Matches, burnt fireworks	NE	NE		NE
Methyl Mercaptan	Rotten cabbage, odorized	0.0002ppb	10ppm	0.5ppm	0.5ppm
Ethyl Mercaptan	Rotten cabbage, odorized	0.098ppb	10ppm	0.5ppm	0.5ppm
Dimethyl Sulfide	Garlic-like <sup>3</sup>	8ppb			10ppm

### Reference

<sup>1</sup> www.osha.gov

<sup>2</sup> "Odor Thresholds for Chemicals with Established Occupational Health Standards", AIHA, Fairfax VA, 1989

<sup>3</sup> MSDS sheet, www.arkema-inc.com

### Agency Definitions

OSHA= Occupational Safety and Health Administration

NIOSH=National Institute for Occupational Safety and Health

ACGIH=American Conference of Governmental Industrial Hygienists

### Exposure Limit Definitions

PEL= Permissible Exposure Limit

REL=Recommended Exposure Limit

TLV=Threshold Limit Value

TWA=Time Weighted Average

NE= Not established