Derenzo and Associates, Inc.
Environmental Consultants

June 4, 2010

Ms. Trina Vielhauer, Bureau Chief
Bureau of Air Regulation
Department of Environmental Protection
STATE OF FLORIDA
2600 Blair Stone Road, MS 5505
Tallahassee, FL 32399-2400

Subject: Trail Ridge Energy, LLC
DEP File No. 0310358-011-AC (PSD-FL-374B)
LFG Monitoring Sulfur and Chlorine Contents

Dear Ms Vielhauer:

Condition 3.C. of Section III – Emission Unit(s) Specific Conditions of Air Construction Permit 0310358-011-AC (PSD-FL-374B) issued Trail Ridge Energy, LLC (Trail Ridge Energy) specifies that *The permittee shall comply with the following requirements to monitor the sulfur and chlorine content of the landfill gas:*

... the permittee shall sample and analyze the landfill gas for sulfur and chlorine content. The gas sample collected for the analyses shall be a composite sample and collected under normal operating conditions ... The gas sample collection and analyses for sulfur and chlorine content shall be done semi-annually ... Results shall be reported as SO_2 and HCl emission factors in terms of lb/MMscf of landfill gas.

The initial gas sample collection and analyses were completed in February 2007. Therefore, Derenzo and Associates, Inc. (Derenzo and Associates), on behalf of Trail Ridge Energy, is submitting to the Florida Department of Environmental Protection, Division of Air Resource Management (FDEP-DARM) results of sulfur and chlorine analyses that were performed on a sample of landfill gas (LFG) obtained from the Trail Ridge Landfill in May 2010 (semi-annual collection and analyses). The required SO_2 and HCl emission factors (in terms of lb/MMscf of landfill gas) and supporting analytical data are provided in the attached documents.

The air permit application for Trail Ridge Energy developed (based on USEPA AP-42 default LFG composition data) a:

1. SO_2 emission factor of 27.5 lb/MMscf of LFG; and

2. HCl emission factor of 11.95 lb/MMscf of LFG.

The SO_2 emission factor developed from analyses of the May 5, 2010 sample of gas obtained from the Trail Ridge Landfill is 8.029 lb/MMscf of LFG (<8.034 lb/MMscf of LFG with the incorporation of all non-measured chemicals at its reporting limit).

The HCl emission factor developed from analyses of the May 5, 2010 sample of gas obtained from the Trail Ridge Landfill is 0.31 lb/MMscf of landfill gas (<2.85 lb/MMscf of landfill gas with the incorporation of all non-measured chemicals at its reporting limit).

Please contact us if you have questions or require clarifications

Sincerely,

DERENZO AND ASSOCIATES, INC.

Charles Scamp
Environmental Consultant

attachments
c: Mike Laframboise, Landfill Energy Systems
Christopher L. Kirts, Northeast District Office
Jacksonville Environmental Quality Division

Trail Ridge Energy, LLC (May 5, 2010 Sample)

Sulfur Dioxide Emission Factor for LFG Combustion

LFG Influent Sulfur Compound	Analytical Report Concentrations[A] (ppmv)	Molecular Formula	No. Sulfur Atoms	Sulfur Content[B] as H_2S (ppmv)	Resulting SO_2 Emission Rate (lb./MMcf)
Hydrogen sulfide	28.5	H_2S	1	28.5	4.738 *
Carbonyl sulfide	0.07	CSO	1	0.07	0.011
Methyl mercaptan	5.40	CH_4S	1	5.40	0.898
Ethyl mercaptan	0.13	C_2H_6S	1	0.13	0.021
Dimethyl sulfide	12.5	C_2H_6S	1	12.5	2.078
Carbon disulfide	0.03	CS_2	2	0.06	0.010
Isopropyl mercaptan	0.55	C_3H_6S	1	0.55	0.091
tert-Butyl mercaptan	0.23	$C_4H_{10}S$	1	0.23	0.038
n-Propyl mercaptan	0.07	C_3H_8S	1	0.07	0.012
Ethyl methyl sulfide	0.04	C_3H_8S	1	0.04	0.007
Thiophene	0.52	C_4H_4S	1	0.52	0.086
Isobutyl mercaptan	0.07	$C_4H_{10}S$	1	0.07	0.012
Diethyl sulfide	0.02	$CH_3CH_2SCH_2CH_3$	1	0.02	0.003
n-Butyl mercaptan	0.02	$C_4H_{10}S$	1	0.02	0.004
3-Methyl Thiophene	0.05	C_5H_6S	1	0.05	0.008
Dimethyl disulfide	0.03	CH_3SSCH_3	2	0.06	0.010
Tetrahydrothiophene	0.01	$C_4H_8O_2S$	1	0.01	0.002
2-Ethylthiophene	<0.01	C_6H_8S	1	<0.01	<0.002
2,5-Dimethylthiopene	<0.01	C_6H_8S	1	<0.01	<0.002
Diethyl disulfide	<0.01	CH_3SSCH_3	2	<0.01	<0.002
Total				**<48.3**	**<8.034** [C]

Notes

A. May 6, 2010 LFG sample laboratory analytical results (see Attachment)

B. Determined by multiplying concentration by number of sulfur atoms in the molecule.

C. Calculation of SO_2 emission factor from sulfur content, as H_2S:

(48.3 scf H_2S/MMcf LFG) (1 scf SO_2/scf H_2S) (64.06 lb.SO_2/mol) / (385.3 ft^3/mol)

8.03 lb SO_2/MMcf LFG

* Sample calculation: SO_2 generation from hydrogen sulfide (H_2S):

Trail Ridge Energy, LLC (May 5, 2010 Sample)

Sulfur Dioxide Emission Factor for LFG Combustion

LFG Influent Sulfur Compound	Measured Concentrations[A] (ppmv)	Molecular Formula	No. Sulfur Atoms	Sulfur Content[B] as H_2S (ppmv)	Resulting SO_2 Emission Rate (lb./MMcf)
Hydrogen sulfide	28.5	H_2S	1	28.5	4.738 *
Carbonyl sulfide	0.07	CSO	1	0.07	0.011
Methyl mercaptan	5.40	CH_4S	1	5.40	0.898
Ethyl mercaptan	0.13	C_2H_6S	1	0.13	0.021
Dimethyl sulfide	12.5	C_2H_6S	1	12.5	2.078
Carbon disulfide	0.03	CS_2	2	0.06	0.010
Isopropyl mercaptan	0.55	C_3H_6S	1	0.55	0.091
tert-Butyl mercaptan	0.23	$C_4H_{10}S$	1	0.23	0.038
n-Propyl mercaptan	0.07	C_3H_8S	1	0.07	0.012
Ethyl methyl sulfide	0.04	C_3H_8S	1	0.04	0.007
Thiophene	0.52	C_4H_4S	1	0.52	0.086
Isobutyl mercaptan	0.07	$C_4H_{10}S$	1	0.07	0.012
Diethyl sulfide	0.02	$CH_3CH_2SCH_2CH_3$	1	0.02	0.003
n-Butyl mercaptan	0.02	$C_4H_{10}S$	1	0.02	0.004
3-Methyl Thiophene	0.05	C_5H_6S	1	0.05	0.008
Dimethyl disulfide	0.03	CH_3SSCH_3	2	0.06	0.010
Tetrahydrothiophene	0.01	$C_4H_8O_2S$	1	0.01	0.002
Total				**48.3**	**8.029**

Notes

A. May 6, 2010 LFG sample laboratory analytical results (see Attachment)

B. Determined by multiplying concentration by number of sulfur atoms in the molecule.

* Sample calculation: SO_2 generation from hydrogen sulfide (H_2S):

(28.5 scf H_2S/MMcf LFG) (1 scf SO_2/scf H_2S) (64.06 lb.SO_2/mol) / (385.3 ft^3/mol)

= 4.74 lb SO_2/MMcf LFG

Trail Ridge Energy, LLC (May 5, 2010 Sample)

LFG Combustion Hydrogen Chloride Emission Factor

LFG Influent Chlorine Coumpounds	Analytical Report Concentration[1] (ppm)	Molecular Formula	No. Chlorine Atoms	HCl Emission Factor (lb./MMcf)
Freon 12 (Dichlorodifluoromethane)	0.620	CCl_2F_2	2	0.117 *
Freon 114 (Dichlorotetrafluroethane)	<0.280	$C_2Cl_2F_4$	2	<0.053
Chloromethane	<1.10	CH_3Cl	1	<0.104
Vinyl Chloride	<0.280	C_2HCl	1	<0.026
Chloroethane	<0.280	C_2H_5Cl	1	<0.026
Freon 11 (Fluorotrichloromethane)	<0.280	$CFCl_3$	3	<0.079
Freon 113 (1,1,2-trichloro-1,2,2-trifluoroethane)	<0.280	$C_2Cl_2F_3$	2	<0.053
3-Chloropropene	<0.210	C_3H_5Cl	1	<0.020
Methylene Chloride (Dichloromethane)	<0.280	CH_2Cl_2	2	<0.053
1,2-Dichloroethene (as cis-1,2-Dichloroethene)	0.450	$C_2H_2Cl_2$	2	0.085
1,2-Dichloroethene (as trans-1,2-Dichloroethene)	<0.280	$C_2H_2Cl_2$	2	<0.053
1,1-Dichloroethane	<0.280	$C_2H_4Cl_2$	2	<0.053
1,1-Dichloroethene	<0.280	$C_2H_2Cl_2$	2	<0.053
Chloroform	<0.280	$CHCl_3$	3	<0.079
1,1,1-Trichloroethane	<0.280	$C_2H_3Cl_3$	3	<0.079
Carbon Tetrachloride	<0.280	CCl_4	4	<0.106
1,2-Dichloroethane	<0.280	$C_2H_4Cl_2$	2	<0.053
Trichloroethene	<0.280	C_2HCl_3	3	<0.079
1,2-dichloropropane	<0.280	$C_3H_6Cl_2$	2	<0.053
Bromodichloromethane	<0.280	$CBrCl_2$	2	<0.053
1,3-Dichloropropene (as cis-1,3-Dichloropropene)	<0.280	$C_3H_4Cl_2$	2	<0.053
1,3-Dichloropropene (as trans-1,3-Dichloropropene)	<0.280	$C_3H_4Cl_2$	2	<0.053
1,1,2-Trichloroethane	<0.280	$C_2H_3Cl_3$	3	<0.079
Tetrachloroethene (Perchloroethene)	0.300	C_2Cl_4	4	0.113
Dibromochloromethane	<0.280	$CHBr_2Cl$	1	<0.026
Chlorobenzene	<0.280	C_6H_5Cl	1	<0.026
1,1,2,2-Tetrachloroethane	<0.280	$C_2H_2Cl_4$	4	<0.106
1,3-Dichlorobenzene	<0.280	$C_6H_4Cl_2$	2	<0.053
1,4-Dichlorobenzene	<0.280	$C_6H_4Cl_2$	2	<0.053
alpha-Chlorotoluene	<0.280	C_7H_7Cl	1	<0.026
1,2-Dichlorobenzene	<0.280	$C_6H_4Cl_2$	2	<0.053
1,2,4-Trichlorobenzene	<1.100	$C_6H_3Cl_3$	3	<0.311
Hexachlorobutadiene	<1.100	C_4Cl_6	6	<0.622
Total hydrogen chloride emission factor (lb./MMcf)				**<2.85**

Notes

1. May 18, 2010 LFG sample laboratory analytical results (see Attachment)

* Example calculation for Freon 12 that assumes complete conversion of chloride to HCl

(0.620 ft^3 Freon 12/MMcf LFG) (2 mol HCl/mol Freon 12) (36.46 lb. HCl/mol) / (387 ft^3/mol)

= 0.117 lb. HCl/MMcf LFG

Trail Ridge Energy, LLC (May 5, 2010 Sample)

LFG Combustion Hydrogen Chloride Emission Factor

LFG Influent Chlorine Compounds	Measured Concentration[1] (ppm)	Molecular Formula	No. Chlorine Atoms	HCl Emission Factor (lb./MMcf)
Freon 12 (Dichlorodifluoromethane)	0.620	CCl_2F_2	2	0.117 *
1,2-Dichloroethene (as cis-1,2-Dichloroethene)	0.450	$C_2H_2Cl_2$	2	0.085
Tetrachloroethene (Perchloroethene)	0.300	C_2Cl_4	4	0.113
Total hydrogen chloride emission factor (lb./MMcf)				**0.31**

Notes

1. May 18, 2010 LFG sample laboratory analytical results (see Attachment)

* Example calculation for Freon 12 that assumes complete conversion of chloride to HCl

(0.620 ft^3 Freon 12/MMcf LFG) (2 mol HCl/mol Freon 12) (36.46 lb. HCl/mol) / (387 ft^3/mol)

= 0.117 lb. HCl/MMcf LFG

Client: Derenzo and Associates, Inc. CAS Project No: P1001577
Project: Trail Ridge Energy / 1001037

CASE NARRATIVE

The samples were received intact under chain of custody on May 6, 2010 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Sulfur Analysis

The samples were analyzed for twenty sulfur compounds per ASTM D 5504-08 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). All compounds with the exception of hydrogen sulfide and carbonyl sulfide are quantitated against the initial calibration curve for methyl mercaptan.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for utilization of less than the complete report.

Client: Derenzo and Associates, Inc.
Project: Trail Ridge Energy/1001037

Service Request: P1001577

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
P1001577-001	TRE-1	5/5/10	15:05
P1001577-002	TRE-2	5/5/10	15:15

Columbia Analytical Services, Inc.

Sample Acceptance Check Form

Client: Derenzo and Associates, Inc. Work order: P1001577

Project: Trail Ridge Energy / 1001037

Sample(s) received on: 5/6/2010 Date opened: 5/6/2010 by: SSTAPLES

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☐	☒	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Was a **chain-of-custody** provided?	☒	☐	☐
5	Was the **chain-of-custody** properly completed?	☒	☐	☐
6	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
7	Was **sample volume** received adequate for analysis?	☒	☐	☐
8	Are samples within specified holding times?	☒	☐	☐
9	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
	Cooler Temperature _____ °C Blank Temperature _____ °C			
10	Was a **trip blank** received?	☐	☐	☒
	Trip blank supplied by CAS: _____			
11	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
12	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
13	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
14	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1001577-001.01	1.0 L Tedlar Bag					
P1001577-002.01	1.0 L Tedlar Bag					

Explain any discrepancies: (include lab sample ID numbers): _____

*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12); Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Derenzo and Associates, Inc.**
Client Sample ID: **TRE-1**
Client Project ID: **Trail Ridge Energy / 1001037**

CAS Project ID: P1001577
CAS Sample ID: P1001577-001

Test Code: ASTM D 5504-08
Instrument ID: Agilent 7890A/GC22/SCD
Analyst: Zheng Wang
Sampling Media: 1.0 L Tedlar Bag
Test Notes:

Date Collected: 5/5/10
Time Collected: 15:05
Date Received: 5/6/10
Date Analyzed: 5/6/10
Time Analyzed: 10:14
Volume(s) Analyzed: 0.50 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	**Hydrogen Sulfide**	**39,000**	14	**28,000**	10	
463-58-1	**Carbonyl Sulfide**	**160**	25	**66**	10	
74-93-1	**Methyl Mercaptan**	**11,000**	20	**5,400**	10	
75-08-1	**Ethyl Mercaptan**	**320**	25	**130**	10	
75-18-3	**Dimethyl Sulfide**	**32,000**	25	**13,000**	10	
75-15-0	**Carbon Disulfide**	**87**	16	**28**	5.0	+
75-33-2	**Isopropyl Mercaptan**	**1,700**	31	**550**	10	
75-66-1	**tert-Butyl Mercaptan**	**860**	37	**230**	10	
107-03-9	**n-Propyl Mercaptan**	**220**	31	**72**	10	
624-89-5	**Ethyl Methyl Sulfide**	**130**	31	**41**	10	
110-02-1	**Thiophene**	**1,700**	34	**510**	10	W
513-44-0	**Isobutyl Mercaptan**	**250**	37	**67**	10	W
352-93-2	**Diethyl Sulfide**	**74**	37	**20**	10	W
109-79-5	***n*-Butyl Mercaptan**	**79**	37	**22**	10	
624-92-0	**Dimethyl Disulfide**	**120**	19	**32**	5.0	
616-44-4	**3-Methylthiophene**	**180**	40	**46**	10	
110-01-0	Tetrahydrothiophene	ND	36	ND	10	
638-02-8	2,5-Dimethylthiophene	ND	46	ND	10	
872-55-9	2-Ethylthiophene	ND	46	ND	10	
110-81-6	Diethyl Disulfide	ND	25	ND	5.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
W = Result quantified, but the corresponding peak was detected outside of generated retention time window.
+ = Possible Tedlar bag artifact.

Verified By: _____ Date: 5/18/10

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Derenzo and Associates, Inc.**
Client Sample ID: **TRE-2**
Client Project ID: **Trail Ridge Energy / 1001037**

CAS Project ID: P1001577
CAS Sample ID: P1001577-002

Test Code: ASTM D 5504-08
Instrument ID: Agilent 7890A/GC22/SCD
Analyst: Zheng Wang
Sampling Media: 1.0 L Tedlar Bag
Test Notes:

Date Collected: 5/5/10
Time Collected: 15:15
Date Received: 5/6/10
Date Analyzed: 5/6/10
Time Analyzed: 10:34
Volume(s) Analyzed: 0.50 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	**Hydrogen Sulfide**	**41,000**	14	**29,000**	10	
463-58-1	**Carbonyl Sulfide**	**170**	25	**69**	10	
74-93-1	**Methyl Mercaptan**	**11,000**	20	**5,400**	10	
75-08-1	**Ethyl Mercaptan**	**310**	25	**120**	10	
75-18-3	**Dimethyl Sulfide**	**32,000**	25	**12,000**	10	
75-15-0	**Carbon Disulfide**	**94**	16	**30**	5.0	
75-33-2	**Isopropyl Mercaptan**	**1,700**	31	**540**	10	
75-66-1	**tert-Butyl Mercaptan**	**860**	37	**230**	10	
107-03-9	**n-Propyl Mercaptan**	**230**	31	**73**	10	
624-89-5	**Ethyl Methyl Sulfide**	**140**	31	**44**	10	
110-02-1	**Thiophene**	**1,800**	34	**530**	10	W
513-44-0	**Isobutyl Mercaptan**	**270**	37	**72**	10	W
352-93-2	**Diethyl Sulfide**	**82**	37	**22**	10	W
109-79-5	**n-Butyl Mercaptan**	**92**	37	**25**	10	
624-92-0	**Dimethyl Disulfide**	**120**	19	**30**	5.0	
616-44-4	**3-Methylthiophene**	**190**	40	**48**	10	
110-01-0	**Tetrahydrothiophene**	**41**	36	**11**	10	
638-02-8	2,5-Dimethylthiophene	ND	46	ND	10	
872-55-9	2-Ethylthiophene	ND	46	ND	10	
110-81-6	Diethyl Disulfide	ND	25	ND	5.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
W = Result quantified, but the corresponding peak was detected outside of generated retention time window.

Verified By: _____ Date: 5/18/10

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Derenzo and Associates, Inc.**
Client Sample ID: **Method Blank**
Client Project ID: **Trail Ridge Energy / 1001037**

CAS Project ID: P1001577
CAS Sample ID: P100506-MB

Test Code: ASTM D 5504-08
Instrument ID: Agilent 7890A/GC22/SCD
Analyst: Zheng Wang
Sampling Media: 1.0 L Tedlar Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 5/06/10
Time Analyzed: 09:02
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: _____ Date: 5/8/10

Air Toxics LTD.
Laboratory Services Since 1989

WORK ORDER #: 1005309

Work Order Summary

CLIENT:	Mr. David Derenzo Derenzo & Associates 39395 Schoolcraft Road Livonia, MI 48150	**BILL TO:**	Ms. Donna Povich Derenzo & Associates 39395 Schoolcraft Road Livonia, MI 48150
PHONE:	734-464-3880	**P.O. #**	1268
FAX:	734-464-4368	**PROJECT #**	1001037 Trail Ridge Energy
DATE RECEIVED:	05/13/2010	**CONTACT:**	Jacquelyn Luta
DATE COMPLETED:	05/26/2010		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	TRE-1	Modified TO-15 (5&20 ppbv	1.4 "Hg	5 psi
02A	Lab Blank	Modified TO-15 (5&20 ppbv	NA	NA
03A	CCV	Modified TO-15 (5&20 ppbv	NA	NA
04A	LCS	Modified TO-15 (5&20 ppbv	NA	NA

CERTIFIED BY: Linda A. Truman DATE: 05/26/10

Laboratory Director

Certfication numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763,
NY NELAP - 11291, UT NELAP - 9166389892, AZ Licensure AZ0719
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/09, Expiration date: 06/30/10
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
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LABORATORY NARRATIVE
Modified TO-15 Soil Gas
Derenzo & Associates
Workorder# 1005309

One 6 Liter Summa Canister sample was received on May 13, 2010. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the full scan mode. The method involves concentrating up to 50 mLs of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis.

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

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

Requirement	*TO-15*	*ATL Modifications*
Daily CCV	+- 30% Difference	</= 30% Difference with two allowed out up to </=40%.; flag and narrate outliers
Sample collection media	Summa canister	ATL recommends use of summa canisters to insure data defensibility, but will report results from Tedlar bags at client request
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

The canister in this work order was pressurized with Helium prior to sampling, per client request. Dilution factors have been adjusted accordingly.

Definition of Data Qualifying Flags

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

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

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

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

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

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

Air Toxics LTD.
Laboratory Services Since 1989

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

Client Sample ID: TRE-1

Lab ID#: 1005309-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	280	620	1400	3000
Ethanol	1100	180000 E	2100	340000 E
Acetone	1100	26000	2700	62000
2-Propanol	1100	35000	2800	86000
Hexane	280	360	1000	1300
2-Butanone (Methyl Ethyl Ketone)	280	32000	840	94000
cis-1,2-Dichloroethene	280	450	1100	1800
Tetrahydrofuran	280	5200	840	15000
Cyclohexane	280	450	980	1600
Benzene	280	1300	900	4100
Heptane	280	680	1200	2800
4-Methyl-2-pentanone	280	1300	1200	5200
Toluene	280	12000	1100	47000
Tetrachloroethene	280	300	1900	2000
Ethyl Benzene	280	4400	1200	19000
m,p-Xylene	280	7800	1200	34000
o-Xylene	280	2000	1200	8700
Styrene	280	490	1200	2100
4-Ethyltoluene	280	940	1400	4600
1,3,5-Trimethylbenzene	280	350	1400	1700
1,2,4-Trimethylbenzene	280	700	1400	3400

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: TRE-1

Lab ID#: 1005309-01A

MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**b051820**	**Date of Collection:**	**5/5/10 4:14:00 PM**
Dil. Factor:	**56.7**	**Date of Analysis:**	**5/18/10 06:38 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	280	620	1400	3000
Freon 114	280	Not Detected	2000	Not Detected
Chloromethane	1100	Not Detected	2300	Not Detected
Vinyl Chloride	280	Not Detected	720	Not Detected
1,3-Butadiene	280	Not Detected	630	Not Detected
Bromomethane	280	Not Detected	1100	Not Detected
Chloroethane	280	Not Detected	750	Not Detected
Freon 11	280	Not Detected	1600	Not Detected
Ethanol	1100	180000 E	2100	340000 E
Freon 113	280	Not Detected	2200	Not Detected
1,1-Dichloroethene	280	Not Detected	1100	Not Detected
Acetone	1100	26000	2700	62000
2-Propanol	1100	35000	2800	86000
Carbon Disulfide	280	Not Detected	880	Not Detected
3-Chloropropene	1100	Not Detected	3500	Not Detected
Methylene Chloride	280	Not Detected	980	Not Detected
Methyl tert-butyl ether	280	Not Detected	1000	Not Detected
trans-1,2-Dichloroethene	280	Not Detected	1100	Not Detected
Hexane	280	360	1000	1300
1,1-Dichloroethane	280	Not Detected	1100	Not Detected
2-Butanone (Methyl Ethyl Ketone)	280	32000	840	94000
cis-1,2-Dichloroethene	280	450	1100	1800
Tetrahydrofuran	280	5200	840	15000
Chloroform	280	Not Detected	1400	Not Detected
1,1,1-Trichloroethane	280	Not Detected	1500	Not Detected
Cyclohexane	280	450	980	1600
Carbon Tetrachloride	280	Not Detected	1800	Not Detected
2,2,4-Trimethylpentane	280	Not Detected	1300	Not Detected
Benzene	280	1300	900	4100
1,2-Dichloroethane	280	Not Detected	1100	Not Detected
Heptane	280	680	1200	2800
Trichloroethene	280	Not Detected	1500	Not Detected
1,2-Dichloropropane	280	Not Detected	1300	Not Detected
1,4-Dioxane	1100	Not Detected	4100	Not Detected
Bromodichloromethane	280	Not Detected	1900	Not Detected
cis-1,3-Dichloropropene	280	Not Detected	1300	Not Detected
4-Methyl-2-pentanone	280	1300	1200	5200
Toluene	280	12000	1100	47000
trans-1,3-Dichloropropene	280	Not Detected	1300	Not Detected

Air TOXICS LTD.
Laboratory Services Since 1989

Client Sample ID: TRE-1

Lab ID#: 1005309-01A

MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**b051820**	**Date of Collection: 5/5/10 4:14:00 PM**	
Dil. Factor:	**56.7**	**Date of Analysis: 5/18/10 06:38 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1,2-Trichloroethane	280	Not Detected	1500	Not Detected
Tetrachloroethene	280	300	1900	2000
2-Hexanone	1100	Not Detected	4600	Not Detected
Dibromochloromethane	280	Not Detected	2400	Not Detected
1,2-Dibromoethane (EDB)	280	Not Detected	2200	Not Detected
Chlorobenzene	280	Not Detected	1300	Not Detected
Ethyl Benzene	280	4400	1200	19000
m,p-Xylene	280	7800	1200	34000
o-Xylene	280	2000	1200	8700
Styrene	280	490	1200	2100
Bromoform	280	Not Detected	2900	Not Detected
Cumene	280	Not Detected	1400	Not Detected
1,1,2,2-Tetrachloroethane	280	Not Detected	1900	Not Detected
Propylbenzene	280	Not Detected	1400	Not Detected
4-Ethyltoluene	280	940	1400	4600
1,3,5-Trimethylbenzene	280	350	1400	1700
1,2,4-Trimethylbenzene	280	700	1400	3400
1,3-Dichlorobenzene	280	Not Detected	1700	Not Detected
1,4-Dichlorobenzene	280	Not Detected	1700	Not Detected
alpha-Chlorotoluene	280	Not Detected	1500	Not Detected
1,2-Dichlorobenzene	280	Not Detected	1700	Not Detected
1,2,4-Trichlorobenzene	1100	Not Detected	8400	Not Detected
Hexachlorobutadiene	1100	Not Detected	12000	Not Detected

E = Exceeds instrument calibration range.

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	97	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	102	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1005309-02A

MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**b051809**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/18/10 11:16 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.0	Not Detected	25	Not Detected
Freon 114	5.0	Not Detected	35	Not Detected
Chloromethane	20	Not Detected	41	Not Detected
Vinyl Chloride	5.0	Not Detected	13	Not Detected
1,3-Butadiene	5.0	Not Detected	11	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	5.0	Not Detected	13	Not Detected
Freon 11	5.0	Not Detected	28	Not Detected
Ethanol	20	Not Detected	38	Not Detected
Freon 113	5.0	Not Detected	38	Not Detected
1,1-Dichloroethene	5.0	Not Detected	20	Not Detected
Acetone	20	Not Detected	48	Not Detected
2-Propanol	20	Not Detected	49	Not Detected
Carbon Disulfide	5.0	Not Detected	16	Not Detected
3-Chloropropene	20	Not Detected	63	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	5.0	Not Detected	18	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Hexane	5.0	Not Detected	18	Not Detected
1,1-Dichloroethane	5.0	Not Detected	20	Not Detected
2-Butanone (Methyl Ethyl Ketone)	5.0	Not Detected	15	Not Detected
cis-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Tetrahydrofuran	5.0	Not Detected	15	Not Detected
Chloroform	5.0	Not Detected	24	Not Detected
1,1,1-Trichloroethane	5.0	Not Detected	27	Not Detected
Cyclohexane	5.0	Not Detected	17	Not Detected
Carbon Tetrachloride	5.0	Not Detected	31	Not Detected
2,2,4-Trimethylpentane	5.0	Not Detected	23	Not Detected
Benzene	5.0	Not Detected	16	Not Detected
1,2-Dichloroethane	5.0	Not Detected	20	Not Detected
Heptane	5.0	Not Detected	20	Not Detected
Trichloroethene	5.0	Not Detected	27	Not Detected
1,2-Dichloropropane	5.0	Not Detected	23	Not Detected
1,4-Dioxane	20	Not Detected	72	Not Detected
Bromodichloromethane	5.0	Not Detected	34	Not Detected
cis-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
4-Methyl-2-pentanone	5.0	Not Detected	20	Not Detected
Toluene	5.0	Not Detected	19	Not Detected
trans-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1005309-02A

MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**b051809**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/18/10 11:16 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1,2-Trichloroethane	5.0	Not Detected	27	Not Detected
Tetrachloroethene	5.0	Not Detected	34	Not Detected
2-Hexanone	20	Not Detected	82	Not Detected
Dibromochloromethane	5.0	Not Detected	42	Not Detected
1,2-Dibromoethane (EDB)	5.0	Not Detected	38	Not Detected
Chlorobenzene	5.0	Not Detected	23	Not Detected
Ethyl Benzene	5.0	Not Detected	22	Not Detected
m,p-Xylene	5.0	Not Detected	22	Not Detected
o-Xylene	5.0	Not Detected	22	Not Detected
Styrene	5.0	Not Detected	21	Not Detected
Bromoform	5.0	Not Detected	52	Not Detected
Cumene	5.0	Not Detected	24	Not Detected
1,1,2,2-Tetrachloroethane	5.0	Not Detected	34	Not Detected
Propylbenzene	5.0	Not Detected	24	Not Detected
4-Ethyltoluene	5.0	Not Detected	24	Not Detected
1,3,5-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,2,4-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,3-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,4-Dichlorobenzene	5.0	Not Detected	30	Not Detected
alpha-Chlorotoluene	5.0	Not Detected	26	Not Detected
1,2-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,2,4-Trichlorobenzene	20	Not Detected	150	Not Detected
Hexachlorobutadiene	20	Not Detected	210	Not Detected

Container Type: NA - Not Applicable

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

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: CCV

Lab ID#: 1005309-03A

MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**b051803**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/18/10 08:09 AM**	

Compound	%Recovery
Freon 12	104
Freon 114	105
Chloromethane	104
Vinyl Chloride	115
1,3-Butadiene	119
Bromomethane	109
Chloroethane	98
Freon 11	102
Ethanol	116
Freon 113	107
1,1-Dichloroethene	106
Acetone	105
2-Propanol	106
Carbon Disulfide	103
3-Chloropropene	106
Methylene Chloride	95
Methyl tert-butyl ether	110
trans-1,2-Dichloroethene	105
Hexane	105
1,1-Dichloroethane	106
2-Butanone (Methyl Ethyl Ketone)	108
cis-1,2-Dichloroethene	105
Tetrahydrofuran	109
Chloroform	102
1,1,1-Trichloroethane	106
Cyclohexane	102
Carbon Tetrachloride	104
2,2,4-Trimethylpentane	106
Benzene	104
1,2-Dichloroethane	105
Heptane	107
Trichloroethene	104
1,2-Dichloropropane	103
1,4-Dioxane	107
Bromodichloromethane	101
cis-1,3-Dichloropropene	106
4-Methyl-2-pentanone	112
Toluene	104
trans-1,3-Dichloropropene	108

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: CCV

Lab ID#: 1005309-03A

MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**b051803**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/18/10 08:09 AM**	

Compound	%Recovery
1,1,2-Trichloroethane	104
Tetrachloroethene	104
2-Hexanone	108
Dibromochloromethane	106
1,2-Dibromoethane (EDB)	105
Chlorobenzene	102
Ethyl Benzene	106
m,p-Xylene	104
o-Xylene	103
Styrene	112
Bromoform	107
Cumene	106
1,1,2,2-Tetrachloroethane	101
Propylbenzene	103
4-Ethyltoluene	104
1,3,5-Trimethylbenzene	106
1,2,4-Trimethylbenzene	99
1,3-Dichlorobenzene	100
1,4-Dichlorobenzene	101
alpha-Chlorotoluene	123
1,2-Dichlorobenzene	101
1,2,4-Trichlorobenzene	85
Hexachlorobutadiene	89

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	97	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	105	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCS

Lab ID#: 1005309-04A

MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**b051804**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/18/10 08:33 AM**	

Compound	%Recovery
Freon 12	102
Freon 114	107
Chloromethane	104
Vinyl Chloride	115
1,3-Butadiene	115
Bromomethane	113
Chloroethane	102
Freon 11	104
Ethanol	120
Freon 113	97
1,1-Dichloroethene	96
Acetone	104
2-Propanol	106
Carbon Disulfide	106
3-Chloropropene	109
Methylene Chloride	89
Methyl tert-butyl ether	111
trans-1,2-Dichloroethene	105
Hexane	107
1,1-Dichloroethane	101
2-Butanone (Methyl Ethyl Ketone)	108
cis-1,2-Dichloroethene	104
Tetrahydrofuran	110
Chloroform	102
1,1,1-Trichloroethane	105
Cyclohexane	102
Carbon Tetrachloride	106
2,2,4-Trimethylpentane	107
Benzene	105
1,2-Dichloroethane	103
Heptane	109
Trichloroethene	108
1,2-Dichloropropane	106
1,4-Dioxane	110
Bromodichloromethane	104
cis-1,3-Dichloropropene	112
4-Methyl-2-pentanone	112
Toluene	101
trans-1,3-Dichloropropene	111

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCS

Lab ID#: 1005309-04A

MODIFIED EPA METHOD TO-15 GC/MS

File Name:	**b051804**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/18/10 08:33 AM**	

Compound	%Recovery
1,1,2-Trichloroethane	104
Tetrachloroethene	104
2-Hexanone	113
Dibromochloromethane	107
1,2-Dibromoethane (EDB)	108
Chlorobenzene	105
Ethyl Benzene	107
m,p-Xylene	107
o-Xylene	106
Styrene	115
Bromoform	108
Cumene	104
1,1,2,2-Tetrachloroethane	104
Propylbenzene	104
4-Ethyltoluene	106
1,3,5-Trimethylbenzene	109
1,2,4-Trimethylbenzene	103
1,3-Dichlorobenzene	104
1,4-Dichlorobenzene	106
alpha-Chlorotoluene	123
1,2-Dichlorobenzene	103
1,2,4-Trichlorobenzene	92
Hexachlorobutadiene	90

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	103	70-130