SULLIVAN ENVIRONMENTAL

October 30, 2013

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DIVISION OF AIR
RESOURCE MANAGEMENT

Ms. Rita-Felton Smith
Waste and Air Resources Management
FDEP Northeast District Office
8800 Baymeadows Way West, Suite 100
Jacksonville, Florida 32256

RE: City of Jacksonville, North Municipal Solid Waste Landfill
Title V Permit 0310340-005-AV
Permit Renewal Application
Project No.: 0310340-006-AV

Dear Ms. Felton-Smith:

Please find attached two copies of the North Municipal Solid Waste Landfill Title V Air Operating Permit Renewal application.

Please contact me with any questions or comments on the application.

Sincerely,

Kristine Sullivan
President
Sullivan Environmental

xc: Jeffrey Foster, P.E., P.G., City of Jacksonville (Solid Waste Division)
Rebecca Kelner, PE, Kelner Engineering
Ron Moore, Sullivan Environmental

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NORTH MUNICIPAL SOLID WASTE LANDFILL
FACILITY 0310340

TITLE V AIR OPERATIONS PERMIT RENEWAL APPLICATION

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NOV 04 2013
DIVISION OF AIR RESOURCE MANAGEMENT

Prepared for:

THE CITY OF JACKSONVILLE
1031 Superior Street
Jacksonville, Florida 32254

Presented to:

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
NORTHEAST DISTRICT
8800 Baymeadows Way West, Suite 100
Jacksonville, Florida 32256

Prepared by:

SULLIVAN ENVIRONMENTAL
4448 13TH Lane NE
St. Petersburg, FL 33703

And:

KELNER ENGINEERING
5844 Blue Savannah Drive
Leesburg, Florida 34748

November 2013

TABLE OF CONTENTS

PART I

PERMIT APPLICATION REPORT

NORTH MUNICIPAL SOLID WASTE LANDFILL AIR OPERATIONS PERMIT RENEWAL APPLICATION

1.0 INTRODUCTION

The City of Jacksonville's closed North Municipal Solid Waste Landfill (Facility) is currently permitted under Air Operations Permit 0310318-005-AV. The Facility is a closed +/- 126 acre Municipal Solid Waste (MSW) landfill that accepted waste from 1976 until 1992. The Facility has one permitted emissions unit:

EU001: Municipal Solid Waste Landfill and Enclosed Flare

Landfill gas collected from the closed MSW landfill is either destroyed on-site in an enclosed flare or sent off-site to the No. 3 Utility Boiler located at JEA Northside electric generating facility on New Berlin Road. The landfill gas is used as a supplemental fuel at the JEA boiler. Landfill gas is routed through a treatment system when sent to the JEA boiler. The JEA boiler is not in the Facility permit, and is not included in this renewal application. When JEA is not able to accept the landfill gas, it is combusted in the enclosed flare.

The Title V permit application expires June 18, 2014; the deadline to submit the permit renewal application is November 5, 2013. The City is required to complete a NMOC destruction efficiency test on the enclosed flare prior to permit renewal. The results of the testing will be submitted to FDEP under separate cover before the permit expiration date.

2.0 LANDFILL EMISSIONS

Landfill gas is generated by the anaerobic degradation of waste; methane (CH_4) and carbon dioxide (CO_2) are the primary constituents of landfill gas. Landfill gas also contains a small amount of non methane organic compounds (NMOC), including hazardous air pollutants (HAP) and volatile organic compounds (VOC). Other emissions associated with landfills include combustion byproducts from the control (combustion) of landfill gas, including carbon monoxide (CO), oxides of nitrogen (NO_x), particulate matter (PM), sulfur dioxide (SO_2), and hydrochloric acid (HCl).

We have calculated landfill fugitive emissions from the enclosed flare. Landfill fugitive emissions were calculated using the U.S. EPA's *Landfill Gas Emissions Model* (LandGEM) and equations in the US EPA's *Compilation of Air Pollutant Emission Factors* (AP-42). The LandGEM model uses a first-order decay equation to predict landfill gas and pollutant generation based on the amount and age of waste in place. The values recommended in AP-42 for methane generation potential (L_o=100m^3/MG) and methane generation rate constant (k=0.04) were used in the model along with estimated waste acceptance rates based on the total amount of waste in place divided by the number of years the landfill was open. The NMOC concentration in the landfill gas was input using the average of three recent Method 25C tests conducted at the Facility ($C_{NMOCAVE}$=72 ppmv hexane). VOCs were assumed to be equal to NMOC.

Model year 2013 was used as the worst-case year for pollutant emissions, as landfill gas generation will decrease over time in the closed landfill. The LandGEM model results are provided in Attachment 1. The Method 25C lab reports are provided in Attachment G to Part II of this application.

The enclosed flare pollutant emissions were calculated using the maximum rated capacity of the flare. Emissions factors provided by the manufacturer during the flare permitting process were used where possible, and default pollutant concentrations from Draft Section 2.4 of the EPAs *Compilation of Air Pollutant Emissions Factors* were used where manufacturer's data was not available. The manufacturer's recommended emissions factors are provided in Attachment 3.

Table 1 summarizes the maximum annual air pollutant emissions for the Facility over the permitting period. Detailed calculations are provided in Attachment 2.

TABLE 1
SUMMARY OF NORTH MUNICIPAL LANDFILL EMISSIONS

Air Pollutant / LFG Constituent	Maximum Mass-Based Emission Rate (TPY)
MSW Landfill Fugitive Emissions	
NMOC	0.9
VOC (taken as NMOC)	0.9
HAPS (total)	1.7
HAPS (single)	0.6 (toluene)
Enclosed Flare Emissions	
NO_x	29.8
CO	74.5
HCl	6.3
SO_2	7.2
PM10 (all PM assumed to be PM10)	37.3

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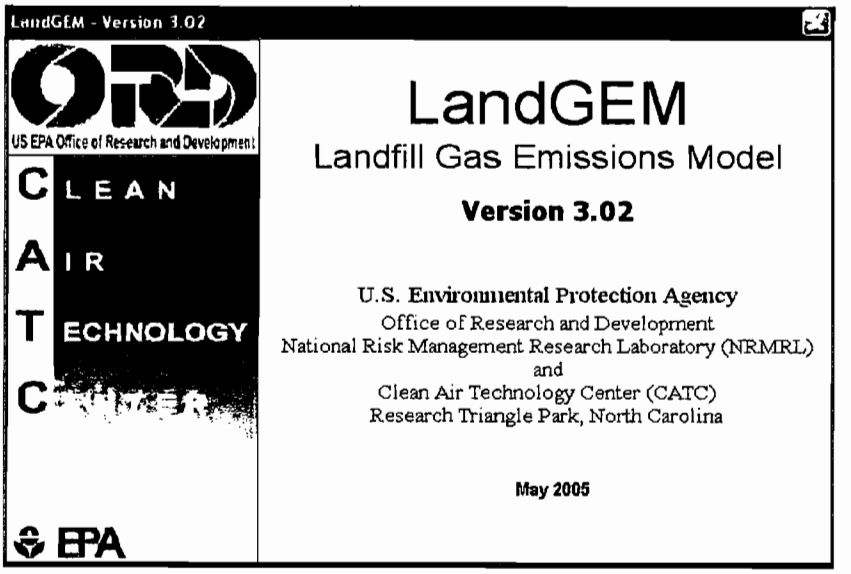
ATTACHMENT 1

LANDGEM RESULTS



Summary Report

Landfill Name or Identifier: NORTH LANDFILL

Date: Monday, October 28, 2013

Description/Comments:

About LandGEM:

First-Order Decomposition Rate Equation:

$$Q_{CH_4} = \sum_{i=1}^{n} \sum_{j=0.1}^{1} kL_o \left(\frac{M_i}{10} \right) e^{-kt_{ij}}$$

Where,

Q_{CH_4} = annual methane generation in the year of the calculation ($m^3/year$)
i = 1-year time increment
n = (year of the calculation) - (initial year of waste acceptance)
j = 0.1-year time increment
k = methane generation rate ($year^{-1}$)
L_o = potential methane generation capacity (m^3/Mg)
M_i = mass of waste accepted in the i^{th} year (Mg)
t_{ij} = age of the j^{th} section of waste mass M_i accepted in the i^{th} year (*decimal years*, e.g., 3.2 years)

LandGEM is based on a first-order decomposition rate equation for quantifying emissions from the decomposition of landfilled waste in municipal solid waste (MSW) landfills. The software provides a relatively simple approach to estimating landfill gas emissions. Model defaults are based on empirical data from U.S. landfills. Field test data can also be used in place of model defaults when available. Further guidance on EPA test methods, Clean Air Act (CAA) regulations, and other guidance regarding landfill gas emissions and control technology requirements can be found at http://www.epa.gov/ttnatw01/landfill/landflpg.html.

LandGEM is considered a screening tool — the better the input data, the better the estimates. Often, there are limitations with the available data regarding waste quantity and composition, variation in design and operating practices over time, and changes occurring over time that impact the emissions potential. Changes to landfill operation, such as operating under wet conditions through leachate recirculation or other liquid additions, will result in generating more gas at a faster rate. Defaults for estimating emissions for this type of operation are being developed to include in LandGEM along with defaults for convential landfills (no leachate or liquid additions) for developing emission inventories and determining CAA applicability. Refer to the Web site identified above for future updates.

Input Review

LANDFILL CHARACTERISTICS

Landfill Open Year	**1976**	
Landfill Closure Year (with 80-year limit)	**1992**	
Actual Closure Year (without limit)	***1992***	
Have Model Calculate Closure Year?	**No**	
Waste Design Capacity	**4,900,000**	*megagrams*

MODEL PARAMETERS

Methane Generation Rate, k	**0.040**	$year^{-1}$
Potential Methane Generation Capacity, L_o	**100**	m^3/Mg
NMOC Concentration	**72**	*ppmv as hexane*
Methane Content	**50**	*% by volume*

GASES / POLLUTANTS SELECTED

Gas / Pollutant #1:	**Total landfill gas**
Gas / Pollutant #2:	**Methane**
Gas / Pollutant #3:	**Carbon dioxide**
Gas / Pollutant #4:	**NMOC**

WASTE ACCEPTANCE RATES

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
1976	288,235	317,059	0	0
1977	288,235	317,059	288,235	317,059
1978	288,235	317,059	576,470	634,117
1979	288,235	317,059	864,705	951,176
1980	288,235	317,059	1,152,940	1,268,234
1981	288,235	317,059	1,441,175	1,585,293
1982	288,235	317,059	1,729,410	1,902,351
1983	288,235	317,059	2,017,645	2,219,410
1984	288,235	317,059	2,305,880	2,536,468
1985	288,235	317,059	2,594,115	2,853,527
1986	288,235	317,059	2,882,350	3,170,585
1987	288,235	317,059	3,170,585	3,487,644
1988	288,235	317,059	3,458,820	3,804,702
1989	288,235	317,059	3,747,055	4,121,761
1990	288,235	317,059	4,035,290	4,438,819
1991	288,235	317,059	4,323,525	4,755,878
1992	288,235	317,059	4,611,760	5,072,936
1993	0	0	4,899,995	5,389,995
1994	0	0	4,899,995	5,389,995
1995	0	0	4,899,995	5,389,995
1996	0	0	4,899,995	5,389,995
1997	0	0	4,899,995	5,389,995
1998	0	0	4,899,995	5,389,995
1999	0	0	4,899,995	5,389,995
2000	0	0	4,899,995	5,389,995
2001	0	0	4,899,995	5,389,995
2002	0	0	4,899,995	5,389,995
2003	0	0	4,899,995	5,389,995
2004	0	0	4,899,995	5,389,995
2005	0	0	4,899,995	5,389,995
2006	0	0	4,899,995	5,389,995
2007	0	0	4,899,995	5,389,995
2008	0	0	4,899,995	5,389,995
2009	0	0	4,899,995	5,389,995
2010	0	0	4,899,995	5,389,995
2011	0	0	4,899,995	5,389,995
2012	0	0	4,899,995	5,389,995
2013	0	0	4,899,995	5,389,995
2014	0	0	4,899,995	5,389,995
2015	0	0	4,899,995	5,389,995

WASTE ACCEPTANCE RATES (Continued)

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
2016	0	0	4,899,995	5,389,995
2017	0	0	4,899,995	5,389,995
2018	0	0	4,899,995	5,389,995
2019	0	0	4,899,995	5,389,995
2020	0	0	4,899,995	5,389,995
2021	0	0	4,899,995	5,389,995
2022	0	0	4,899,995	5,389,995
2023	0	0	4,899,995	5,389,995
2024	0	0	4,899,995	5,389,995
2025	0	0	4,899,995	5,389,995
2026	0	0	4,899,995	5,389,995
2027	0	0	4,899,995	5,389,995
2028	0	0	4,899,995	5,389,995
2029	0	0	4,899,995	5,389,995
2030	0	0	4,899,995	5,389,995
2031	0	0	4,899,995	5,389,995
2032	0	0	4,899,995	5,389,995
2033	0	0	4,899,995	5,389,995
2034	0	0	4,899,995	5,389,995
2035	0	0	4,899,995	5,389,995
2036	0	0	4,899,995	5,389,995
2037	0	0	4,899,995	5,389,995
2038	0	0	4,899,995	5,389,995
2039	0	0	4,899,995	5,389,995
2040	0	0	4,899,995	5,389,995
2041	0	0	4,899,995	5,389,995
2042	0	0	4,899,995	5,389,995
2043	0	0	4,899,995	5,389,995
2044	0	0	4,899,995	5,389,995
2045	0	0	4,899,995	5,389,995
2046	0	0	4,899,995	5,389,995
2047	0	0	4,899,995	5,389,995
2048	0	0	4,899,995	5,389,995
2049	0	0	4,899,995	5,389,995
2050	0	0	4,899,995	5,389,995
2051	0	0	4,899,995	5,389,995
2052	0	0	4,899,995	5,389,995
2053	0	0	4,899,995	5,389,995
2054	0	0	4,899,995	5,389,995
2055	0	0	4,899,995	5,389,995

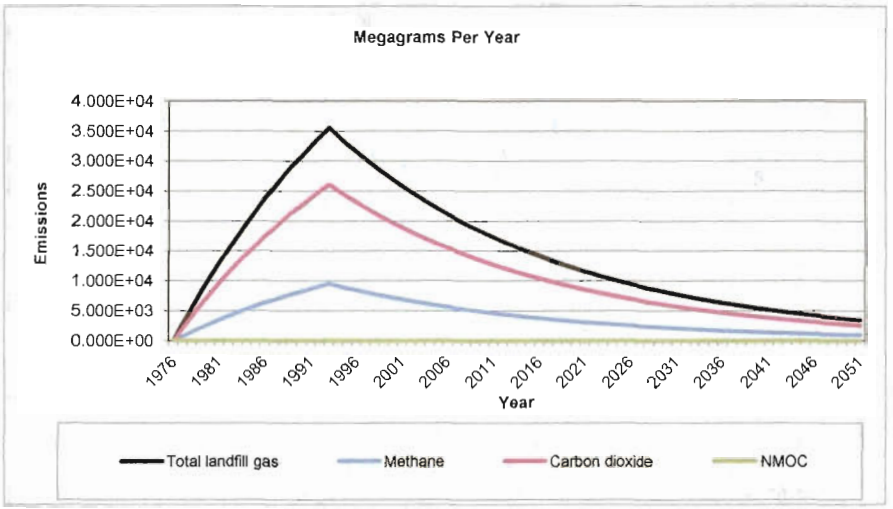
Pollutant Parameters

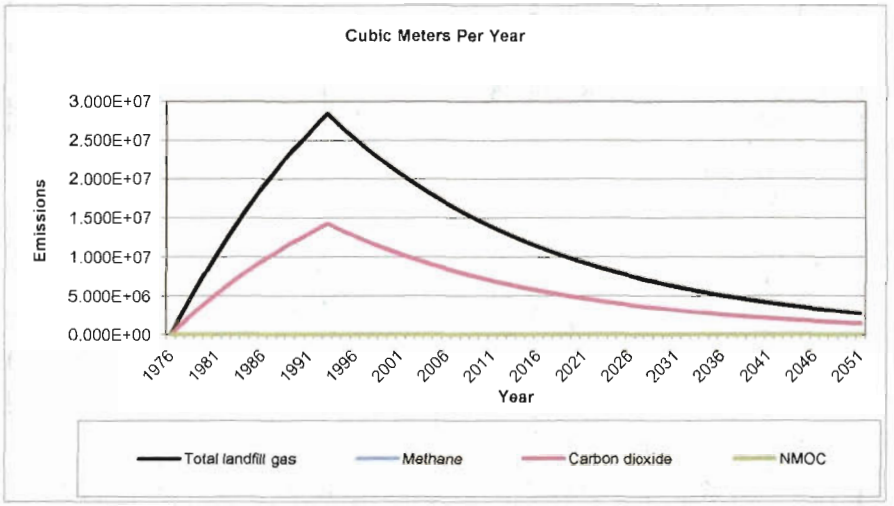
		Gas / Pollutant Default Parameters:		*User-specified Pollutant Parameters:*	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Gases	Total landfill gas		0.00		
	Methane		16.04		
	Carbon dioxide		44.01		
	NMOC	4,000	86.18		
Pollutants	1,1,1-Trichloroethane (methyl chloroform) - HAP	0.48	133.41		
	1,1,2,2-Tetrachloroethane - HAP/VOC	1.1	167.85		
	1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	2.4	98.97		
	1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	0.20	96.94		
	1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	0.41	98.96		
	1,2-Dichloropropane (propylene dichloride) - HAP/VOC	0.18	112.99		
	2-Propanol (isopropyl alcohol) - VOC	50	60.11		
	Acetone	7.0	58.08		
	Acrylonitrile - HAP/VOC	6.3	53.06		
	Benzene - No or Unknown Co-disposal - HAP/VOC	1.9	78.11		
	Benzene - Co-disposal - HAP/VOC	11	78.11		
	Bromodichloromethane - VOC	3.1	163.83		
	Butane - VOC	5.0	58.12		
	Carbon disulfide - HAP/VOC	0.58	76.13		
	Carbon monoxide	140	28.01		
	Carbon tetrachloride - HAP/VOC	4.0E-03	153.84		
	Carbonyl sulfide - HAP/VOC	0.49	60.07		
	Chlorobenzene - HAP/VOC	0.25	112.56		
	Chlorodifluoromethane	1.3	86.47		
	Chloroethane (ethyl chloride) - HAP/VOC	1.3	64.52		
	Chloroform - HAP/VOC	0.03	119.39		
	Chloromethane - VOC	1.2	50.49		
	Dichlorobenzene - (HAP for para isomer/VOC)	0.21	147		
	Dichlorodifluoromethane	16	120.91		
	Dichlorofluoromethane - VOC	2.6	102.92		
	Dichloromethane (methylene chloride) - HAP	14	84.94		
	Dimethyl sulfide (methyl sulfide) - VOC	7.8	62.13		
	Ethane	890	30.07		
	Ethanol - VOC	27	46.08		

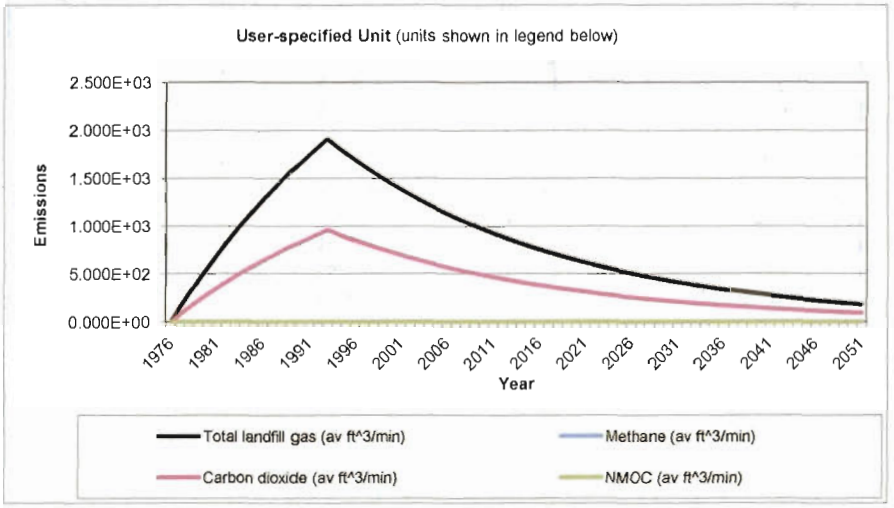
Pollutant Parameters (Continued)

		Gas / Pollutant Default Parameters:		*User-specified Pollutant Parameters:*	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Pollutants	Ethyl mercaptan (ethanethiol) - VOC	2.3	62.13		
	Ethylbenzene - HAP/VOC	4.6	106.16		
	Ethylene dibromide - HAP/VOC	1.0E-03	187.88		
	Fluorotrichloromethane - VOC	0.76	137.38		
	Hexane - HAP/VOC	6.6	86.18		
	Hydrogen sulfide	36	34.08		
	Mercury (total) - HAP	2.9E-04	200.61		
	Methyl ethyl ketone - HAP/VOC	7.1	72.11		
	Methyl isobutyl ketone - HAP/VOC	1.9	100.16		
	Methyl mercaptan - VOC	2.5	48.11		
	Pentane - VOC	3.3	72.15		
	Perchloroethylene (tetrachloroethylene) - HAP	3.7	165.83		
	Propane - VOC	11	44.09		
	t-1,2-Dichloroethene - VOC	2.8	96.94		
	Toluene - No or Unknown Co-disposal - HAP/VOC	39	92.13		
	Toluene - Co-disposal - HAP/VOC	170	92.13		
	Trichloroethylene (trichloroethene) - HAP/VOC	2.8	131.40		
	Vinyl chloride - HAP/VOC	7.3	62.50		
	Xylenes - HAP/VOC	12	106.16		

Graphs


Megagrams Per Year
Emissions
4.000E+04
3.500E+04
3.000E+04
2.500E+04
2.000E+04
1.500E+04
1.000E+04
5.000E+03
0.000E+00
1976 1981 1986 1991 1996 2001 2006 2011 2016 2021 2026 2031 2036 2041 2046 2051
Year
Total landfill gas
Methane
Carbon dioxide
NMOC


Cubic Meters Per Year
Emissions
3.000E+07
2.500E+07
2.000E+07
1.500E+07
1.000E+07
5.000E+06
0.000E+00
1976 1981 1986 1991 1996 2001 2006 2011 2016 2021 2026 2031 2036 2041 2046 2051
Year
Total landfill gas
Methane
Carbon dioxide
NMOC


User-specified Unit (units shown in legend below)
Emissions
2.500E+03
2.000E+03
1.500E+03
1.000E+03
5.000E+02
0.000E+00
1976 1981 1986 1991 1996 2001 2006 2011 2016 2021 2026 2031 2036 2041 2046 2051
Year
Total landfill gas (av ft^3/min)
Methane (av ft^3/min)
Carbon dioxide (av ft^3/min)
NMOC (av ft^3/min)

Results

Year	Total landfill gas			Methane		
	(Mg/year)	(m^3/year)	(av ft^3/min)	(Mg/year)	(m^3/year)	(av ft^3/min)
1976	0	0	0	0	0	0
1977	2.828E+03	2.265E+06	1.522E+02	7.555E+02	1.132E+06	7.609E+01
1978	5.546E+03	4.441E+06	2.984E+02	1.481E+03	2.220E+06	1.492E+02
1979	8.157E+03	6.532E+06	4.389E+02	2.179E+03	3.266E+06	2.194E+02
1980	1.067E+04	8.541E+06	5.738E+02	2.849E+03	4.270E+06	2.869E+02
1981	1.308E+04	1.047E+07	7.035E+02	3.493E+03	5.235E+06	3.518E+02
1982	1.539E+04	1.232E+07	8.281E+02	4.111E+03	6.162E+06	4.141E+02
1983	1.762E+04	1.411E+07	9.478E+02	4.706E+03	7.053E+06	4.739E+02
1984	1.975E+04	1.582E+07	1.063E+03	5.277E+03	7.909E+06	5.314E+02
1985	2.181E+04	1.746E+07	1.173E+03	5.825E+03	8.731E+06	5.867E+02
1986	2.378E+04	1.904E+07	1.280E+03	6.352E+03	9.522E+06	6.398E+02
1987	2.568E+04	2.056E+07	1.382E+03	6.859E+03	1.028E+07	6.908E+02
1988	2.750E+04	2.202E+07	1.480E+03	7.345E+03	1.101E+07	7.398E+02
1989	2.925E+04	2.342E+07	1.574E+03	7.813E+03	1.171E+07	7.868E+02
1990	3.093E+04	2.477E+07	1.664E+03	8.262E+03	1.238E+07	8.321E+02
1991	3.255E+04	2.606E+07	1.751E+03	8.694E+03	1.303E+07	8.755E+02
1992	3.410E+04	2.730E+07	1.835E+03	9.108E+03	1.365E+07	9.173E+02
1993	3.559E+04	2.850E+07	1.915E+03	9.507E+03	1.425E+07	9.574E+02
1994	3.419E+04	2.738E+07	1.840E+03	9.134E+03	1.369E+07	9.199E+02
1995	3.285E+04	2.631E+07	1.768E+03	8.776E+03	1.315E+07	8.838E+02
1996	3.157E+04	2.528E+07	1.698E+03	8.432E+03	1.264E+07	8.492E+02
1997	3.033E+04	2.429E+07	1.632E+03	8.101E+03	1.214E+07	8.159E+02
1998	2.914E+04	2.333E+07	1.568E+03	7.783E+03	1.167E+07	7.839E+02
1999	2.800E+04	2.242E+07	1.506E+03	7.478E+03	1.121E+07	7.531E+02
2000	2.690E+04	2.154E+07	1.447E+03	7.185E+03	1.077E+07	7.236E+02
2001	2.584E+04	2.069E+07	1.390E+03	6.903E+03	1.035E+07	6.952E+02
2002	2.483E+04	1.988E+07	1.336E+03	6.632E+03	9.942E+06	6.680E+02
2003	2.386E+04	1.910E+07	1.284E+03	6.372E+03	9.552E+06	6.418E+02
2004	2.292E+04	1.835E+07	1.233E+03	6.123E+03	9.177E+06	6.166E+02
2005	2.202E+04	1.763E+07	1.185E+03	5.882E+03	8.817E+06	5.924E+02
2006	2.116E+04	1.694E+07	1.138E+03	5.652E+03	8.472E+06	5.692E+02
2007	2.033E+04	1.628E+07	1.094E+03	5.430E+03	8.139E+06	5.469E+02
2008	1.953E+04	1.564E+07	1.051E+03	5.217E+03	7.820E+06	5.254E+02
2009	1.877E+04	1.503E+07	1.010E+03	5.013E+03	7.514E+06	5.048E+02
2010	1.803E+04	1.444E+07	9.701E+02	4.816E+03	7.219E+06	4.850E+02
2011	1.732E+04	1.387E+07	9.321E+02	4.627E+03	6.936E+06	4.660E+02
2012	1.664E+04	1.333E+07	~~8.955E+02~~	4.446E+03	6.664E+06	4.478E+02
2013	1.599E+04	1.281E+07	8.604E+02	4.272E+03	6.403E+06	4.302E+02
2014	1.536E+04	1.230E+07	~~8.267E+02~~	4.104E+03	6.152E+06	4.133E+02
2015	1.476E+04	1.182E+07	7.942E+02	3.943E+03	5.910E+06	3.971E+02
2016	1.418E+04	1.136E+07	7.631E+02	3.789E+03	5.679E+06	3.816E+02
2017	1.363E+04	1.091E+07	7.332E+02	3.640E+03	5.456E+06	3.666E+02
2018	1.309E+04	1.048E+07	7.044E+02	3.497E+03	5.242E+06	3.522E+02
2019	1.258E+04	1.007E+07	6.768E+02	3.360E+03	5.037E+06	3.384E+02
2020	1.209E+04	9.678E+06	6.503E+02	3.228E+03	4.839E+06	3.251E+02
2021	1.161E+04	9.299E+06	6.248E+02	3.102E+03	4.649E+06	3.124E+02
2022	1.116E+04	8.934E+06	6.003E+02	2.980E+03	4.467E+06	3.001E+02
2023	1.072E+04	8.584E+06	5.767E+02	2.863E+03	4.292E+06	2.884E+02
2024	1.030E+04	8.247E+06	5.541E+02	2.751E+03	4.124E+06	2.771E+02
2025	9.895E+03	7.924E+06	5.324E+02	2.643E+03	3.962E+06	2.662E+02

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	(m^3/year)	(av ft^3/min)	(Mg/year)	(m^3/year)	(av ft^3/min)
2026	9.507E+03	7.613E+06	5.115E+02	2.540E+03	3.807E+06	2.558E+02
2027	9.135E+03	7.315E+06	4.915E+02	2.440E+03	3.657E+06	2.457E+02
2028	8.776E+03	7.028E+06	4.722E+02	2.344E+03	3.514E+06	2.361E+02
2029	8.432E+03	6.752E+06	4.537E+02	2.252E+03	3.376E+06	2.268E+02
2030	8.102E+03	6.487E+06	4.359E+02	2.164E+03	3.244E+06	2.179E+02
2031	7.784E+03	6.233E+06	4.188E+02	2.079E+03	3.117E+06	2.094E+02
2032	7.479E+03	5.989E+06	4.024E+02	1.998E+03	2.994E+06	2.012E+02
2033	7.186E+03	5.754E+06	3.866E+02	1.919E+03	2.877E+06	1.933E+02
2034	6.904E+03	5.528E+06	3.714E+02	1.844E+03	2.764E+06	1.857E+02
2035	6.633E+03	5.311E+06	3.569E+02	1.772E+03	2.656E+06	1.784E+02
2036	6.373E+03	5.103E+06	3.429E+02	1.702E+03	2.552E+06	1.714E+02
2037	6.123E+03	4.903E+06	3.294E+02	1.636E+03	2.452E+06	1.647E+02
2038	5.883E+03	4.711E+06	3.165E+02	1.571E+03	2.355E+06	1.583E+02
2039	5.652E+03	4.526E+06	3.041E+02	1.510E+03	2.263E+06	1.521E+02
2040	5.431E+03	4.349E+06	2.922E+02	1.451E+03	2.174E+06	1.461E+02
2041	5.218E+03	4.178E+06	2.807E+02	1.394E+03	2.089E+06	1.404E+02
2042	5.013E+03	4.014E+06	2.697E+02	1.339E+03	2.007E+06	1.349E+02
2043	4.817E+03	3.857E+06	2.591E+02	1.287E+03	1.928E+06	1.296E+02
2044	4.628E+03	3.706E+06	2.490E+02	1.236E+03	1.853E+06	1.245E+02
2045	4.446E+03	3.560E+06	2.392E+02	1.188E+03	1.780E+06	1.196E+02
2046	4.272E+03	3.421E+06	2.298E+02	1.141E+03	1.710E+06	1.149E+02
2047	4.104E+03	3.287E+06	2.208E+02	1.096E+03	1.643E+06	1.104E+02
2048	3.944E+03	3.158E+06	2.122E+02	1.053E+03	1.579E+06	1.061E+02
2049	3.789E+03	3.034E+06	2.039E+02	1.012E+03	1.517E+06	1.019E+02
2050	3.640E+03	2.915E+06	1.959E+02	9.724E+02	1.457E+06	9.793E+01
2051	3.498E+03	2.801E+06	1.882E+02	9.342E+02	1.400E+06	9.409E+01
2052	3.360E+03	2.691E+06	1.808E+02	8.976E+02	1.345E+06	9.040E+01
2053	3.229E+03	2.585E+06	1.737E+02	8.624E+02	1.293E+06	8.686E+01
2054	3.102E+03	2.484E+06	1.669E+02	8.286E+02	1.242E+06	8.345E+01
2055	2.980E+03	2.387E+06	1.604E+02	7.961E+02	1.193E+06	8.018E+01
2056	2.864E+03	2.293E+06	1.541E+02	7.649E+02	1.147E+06	7.703E+01
2057	2.751E+03	2.203E+06	1.480E+02	7.349E+02	1.102E+06	7.401E+01
2058	2.643E+03	2.117E+06	1.422E+02	7.061E+02	1.058E+06	7.111E+01
2059	2.540E+03	2.034E+06	1.366E+02	6.784E+02	1.017E+06	6.832E+01
2060	2.440E+03	1.954E+06	1.313E+02	6.518E+02	9.770E+05	6.564E+01
2061	2.344E+03	1.877E+06	1.261E+02	6.262E+02	9.387E+05	6.307E+01
2062	2.253E+03	1.804E+06	1.212E+02	6.017E+02	9.019E+05	6.060E+01
2063	2.164E+03	1.733E+06	1.164E+02	5.781E+02	8.665E+05	5.822E+01
2064	2.079E+03	1.665E+06	1.119E+02	5.554E+02	8.325E+05	5.594E+01
2065	1.998E+03	1.600E+06	1.075E+02	5.336E+02	7.999E+05	5.374E+01
2066	1.920E+03	1.537E+06	1.033E+02	5.127E+02	7.685E+05	5.164E+01
2067	1.844E+03	1.477E+06	9.923E+01	4.926E+02	7.384E+05	4.961E+01
2068	1.772E+03	1.419E+06	9.533E+01	4.733E+02	7.094E+05	4.767E+01
2069	1.702E+03	1.363E+06	9.160E+01	4.547E+02	6.816E+05	4.580E+01
2070	1.636E+03	1.310E+06	8.800E+01	4.369E+02	6.549E+05	4.400E+01
2071	1.572E+03	1.258E+06	8.455E+01	4.198E+02	6.292E+05	4.228E+01
2072	1.510E+03	1.209E+06	8.124E+01	4.033E+02	6.045E+05	4.062E+01
2073	1.451E+03	1.162E+06	7.805E+01	3.875E+02	5.808E+05	3.903E+01
2074	1.394E+03	1.116E+06	7.499E+01	3.723E+02	5.581E+05	3.750E+01
2075	1.339E+03	1.072E+06	7.205E+01	3.577E+02	5.362E+05	3.603E+01
2076	1.287E+03	1.030E+06	6.923E+01	3.437E+02	5.152E+05	3.461E+01

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	(m^3/year)	(av ft^3/min)	(Mg/year)	(m^3/year)	(av ft^3/min)
2077	1.236E+03	9.899E+05	6.651E+01	3.302E+02	4.950E+05	3.326E+01
2078	1.188E+03	9.511E+05	6.390E+01	3.173E+02	4.756E+05	3.195E+01
2079	1.141E+03	9.138E+05	6.140E+01	3.048E+02	4.569E+05	3.070E+01
2080	1.096E+03	8.780E+05	5.899E+01	2.929E+02	4.390E+05	2.950E+01
2081	1.053E+03	8.436E+05	5.668E+01	2.814E+02	4.218E+05	2.834E+01
2082	1.012E+03	8.105E+05	5.446E+01	2.704E+02	4.052E+05	2.723E+01
2083	9.725E+02	7.787E+05	5.232E+01	2.598E+02	3.893E+05	2.616E+01
2084	9.343E+02	7.482E+05	5.027E+01	2.496E+02	3.741E+05	2.513E+01
2085	8.977E+02	7.188E+05	4.830E+01	2.398E+02	3.594E+05	2.415E+01
2086	8.625E+02	6.906E+05	4.640E+01	2.304E+02	3.453E+05	2.320E+01
2087	8.287E+02	6.636E+05	4.458E+01	2.213E+02	3.318E+05	2.229E+01
2088	7.962E+02	6.375E+05	4.284E+01	2.127E+02	3.188E+05	2.142E+01
2089	7.650E+02	6.125E+05	4.116E+01	2.043E+02	3.063E+05	2.058E+01
2090	7.350E+02	5.885E+05	3.954E+01	1.963E+02	2.943E+05	1.977E+01
2091	7.061E+02	5.655E+05	3.799E+01	1.886E+02	2.827E+05	1.900E+01
2092	6.785E+02	5.433E+05	3.650E+01	1.812E+02	2.716E+05	1.825E+01
2093	6.519E+02	5.220E+05	3.507E+01	1.741E+02	2.610E+05	1.754E+01
2094	6.263E+02	5.015E+05	3.370E+01	1.673E+02	2.508E+05	1.685E+01
2095	6.017E+02	4.818E+05	3.238E+01	1.607E+02	2.409E+05	1.619E+01
2096	5.781E+02	4.630E+05	3.111E+01	1.544E+02	2.315E+05	1.555E+01
2097	5.555E+02	4.448E+05	2.989E+01	1.484E+02	2.224E+05	1.494E+01
2098	5.337E+02	4.274E+05	2.871E+01	1.426E+02	2.137E+05	1.436E+01
2099	5.128E+02	4.106E+05	2.759E+01	1.370E+02	2.053E+05	1.379E+01
2100	4.927E+02	3.945E+05	2.651E+01	1.316E+02	1.973E+05	1.325E+01
2101	4.733E+02	3.790E+05	2.547E+01	1.264E+02	1.895E+05	1.273E+01
2102	4.548E+02	3.642E+05	2.447E+01	1.215E+02	1.821E+05	1.223E+01
2103	4.370E+02	3.499E+05	2.351E+01	1.167E+02	1.749E+05	1.175E+01
2104	4.198E+02	3.362E+05	2.259E+01	1.121E+02	1.681E+05	1.129E+01
2105	4.034E+02	3.230E+05	2.170E+01	1.077E+02	1.615E+05	1.085E+01
2106	3.875E+02	3.103E+05	2.085E+01	1.035E+02	1.552E+05	1.043E+01
2107	3.723E+02	2.982E+05	2.003E+01	9.946E+01	1.491E+05	1.002E+01
2108	3.577E+02	2.865E+05	1.925E+01	9.556E+01	1.432E+05	9.624E+00
2109	3.437E+02	2.752E+05	1.849E+01	9.181E+01	1.376E+05	9.246E+00
2110	3.302E+02	2.644E+05	1.777E+01	8.821E+01	1.322E+05	8.884E+00
2111	3.173E+02	2.541E+05	1.707E+01	8.475E+01	1.270E+05	8.536E+00
2112	3.049E+02	2.441E+05	1.640E+01	8.143E+01	1.221E+05	8.201E+00
2113	2.929E+02	2.345E+05	1.576E+01	7.824E+01	1.173E+05	7.879E+00
2114	2.814E+02	2.253E+05	1.514E+01	7.517E+01	1.127E+05	7.570E+00
2115	2.704E+02	2.165E+05	1.455E+01	7.222E+01	1.083E+05	7.274E+00
2116	2.598E+02	2.080E+05	1.398E+01	6.939E+01	1.040E+05	6.988E+00

Results (Continued)

Year	Carbon dioxide			NMOC		
	(Mg/year)	(m^3/year)	(av ft^3/min)	(Mg/year)	(m^3/year)	(av ft^3/min)
1976	0	0	0	0	0	0
1977	2.073E+03	1.132E+06	7.609E+01	5.845E-01	1.631E+02	1.096E-02
1978	4.065E+03	2.220E+06	1.492E+02	1.146E+00	3.198E+02	2.148E-02
1979	5.978E+03	3.266E+06	2.194E+02	1.686E+00	4.703E+02	3.160E-02
1980	7.817E+03	4.270E+06	2.869E+02	2.204E+00	6.149E+02	4.132E-02
1981	9.583E+03	5.235E+06	3.518E+02	2.702E+00	7.539E+02	5.065E-02
1982	1.128E+04	6.162E+06	4.141E+02	3.181E+00	8.874E+02	5.962E-02
1983	1.291E+04	7.053E+06	4.739E+02	3.641E+00	1.016E+03	6.824E-02
1984	1.448E+04	7.909E+06	5.314E+02	4.082E+00	1.139E+03	7.652E-02
1985	1.598E+04	8.731E+06	5.867E+02	4.507E+00	1.257E+03	8.448E-02
1986	1.743E+04	9.522E+06	6.398E+02	4.915E+00	1.371E+03	9.212E-02
1987	1.882E+04	1.028E+07	6.908E+02	5.306E+00	1.480E+03	9.947E-02
1988	2.015E+04	1.101E+07	7.398E+02	5.683E+00	1.585E+03	1.065E-01
1989	2.144E+04	1.171E+07	7.868E+02	6.045E+00	1.686E+03	1.133E-01
1990	2.267E+04	1.238E+07	8.321E+02	6.392E+00	1.783E+03	1.198E-01
1991	2.385E+04	1.303E+07	8.755E+02	6.726E+00	1.876E+03	1.261E-01
1992	2.499E+04	1.365E+07	9.173E+02	7.047E+00	1.966E+03	1.321E-01
1993	2.608E+04	1.425E+07	9.574E+02	7.355E+00	2.052E+03	1.379E-01
1994	2.506E+04	1.369E+07	9.199E+02	7.067E+00	1.971E+03	1.325E-01
1995	2.408E+04	1.315E+07	8.838E+02	6.790E+00	1.894E+03	1.273E-01
1996	2.313E+04	1.264E+07	8.492E+02	6.523E+00	1.820E+03	1.223E-01
1997	2.223E+04	1.214E+07	8.159E+02	6.268E+00	1.749E+03	1.175E-01
1998	2.136E+04	1.167E+07	7.839E+02	6.022E+00	1.680E+03	1.129E-01
1999	2.052E+04	1.121E+07	7.531E+02	5.786E+00	1.614E+03	1.085E-01
2000	1.971E+04	1.077E+07	7.236E+02	5.559E+00	1.551E+03	1.042E-01
2001	1.894E+04	1.035E+07	6.952E+02	5.341E+00	1.490E+03	1.001E-01
2002	1.820E+04	9.942E+06	6.680E+02	5.131E+00	1.432E+03	9.619E-02
2003	1.748E+04	9.552E+06	6.418E+02	4.930E+00	1.375E+03	9.242E-02
2004	1.680E+04	9.177E+06	6.166E+02	4.737E+00	1.322E+03	8.879E-02
2005	1.614E+04	8.817E+06	5.924E+02	4.551E+00	1.270E+03	8.531E-02
2006	1.551E+04	8.472E+06	5.692E+02	4.373E+00	1.220E+03	8.197E-02
2007	1.490E+04	8.139E+06	5.469E+02	4.201E+00	1.172E+03	7.875E-02
2008	1.432E+04	7.820E+06	5.254E+02	4.037E+00	1.126E+03	7.566E-02
2009	1.375E+04	7.514E+06	5.048E+02	3.878E+00	1.082E+03	7.270E-02
2010	1.321E+04	7.219E+06	4.850E+02	3.726E+00	1.040E+03	6.985E-02
2011	1.270E+04	6.936E+06	4.660E+02	3.580E+00	9.988E+02	6.711E-02
2012	1.220E+04	6.664E+06	4.478E+02	~~3.440E+00~~	9.596E+02	6.448E-02
2013	1.172E+04	6.403E+06	4.302E+02	3.305E+00	9.220E+02	6.195E-02
2014	1.126E+04	6.152E+06	4.133E+02	~~3.175E+00~~	8.858E+02	5.952E-02
2015	1.082E+04	5.910E+06	3.971E+02	3.051E+00	8.511E+02	5.719E-02
2016	1.039E+04	5.679E+06	3.816E+02	2.931E+00	8.177E+02	5.494E-02
2017	9.987E+03	5.456E+06	3.666E+02	2.816E+00	7.857E+02	5.279E-02
2018	9.596E+03	5.242E+06	3.522E+02	2.706E+00	7.549E+02	5.072E-02
2019	9.219E+03	5.037E+06	3.384E+02	2.600E+00	7.253E+02	4.873E-02
2020	8.858E+03	4.839E+06	3.251E+02	2.498E+00	6.968E+02	4.682E-02
2021	8.511E+03	4.649E+06	3.124E+02	2.400E+00	6.695E+02	4.498E-02
2022	8.177E+03	4.467E+06	3.001E+02	2.306E+00	6.433E+02	4.322E-02
2023	7.856E+03	4.292E+06	2.884E+02	2.215E+00	6.180E+02	4.153E-02
2024	7.548E+03	4.124E+06	2.771E+02	2.128E+00	5.938E+02	3.990E-02
2025	7.252E+03	3.962E+06	2.662E+02	2.045E+00	5.705E+02	3.833E-02

Results (Continued)

Year	Carbon dioxide			NMOC		
	(Mg/year)	(m^3/year)	(av ft^3/min)	(Mg/year)	(m^3/year)	(av ft^3/min)
2026	6.968E+03	3.807E+06	2.558E+02	1.965E+00	5.481E+02	3.683E-02
2027	6.695E+03	3.657E+06	2.457E+02	1.888E+00	5.266E+02	3.539E-02
2028	6.432E+03	3.514E+06	2.361E+02	1.814E+00	5.060E+02	3.400E-02
2029	6.180E+03	3.376E+06	2.268E+02	1.743E+00	4.862E+02	3.266E-02
2030	5.938E+03	3.244E+06	2.179E+02	1.674E+00	4.671E+02	3.138E-02
2031	5.705E+03	3.117E+06	2.094E+02	1.609E+00	4.488E+02	3.015E-02
2032	5.481E+03	2.994E+06	2.012E+02	1.546E+00	4.312E+02	2.897E-02
2033	5.266E+03	2.877E+06	1.933E+02	1.485E+00	4.143E+02	2.784E-02
2034	5.060E+03	2.764E+06	1.857E+02	1.427E+00	3.980E+02	2.674E-02
2035	4.861E+03	2.656E+06	1.784E+02	1.371E+00	3.824E+02	2.570E-02
2036	4.671E+03	2.552E+06	1.714E+02	1.317E+00	3.674E+02	2.469E-02
2037	4.488E+03	2.452E+06	1.647E+02	1.265E+00	3.530E+02	2.372E-02
2038	4.312E+03	2.355E+06	1.583E+02	1.216E+00	3.392E+02	2.279E-02
2039	4.143E+03	2.263E+06	1.521E+02	1.168E+00	3.259E+02	2.190E-02
2040	3.980E+03	2.174E+06	1.461E+02	1.122E+00	3.131E+02	2.104E-02
2041	3.824E+03	2.089E+06	1.404E+02	1.078E+00	3.008E+02	2.021E-02
2042	3.674E+03	2.007E+06	1.349E+02	1.036E+00	2.890E+02	1.942E-02
2043	3.530E+03	1.928E+06	1.296E+02	9.954E-01	2.777E+02	1.866E-02
2044	3.392E+03	1.853E+06	1.245E+02	9.564E-01	2.668E+02	1.793E-02
2045	3.259E+03	1.780E+06	1.196E+02	9.189E-01	2.563E+02	1.722E-02
2046	3.131E+03	1.710E+06	1.149E+02	8.828E-01	2.463E+02	1.655E-02
2047	3.008E+03	1.643E+06	1.104E+02	8.482E-01	2.366E+02	1.590E-02
2048	2.890E+03	1.579E+06	1.061E+02	8.150E-01	2.274E+02	1.528E-02
2049	2.777E+03	1.517E+06	1.019E+02	7.830E-01	2.184E+02	1.468E-02
2050	2.668E+03	1.457E+06	9.793E+01	7.523E-01	2.099E+02	1.410E-02
2051	2.563E+03	1.400E+06	9.409E+01	7.228E-01	2.017E+02	1.355E-02
2052	2.463E+03	1.345E+06	9.040E+01	6.945E-01	1.937E+02	1.302E-02
2053	2.366E+03	1.293E+06	8.686E+01	6.672E-01	1.861E+02	1.251E-02
2054	2.273E+03	1.242E+06	8.345E+01	6.411E-01	1.788E+02	1.202E-02
2055	2.184E+03	1.193E+06	8.018E+01	6.159E-01	1.718E+02	1.155E-02
2056	2.099E+03	1.147E+06	7.703E+01	5.918E-01	1.651E+02	1.109E-02
2057	2.016E+03	1.102E+06	7.401E+01	5.686E-01	1.586E+02	1.066E-02
2058	1.937E+03	1.058E+06	7.111E+01	5.463E-01	1.524E+02	1.024E-02
2059	1.861E+03	1.017E+06	6.832E+01	5.249E-01	1.464E+02	9.838E-03
2060	1.788E+03	9.770E+05	6.564E+01	5.043E-01	1.407E+02	9.453E-03
2061	1.718E+03	9.387E+05	6.307E+01	4.845E-01	1.352E+02	9.082E-03
2062	1.651E+03	9.019E+05	6.060E+01	4.655E-01	1.299E+02	8.726E-03
2063	1.586E+03	8.665E+05	5.822E+01	4.473E-01	1.248E+02	8.384E-03
2064	1.524E+03	8.325E+05	5.594E+01	4.297E-01	1.199E+02	8.055E-03
2065	1.464E+03	7.999E+05	5.374E+01	4.129E-01	1.152E+02	7.739E-03
2066	1.407E+03	7.685E+05	5.164E+01	3.967E-01	1.107E+02	7.436E-03
2067	1.352E+03	7.384E+05	4.961E+01	3.811E-01	1.063E+02	7.144E-03
2068	1.299E+03	7.094E+05	4.767E+01	3.662E-01	1.022E+02	6.864E-03
2069	1.248E+03	6.816E+05	4.580E+01	3.518E-01	9.815E+01	6.595E-03
2070	1.199E+03	6.549E+05	4.400E+01	3.380E-01	9.430E+01	6.336E-03
2071	1.152E+03	6.292E+05	4.228E+01	3.248E-01	9.061E+01	6.088E-03
2072	1.107E+03	6.045E+05	4.062E+01	3.120E-01	8.705E+01	5.849E-03
2073	1.063E+03	5.808E+05	3.903E+01	2.998E-01	8.364E+01	5.620E-03
2074	1.022E+03	5.581E+05	3.750E+01	2.881E-01	8.036E+01	5.399E-03
2075	9.815E+02	5.362E+05	3.603E+01	2.768E-01	7.721E+01	5.188E-03
2076	9.430E+02	5.152E+05	3.461E+01	2.659E-01	7.418E+01	4.984E-03

Results (Continued)

Year	Carbon dioxide			NMOC		
	(Mg/year)	(m^3/year)	(av ft^3/min)	(Mg/year)	(m^3/year)	(av ft^3/min)
2077	9.060E+02	4.950E+05	3.326E+01	2.555E-01	7.127E+01	4.789E-03
2078	8.705E+02	4.756E+05	3.195E+01	2.455E-01	6.848E+01	4.601E-03
2079	8.364E+02	4.569E+05	3.070E+01	2.358E-01	6.579E+01	4.421E-03
2080	8.036E+02	4.390E+05	2.950E+01	2.266E-01	6.321E+01	4.247E-03
2081	7.721E+02	4.218E+05	2.834E+01	2.177E-01	6.074E+01	4.081E-03
2082	7.418E+02	4.052E+05	2.723E+01	2.092E-01	5.835E+01	3.921E-03
2083	7.127E+02	3.893E+05	2.616E+01	2.010E-01	5.607E+01	3.767E-03
2084	6.848E+02	3.741E+05	2.513E+01	1.931E-01	5.387E+01	3.619E-03
2085	6.579E+02	3.594E+05	2.415E+01	1.855E-01	5.176E+01	3.477E-03
2086	6.321E+02	3.453E+05	2.320E+01	1.782E-01	4.973E+01	3.341E-03
2087	6.073E+02	3.318E+05	2.229E+01	1.713E-01	4.778E+01	3.210E-03
2088	5.835E+02	3.188E+05	2.142E+01	1.645E-01	4.590E+01	3.084E-03
2089	5.606E+02	3.063E+05	2.058E+01	1.581E-01	4.410E+01	2.963E-03
2090	5.386E+02	2.943E+05	1.977E+01	1.519E-01	4.237E+01	2.847E-03
2091	5.175E+02	2.827E+05	1.900E+01	1.459E-01	4.071E+01	2.735E-03
2092	4.972E+02	2.716E+05	1.825E+01	1.402E-01	3.912E+01	2.628E-03
2093	4.777E+02	2.610E+05	1.754E+01	1.347E-01	3.758E+01	2.525E-03
2094	4.590E+02	2.508E+05	1.685E+01	1.294E-01	3.611E+01	2.426E-03
2095	4.410E+02	2.409E+05	1.619E+01	1.244E-01	3.469E+01	2.331E-03
2096	4.237E+02	2.315E+05	1.555E+01	1.195E-01	3.333E+01	2.240E-03
2097	4.071E+02	2.224E+05	1.494E+01	1.148E-01	3.203E+01	2.152E-03
2098	3.911E+02	2.137E+05	1.436E+01	1.103E-01	3.077E+01	2.067E-03
2099	3.758E+02	2.053E+05	1.379E+01	1.060E-01	2.956E+01	1.986E-03
2100	3.611E+02	1.973E+05	1.325E+01	1.018E-01	2.840E+01	1.908E-03
2101	3.469E+02	1.895E+05	1.273E+01	9.782E-02	2.729E+01	1.834E-03
2102	3.333E+02	1.821E+05	1.223E+01	9.399E-02	2.622E+01	1.762E-03
2103	3.202E+02	1.749E+05	1.175E+01	9.030E-02	2.519E+01	1.693E-03
2104	3.077E+02	1.681E+05	1.129E+01	8.676E-02	2.420E+01	1.626E-03
2105	2.956E+02	1.615E+05	1.085E+01	8.336E-02	2.326E+01	1.563E-03
2106	2.840E+02	1.552E+05	1.043E+01	8.009E-02	2.234E+01	1.501E-03
2107	2.729E+02	1.491E+05	1.002E+01	7.695E-02	2.147E+01	1.442E-03
2108	2.622E+02	1.432E+05	9.624E+00	7.393E-02	2.063E+01	1.386E-03
2109	2.519E+02	1.376E+05	9.246E+00	7.103E-02	1.982E+01	1.331E-03
2110	2.420E+02	1.322E+05	8.884E+00	6.825E-02	1.904E+01	1.279E-03
2111	2.325E+02	1.270E+05	8.536E+00	6.557E-02	1.829E+01	1.229E-03
2112	2.234E+02	1.221E+05	8.201E+00	6.300E-02	1.758E+01	1.181E-03
2113	2.147E+02	1.173E+05	7.879E+00	6.053E-02	1.689E+01	1.135E-03
2114	2.062E+02	1.127E+05	7.570E+00	5.816E-02	1.622E+01	1.090E-03
2115	1.982E+02	1.083E+05	7.274E+00	5.588E-02	1.559E+01	1.047E-03
2116	1.904E+02	1.040E+05	6.988E+00	5.369E-02	1.498E+01	1.006E-03

ATTACHMENT 2

EMISSIONS CALCULATIONS

OBJECTIVE: 1. Calculate pollutant emissions for EU001 as:
Fugitive landfill emissions
Enclosed flare combustion by-products and non-combusted pollutants

APPROACH: 1. Use site-specific emissions factors where available, and published emissions factors where site-specific data is not available
2. Use maximum rated flare capacity for LFG flow rate

CALCULATIONS:

Table 1 - Assumptions		Units	Source
Maximum Flare Capacity	3,150	scfm landfill gas	Manufacturer's Information
Maximum LFG Generation Rate	860	scfm landfill gas	LandGEM (year 2013) - See Att 1
Methane %	0.50	%	Assumed
Collection System Efficiency	75	%	Assumed
Control System Efficiency	98	%	Manufacturer's Information
Temperature LFG	25	C	AP-42, Section 2.4.4.1

Table 2 - Landfill Fugitive Emissions Factors:			
Pollutant	**Emission Factor**	**Units**	**Source**
NMOC	72	ppm as hexane	Site specific testing - Refer to Part II, Att G
VOC	72	ppm	VOCs assumed to be equal to NMOC
HAPs	Varies	N/A	AP-42 (Draft Section2.4 -Table 2.4-2)

Table 3 - Flare Emissions Factors:			
Pollutant	**Emission Factor**	**Units**	**Source**
NO_x	6.80E+00	lb/hr	Manufacturer's Data, see Att. 3
CO	1.70E+01	lb/hr	Manufacturer's Data, see Att. 3
PM	8.51	lb/hr	Manufacturer's Data, see Att. 3
Total Chloride	42	ppmv	AP-42 (Draft Section2.4)
SO_2	1.65	lb/hr	Manufacturer's Data, see Att. 3

LANDFILL FUGITIVE EMISSIONS:

Landfill fugitive emissions based on maximum LFG generation potential, refer to LandGEM model, year 2013 in Att 1

NMOC Emissions

NMOC Generated	3.6 ton/yr	Per LandGEM, see Att 1
NMOC Collected	2.7 ton/yr	75% assumed collection efficiency
Fugitive NMOC	**0.9 ton/yr**	

VOC Emissions

Fugitive VOC	**0.9 ton/yr**	VOC assumed equal to NMOC

HAPs Emissions

Total HAPs	**1.7 ton/yr**	Refer to Page 5 for HAPs calculations
Single HAP	**0.6 ton/yr**	Refer to Page 5 for HAPs calculations

FLARE EMISSIONS:

Landfill fflare emissions based on maximum rated flare capacity

NO_x Emissions

NO_X emissions factor		6.80E+00	lb/hr
		8,760	hr/yr
CM_{NOx}=	**29.8 ton/yr**		

CO Emissions

CO emissions factor		1.70E+01	lb/scf
		8,760	hr/yr
CM_{CO}=	**74.50 ton/yr**		

PM_{10} Emissions
All particulate emissions assumed to be under 10 microns

PM emissions factor		8.51	lb/hr
		8,760	hr/yr
CM_{PM10}=	**37.27 ton/yr**		

SO_x Emissions
Total sulfur oxidized to SOx

Total sulfur emissions factor	1.65	lb/hr
	8,760	hr/yr

CM_{SO2}= 7.2 ton/yr

HCl Emissions

Total Chloride emissions factor	42	ppmv
Flow rate (LFG)	3150	scfm
	4.69E+07	m^3/yr
Flow rate (CH_4)	2.34E+07	m^3/yr

$$Q_{HCl} = \frac{Q_{CH4}}{C_{CH4}} \cdot \frac{C_{HCl}}{1 \cdot 10^6}$$

Q_{HCl}= 1968.8 m^3/yr

$$UM_{HCl} = Q_{HCl} \cdot \left[\frac{MW_{HCl} \cdot 1atm}{(8.205 \cdot 10^{-5} m^3 \cdot atm / gmol \cdot {}^\circ K) \cdot (1000 g / gmol) \cdot (273 + T {}^\circ C)} \right]$$

UM_{HCl}= 2935.7 kg/yr
3.2 ton/yr

$$CM_{HCl} = \left[UM_{HCl} \cdot \frac{\eta_{coll}}{100} \cdot \frac{\eta_{ctl}}{100} \frac{1.03 lbHCl}{lbCl^-} \right]$$

η_{coll}= 100 since calc is based on actual flow rate
η_{ctl}= 98 destruction efficiency
CM_{HCl}= **6.3 ton/yr**

SUMMARY:

Pollutant	Fugitive LFG (tn/yr)	Enclosed Flare (tn/yr)
NOx	-	29.8
CO	-	74.5
VOC	0.9	-
NMOC	0.9	-
PM10	-	37.3
HAPs - Total	1.7	-
HAPs - Single	0.6	-
HCl	-	6.3
SO_2	-	7.2

kelner engineering
1050 Northeast Tenth Place • Gainesville, Florida, 32601 • 352.672.8060

PROJECT NUMBER: SHEET 5 OF 5
PROJECT NAME:
SUBJECT:
BY: Date: 10/15/13
CHECKED BY Date:

City of Jacksonville North Landfill, Facility 031340
Title V Operating Permit Renewal
HAPS Emissions

Efficiency of collection system	75%	Ref: AP-42, Section 2.4	
Fugitive emissions	25%		
Maximum LFG Generation Rate	860	SCFM (Ref: LandGEM model, Att 1)	
Total gas generated by LF	486.1	MMSCF	13.77 MMm^3

						Potential to Emit - Landfill		Fugitive
CAS number	Compound	Median (ppmv)[3]	Data Source	Molecular Weight	Gravimetric Concentration (mg/m^3)	MG/YR	TONS/YR	Uncontrolled (tons/yr)
71-55-6	1,1,1-Trichloroethane (methyl chloroform)	0.48	AP-42	133.41	2.66	3.67E-02	4.04E-02	1.01E-02
79-34-5	1,1,2,2-Tetrachloroethane	1.11	AP-42	167.85	7.75	1.07E-01	1.18E-01	2.94E-02
75-34-3	1,1-Dichloroethane (ethylidene dichloride)	2.35	AP-42	98.97	9.67	1.33E-01	1.47E-01	3.67E-02
75-35-4	1,1,-Dichloroethene (vinylidene chloride)	0.20	AP-42	96.94	0.81	1.11E-02	1.22E-02	3.06E-03
107-06-2	1,2-Dichloroethane (ethylene dichloride)	0.41	AP-42	98.96	1.69	2.32E-02	2.56E-02	6.41E-03
78-87-5	1,2-Dichloropropane (propylene dichloride)	0.18	AP-42	112.99	0.85	1.16E-02	1.28E-02	3.21E-03
107-13-1	Acrylonitrile	6.33	AP-42	53.06	13.97	1.92E-01	2.12E-01	5.30E-02
75-15-0	Carbon disulfide	0.58	AP-42	76.13	1.84	2.53E-02	2.79E-02	6.97E-03
56-23-5	Carbon Tetrachloride	4.00E-03	AP-42	153.84	0.03	3.52E-04	3.89E-04	9.72E-05
463-58-1	Carbonyl sulfide	0.49	AP-42	60.07	1.22	1.69E-02	1.86E-02	4.65E-03
108-90-7	Chlorobenzene	0.25	AP-42	112.56	1.17	1.61E-02	1.78E-02	4.44E-03
75-00-3	Chloroethane (ethyl chloride)	1.25	AP-42	64.52	3.35	4.62E-02	5.09E-02	1.27E-02
67-66-3	Chloroform	0.03	AP-42	119.39	0.15	2.05E-03	2.26E-03	5.66E-04
75-09-2	Dichloromethane (methylene chloride)	14.30	AP-42	84.94	50.53	6.96E-01	7.67E-01	1.92E-01
100-41-4	Ethylbenzene	4.61	AP-42	106.16	20.36	2.80E-01	3.09E-01	7.73E-02
110-54-3	n-Hexane	6.57	AP-42	86.18	23.55	3.24E-01	3.58E-01	8.94E-02
7439-97-6	Mercury[2]	2.94E-04	AP-42	200.61	2.45E-03	3.38E-05	3.73E-05	9.31E-06
78-93-3	Methyl ethyl ketone	7.09	AP-42	72.11	21.27	2.93E-01	3.23E-01	8.07E-02
108-10-1	Methyl isobutyl ketone	1.87	AP-42	100.16	7.79	1.07E-01	1.18E-01	2.96E-02
127-18-4	Perchloroethylene (tetrachloroethylene)	3.73	AP-42	165.83	25.73	3.54E-01	3.91E-01	9.77E-02
79-01-6	Trichloroethylene (trichloroethane)	2.82	AP-42	131.40	15.41	2.12E-01	2.34E-01	5.85E-02
75-01-4	Vinyl Chloride	7.34	AP-42	62.50	19.08	2.63E-01	2.90E-01	7.24E-02
71-43-2	Benzene	1.91	AP-42	78.11	6.21	8.54E-02	9.42E-02	2.36E-02
	Toluene	39.30	AP-42	92.13	150.61	2.07E+00	2.29E+00	5.72E-01
1330-20-7	Xylenes	12.10	AP-42	106.16	53.43	7.36E-01	8.11E-01	2.03E-01
	Total HAPS							**1.67**

Notes:
(1) - VOCs calculated as NMOC
(2) - Assumed 0% combustion efficiency for mercury, per AP-42
(3) - No or Unknown Co-disposal

ATTACHMENT 3

MANUFACTURER'S EMISSIONS DATA

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

APPLICATION TO CONSTRUCT A LANDFILL GAS FLARE

NORTH LANDFILL

CITY OF JACKSONVILLE, FLORIDA

SEPTEMBER, 1993

Prepared by

Hayden-Wegman, Inc.
Boston, Massachusetts

ATTACHMENT #4

APPLICATION SECTION III:
AIR POLLUTION SOURCES AND CONTROL DEVICES

ITEM C.

AIRBORNE CONTAMINANTS EMITTED

CALCULATIONS

ATTACHMENT #4
APPLICATION TO CONSTRUCT A LANDFILL GAS FLARE
CITY OF JACKSONVILLE NORTH LANDFILL

SECTION III - ITEM C

CALCULATIONS OF AIRBORNE CONTAMINANTS EMITTED

1. *Oxides of Nitrogen (NOx)*

   a. NOx emissions quoted by Flare Vendor 0.08 Lbs/MMBTU (1800 Deg.)

   b. Design gas flow rate = 3150 cfm x 450 BTU/cf x 60 min. = 85.05 MMBTU/Hr.

   c. NOx emissions = 0.08 Lbs/MMBTU x 85.05 MMBTU/Hr. = 6.80 Lbs/Hr.

2. *Carbon Monoxide (CO)*

   a. CO emissions quoted by Flare Vendor 0.20 Lbs/MMBTU (1800 Deg.)

   b. Design gas flow rate = 3150 cfm x 450 BTU/cf x 60 min. = 85.05 MMBTU/Hr.

   c. CO emissions = 0.20 Lbs/MMBTU x 85.05 MMBTU/Hr. = 17.01 Lbs/Hr.

3. *Particulates*

   a. Maximum particulate emissions factor = 0.10 Lbs/MMBTU*

   b. Design gas flow rate = 3150 cfm x 450 BTU/cf x 60 min. = 85.05 MMBTU/Hr.

   c. Particulate emissions = 0.10 Lbs/MMBTU x 85.05 MMBTU/Hr. = 8.51 Lbs/Hr.

   * According to the flare vendor, combustion related particulate emissions will be less than 0.10 Lbs/MMBTU.

4. *Non-Methane Organic Compounds (NMOC)*

   a. Assumed NMOC in incoming gas from landfill = 200 ppm (refer to Attachment 4A).

   b. Hourly NMOC volume = 3150 cfm x 60 min. x 200/1,000,000 = 37.8 Cft/Hr.

   c. Destruction Removal Efficiency (DRE) = 99% of Incoming NMOC quoted by Flare Vendor at 1800 Deg. F. combustion temperature.

   d. Outgoing NMOC volume @ 99% DRE = 0.01 x 37.8 Cft/Hr. = 0.38 Cft/Hr.

ATTACHMENT #4
APPLICATION TO CONSTRUCT A LANDFILL GAS FLARE
CITY OF JACKSONVILLE NORTH LANDFILL

SECTION III - ITEM C

CALCULATIONS OF AIRBORNE CONTAMINANTS EMITTED

4. Non-Methane Organic Compounds (NMOC) - (continued)

e. At 14.7 psia, 68 Deg. F., 1 Lb-mole of any gas = 359 Cft

f. NMOC emissions = 0.38 Cft/Hr. / 359 Cft/Lb-mole = 0.00106 Lb-moles/Hr.

g. Molecular weight range of VOC's typically in landfill gas = 72 - 166, assume average molecular weight is 120.

h. Hourly NMOC emissions = 0.00106 Lb-moles/Hr. x 120 M.W. = 0.13 Lbs/Hr.

5. Sulfur Dioxide (SO2)

a. Assumed Sulfur concentration as H2S incoming from landfill = 50 ppm

b. Flare Vendor quoted oxidation efficiency for sulfur compounds = 98%

c. H2S to SO2 conversion = 0.98 x 50 ppm = 49 ppm SO2

d. Hourly SO2 volume = 3150 cfm x 60 min. x 49/1,000,000 = 9.26 Cft/Hr.

e. SO2 emissions = 9.26 Cft/Hr. / 359 Cft/Lb-mole = 0.0258 Lb-moles/Hr.

or 0.0258 Lb-moles/Hr. x 64 M.W. = 1.65 Lbs/Hr.

PART II

FDEP FORM 62-210.900(1)
APPLICATION FOR AIR PERMIT, LONG FORM

Department of Environmental Protection

Division of Air Resource Management

APPLICATION FOR AIR PERMIT - LONG FORM

I. APPLICATION INFORMATION

Air Construction Permit – Use this form to apply for an air construction permit:

- For any required purpose at a facility operating under a federally enforceable state air operation permit (FESOP) or Title V air operation permit;
- For a proposed project subject to prevention of significant deterioration (PSD) review, nonattainment new source review, or maximum achievable control technology (MACT);
- To assume a restriction on the potential emissions of one or more pollutants to escape a requirement such as PSD review, nonattainment new source review, MACT, or Title V; or
- To establish, revise, or renew a plantwide applicability limit (PAL).

Air Operation Permit – Use this form to apply for:

- An initial federally enforceable state air operation permit (FESOP); or
- An initial, revised, or renewal Title V air operation permit.

To ensure accuracy, please see form instructions.

Identification of Facility

1. Facility Owner/Company Name: **City of Jacksonville**	
2. Site Name: **North Municipal Solid Waste Landfill**	
3. Facility Identification Number: **0310340**	
4. Facility Location... Street Address or Other Locator: **11405 Island Drive** City: **Jacksonvillle** County: **Duval** Zip Code: **32225**	
5. Relocatable Facility? ☐ Yes ☒ No	6. Existing Title V Permitted Facility? ☒ Yes ☐ No

Application Contact

1. Application Contact Name: **John Sullivan**
2. Application Contact Mailing Address... Organization/Firm: **Sullivan Environmental** Street Address: **4448 13th Lane NE** City: **St. Petersburg** State: **Florida** Zip Code: **33703**
3. Application Contact Telephone Numbers... Telephone: **(813) 625 - 2952** ext. Fax: **N/A**
4. Application Contact E-mail Address: **john@sullivanenv.com**

Application Processing Information (DEP Use)

1. Date of Receipt of Application: 11-4-2013	3. PSD Number (if applicable):
2. Project Number(s): 0310340-006-AV	4. Siting Number (if applicable):

Purpose of Application

This application for air permit is being submitted to obtain: (Check one)

Air Construction Permit

☐ Air construction permit.

☐ Air construction permit to establish, revise, or renew a plantwide applicability limit (PAL).

☐ Air construction permit to establish, revise, or renew a plantwide applicability limit (PAL), and separate air construction permit to authorize construction or modification of one or more emissions units covered by the PAL.

Air Operation Permit

☐ Initial Title V air operation permit.

☐ Title V air operation permit revision.

☒ Title V air operation permit renewal.

☐ Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is required.

☐ Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is not required.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit (Concurrent Processing)

☐ Air construction permit and Title V permit revision, incorporating the proposed project.

☐ Air construction permit and Title V permit renewal, incorporating the proposed project.

Note: By checking one of the above two boxes, you, the applicant, are requesting concurrent processing pursuant to Rule 62-213.405, F.A.C. In such case, you must also check the following box:

☐ I hereby request that the department waive the processing time requirements of the air construction permit to accommodate the processing time frames of the Title V air operation permit.

Application Comment

The City of Jacksonville is submitting this permit renewal application and supporting documents to obtain a renewal Title V Operating Permit. The existing permit 0310340-005-AV expires June 18, 2014.

Scope of Application

Emissions Unit ID Number	Description of Emissions Unit	Air Permit Type	Air Permit Processing Fee
001	Municipal Solid Waste Landfill with Enclosed Flare	N/A	N/A

Application Processing Fee

Check one: ☐ Attached - Amount: $_____ ☒ Not Applicable

Owner/Authorized Representative Statement **N/A**

Complete if applying for an air construction permit or an initial FESOP.

1. Owner/Authorized Representative Name :
2. Owner/Authorized Representative Mailing Address... Organization/Firm: Street Address: City: State: Zip Code:
3. Owner/Authorized Representative Telephone Numbers... Telephone: ( ) - ext. Fax: ( ) -
4. Owner/Authorized Representative E-mail Address:
5. Owner/Authorized Representative Statement: *I, the undersigned, am the owner or authorized representative of the corporation, partnership, or other legal entity submitting this air permit application. To the best of my knowledge, the statements made in this application are true, accurate and complete, and any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department.* _____ _____ Signature Date

Application Responsible Official Certification

Complete if applying for an initial, revised, or renewal Title V air operation permit or concurrent processing of an air construction permit and revised or renewal Title V air operation permit. If there are multiple responsible officials, the "application responsible official" need not be the "primary responsible official."

1. Application Responsible Official Name: Cleveland Ferguson, CAO

2. Application Responsible Official Qualification (Check one or more of the following options, as applicable):

- ☐ For a corporation, the president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for or subject to a permit under Chapter 62-213, F.A.C.
- ☐ For a partnership or sole proprietorship, a general partner or the proprietor, respectively.
- ☒ For a municipality, county, state, federal, or other public agency, either a principal executive officer or ranking elected official.
- ☐ The designated representative at an Acid Rain source or CAIR source.

3. Application Responsible Official Mailing Address...
Organization/Firm: City of Jacksonville
Street Address: 1031 Superior Street
City: Jacksonville State: Florida Zip Code: 32254

4. Application Responsible Official Telephone Numbers...
Telephone: (904)-387-8837 ext. Fax: ( ) - 904-387-8905

5. Application Responsible Official E-mail Address: cferguson@coj.net

6. Application Responsible Official Certification:

I, the undersigned, am a responsible official of the Title V source addressed in this air permit application. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof and all other applicable requirements identified in this application to which the Title V source is subject. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department, and I will promptly notify the department upon sale or legal transfer of the facility or any permitted emissions unit. Finally, I certify that the facility and each emissions unit are in compliance with all applicable requirements to which they are subject, except as identified in compliance plan(s) submitted with this application.

Signature

11/3/13
Date

Professional Engineer Certification

1. Professional Engineer Name: **Rebecca Kelner, PE**
   Registration Number: **FL PE 66470**
2. Professional Engineer Mailing Address...
   Organization/Firm: **Kelner Engineering, Inc.**
   Street Address: **5844 Blue Savannah Drive**
   City: **Leesburg** State: **Florida** Zip Code: **34748**
3. Professional Engineer Telephone Numbers...
   Telephone: **(352) 672 - 8060** ext. Fax: **(866) 722 - 0656**
4. Professional Engineer E-mail Address: **Rebecca@kelnerinc.com**
5. Professional Engineer Statement:

I, the undersigned, hereby certify, except as particularly noted herein, that:*

(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this application for air permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and

(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.

(3) If the purpose of this application is to obtain a Title V air operation permit (check here [X] *, if so), I further certify that each emissions unit described in this application for air permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance plan and schedule is submitted with this application.*

(4) If the purpose of this application is to obtain an air construction permit (check here [ ] *, if so) or concurrently process and obtain an air construction permit and a Title V air operation permit revision or renewal for one or more proposed new or modified emissions units (check here* [ ] *, if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.*

(5) If the purpose of this application is to obtain an initial air operation permit or operation permit revision or renewal for one or more newly constructed or modified emissions units (check here , if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.

Signature 10-27-13 Date

(seal)

* Attach any exception to certification statement.

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates... Zone **17** East (km) **446.520** North (km) **3367.680**		2. Facility Latitude/Longitude... Latitude (DD/MM/SS) **30/26/30** Longitude (DD/MM/SS) **81/33/25**	
3. Governmental Facility Code: **4**	4. Facility Status Code: **A**	5. Facility Major Group SIC Code: **49**	6. Facility SIC(s): **4953**
7. Facility Comment : **Closed municipal solid waste landfill with gas collection and control system**			

Facility Contact

1. Facility Contact Name: **Jeffrey S. Foster, PE, PG**
2. Facility Contact Mailing Address... Organization/Firm: **City of Jacksonville** Street Address: **1031 Superior St** City: **Jacksonville** State: **Florida** Zip Code: **32254**
3. Facility Contact Telephone Numbers: Telephone: **(904)255 -7500** ext. Fax:**(904) 387-8905**
4. Facility Contact E-mail Address: **jsfoster@coj.net**

Facility Primary Responsible Official

Complete if an "application responsible official" is identified in Section I that is not the facility "primary responsible official."

1. Facility Primary Responsible Official Name:
2. Facility Primary Responsible Official Mailing Address... Organization/Firm: Street Address: City: State: Zip Code:
3. Facility Primary Responsible Official Telephone Numbers... Telephone: ( ) - ext. Fax: ( ) -
4. Facility Primary Responsible Official E-mail Address:

Facility Regulatory Classifications

Check all that would apply *following* completion of all projects and implementation of all other changes proposed in this application for air permit. Refer to instructions to distinguish between a "major source" and a "synthetic minor source."

1. ☐ Small Business Stationary Source	☐ Unknown
2. ☐ Synthetic Non-Title V Source	
3. [x] Title V Source	
4. ☐ Major Source of Air Pollutants, Other than Hazardous Air Pollutants (HAPs)	
5. ☐ Synthetic Minor Source of Air Pollutants, Other than HAPs	
6. ☐ Major Source of Hazardous Air Pollutants (HAPs)	
7. ☐ Synthetic Minor Source of HAPs	
8. [x] One or More Emissions Units Subject to NSPS (40 CFR Part 60)	
9. ☐ One or More Emissions Units Subject to Emission Guidelines (40 CFR Part 60)	
10. [x] One or More Emissions Units Subject to NESHAP (40 CFR Part 61 or Part 63)	
11. ☐ Title V Source Solely by EPA Designation (40 CFR 70.3(a)(5))	

12. Facility Regulatory Classifications Comment:

The Facility is subject to the Landfill NSPS, 40 CFR 60 Subpart WWW.

The Facility is subject to the Landfill NESHAP, 40 CFR 63, Subpart AAAA.

List of Pollutants Emitted by Facility

1. Pollutant Emitted	2. Pollutant Classification	3. Emissions Cap [Y or N]?

B. EMISSIONS CAPS

Facility-Wide or Multi-Unit Emissions Caps - N/A

1. Pollutant Subject to Emissions Cap	2. Facility-Wide Cap [Y or N]? (all units)	3. Emissions Unit ID's Under Cap (if not all units)	4. Hourly Cap (lb/hr)	5. Annual Cap (ton/yr)	6. Basis for Emissions Cap

7. Facility-Wide or Multi-Unit Emissions Cap Comment:

C. FACILITY ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1.	Facility Plot Plan: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) [x] Attached, Document ID: **Att A** [ ] Previously Submitted, Date:_____
2.	Process Flow Diagram(s): (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) [x] Attached, Document ID: **Att B** [ ] Previously Submitted, Date:_____
3.	Precautions to Prevent Emissions of Unconfined Particulate Matter: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) [x] Attached, Document ID: **Att C** [ ] Previously Submitted, Date:_____

Additional Requirements for Air Construction Permit Applications N/A

1.	Area Map Showing Facility Location: [ ] Attached, Document ID:_____ [ ] Not Applicable (existing permitted facility)
2.	Description of Proposed Construction, Modification, or Plantwide Applicability Limit (PAL): [ ] Attached, Document ID:_____
3.	Rule Applicability Analysis: [ ] Attached, Document ID:_____
4.	List of Exempt Emissions Units: [ ] Attached, Document ID:_____ [ ] Not Applicable (no exempt units at facility)
5.	Fugitive Emissions Identification: [ ] Attached, Document ID:_____ [ ] Not Applicable
6.	Air Quality Analysis (Rule 62-212.400(7), F.A.C.): [ ] Attached, Document ID:_____ [ ] Not Applicable
7.	Source Impact Analysis (Rule 62-212.400(5), F.A.C.): [ ] Attached, Document ID:_____ [ ] Not Applicable
8.	Air Quality Impact since 1977 (Rule 62-212.400(4)(e), F.A.C.): [ ] Attached, Document ID:_____ [ ] Not Applicable
9.	Additional Impact Analyses (Rules 62-212.400(8) and 62-212.500(4)(e), F.A.C.): [ ] Attached, Document ID:_____ [ ] Not Applicable
10.	Alternative Analysis Requirement (Rule 62-212.500(4)(g), F.A.C.): [ ] Attached, Document ID:_____ [ ] Not Applicable

C. FACILITY ADDITIONAL INFORMATION (CONTINUED)

Additional Requirements for FESOP Applications N/A

1. List of Exempt Emissions Units:
   ☐ Attached, Document ID:_____ ☐ Not Applicable (no exempt units at facility)

Additional Requirements for Title V Air Operation Permit Applications

1. List of Insignificant Activities: (Required for initial/renewal applications only)
   [x] Attached, Document ID: **Att D** ☐ Not Applicable (revision application)

2. Identification of Applicable Requirements: (Required for initial/renewal applications, and for revision applications if this information would be changed as a result of the revision being sought)
   ☐ Attached, Document ID:_____
   [x] Not Applicable (revision application with no change in applicable requirements)

3. Compliance Report and Plan: (Required for all initial/revision/renewal applications)
   [x] Attached, Document ID: **Att E**
   Note: A compliance plan must be submitted for each emissions unit that is not in compliance with all applicable requirements at the time of application and/or at any time during application processing. The department must be notified of any changes in compliance status during application processing.

4. List of Equipment/Activities Regulated under Title VI: (If applicable, required for initial/renewal applications only)
   ☐ Attached, Document ID:_____
   ☐ Equipment/Activities Onsite but Not Required to be Individually Listed
   [x] Not Applicable

5. Verification of Risk Management Plan Submission to EPA: (If applicable, required for initial/renewal applications only)
   ☐ Attached, Document ID:_____ [x] Not Applicable

6. Requested Changes to Current Title V Air Operation Permit:
   [x] Attached, Document ID: **Att F** ☐ Not Applicable

C. FACILITY ADDITIONAL INFORMATION (CONTINUED)

Additional Requirements for Facilities Subject to Acid Rain, CAIR, or Hg Budget Program

1. Acid Rain Program Forms: **N/A**

   Acid Rain Part Application (DEP Form No. 62-210.900(1)(a)):
   ☐ Attached, Document ID:_____ ☐ Previously Submitted, Date:_____
   ☐ Not Applicable (not an Acid Rain source)

   Phase II NO_X Averaging Plan (DEP Form No. 62-210.900(1)(a)1.):
   ☐ Attached, Document ID:_____ ☐ Previously Submitted, Date:_____
   ☐ Not Applicable

   New Unit Exemption (DEP Form No. 62-210.900(1)(a)2.):
   ☐ Attached, Document ID:_____ ☐ Previously Submitted, Date:_____
   ☐ Not Applicable

2. CAIR Part (DEP Form No. 62-210.900(1)(b)): **N/A**
   ☐ Attached, Document ID:_____ ☐ Previously Submitted, Date:_____
   ☐ Not Applicable (not a CAIR source)

Additional Requirements Comment

III. EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Application - For Title V air operation permitting only, emissions units are classified as regulated, unregulated, or insignificant. If this is an application for an initial, revised or renewal Title V air operation permit, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each regulated and unregulated emissions unit addressed in this application. Some of the subsections comprising the Emissions Unit Information Section of the form are optional for unregulated emissions units. Each such subsection is appropriately marked. Insignificant emissions units are required to be listed at Section II, Subsection C.

Air Construction Permit or FESOP Application - For air construction permitting or federally enforceable state air operation permitting, emissions units are classified as either subject to air permitting or exempt from air permitting. The concept of an "unregulated emissions unit" does not apply. If this is an application for an air construction permit or FESOP, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air permitting are required to be listed at Section II, Subsection C.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit Application – Where this application is used to apply for both an air construction permit and a revised or renewal Title V air operation permit, each emissions unit is classified as either subject to air permitting or exempt from air permitting for air construction permitting purposes, and as regulated, unregulated, or insignificant for Title V air operation permitting purposes. A separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit addressed in this application that is subject to air construction permitting and for each such emissions unit that is a regulated or unregulated unit for purposes of Title V permitting. (An emissions unit may be exempt from air construction permitting but still be classified as an unregulated unit for Title V purposes.) Emissions units classified as insignificant for Title V purposes are required to be listed at Section II, Subsection C.

If submitting the application form in hard copy, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application must be indicated in the space provided at the top of each page.

EMISSIONS UNIT INFORMATION
Section [1] of [1]

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.)

[x] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one)

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[x] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Description of Emissions Unit Addressed in this Section:
Municipal Solid Waste Landfill with Enclosed Flare

3. Emissions Unit Identification Number: **001**

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:
A	**N/A**	**N/A**	**4953**

8. Federal Program Applicability: (Check all that apply)

[ ] Acid Rain Unit

[ ] CAIR Unit

9. Package Unit:
Manufacturer: **N/A** Model Number: **N/A**

10. Generator Nameplate Rating: MW **N/A**

11. Emissions Unit Comment:

EMISSIONS UNIT INFORMATION
Section [1] of [1]

Emissions Unit Control Equipment/Method: Control **1** of **1**

1. Control Equipment/Method Description: **3,150 cfm enclosed flare**
2. Control Device or Method Code: **023 (flaring)**

Emissions Unit Control Equipment/Method: Control ___ of ___

1. Control Equipment/Method Description:
2. Control Device or Method Code:

Emissions Unit Control Equipment/Method: Control ___ of ___

1. Control Equipment/Method Description:
2. Control Device or Method Code:

Emissions Unit Control Equipment/Method: Control ___ of ___

1. Control Equipment/Method Description:
2. Control Device or Method Code:

B. EMISSIONS UNIT CAPACITY INFORMATION
(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate: **3,150 cfm**	
2. Maximum Production Rate: **N/A**	
3. Maximum Heat Input Rate: **N/A**	
4. Maximum Incineration Rate: **N/A** pounds/hr **N/A** tons/day	
5. Requested Maximum Operating Schedule: **24** hours/day **52** weeks/year	 **7** days/week **8,760** hours/year
6. Operating Capacity/Schedule Comment: **Maximum rate is the maximum rated capacity of the flare.**	

EMISSIONS UNIT INFORMATION
Section [1] of [1]

C. EMISSION POINT (STACK/VENT) INFORMATION

(Optional for unregulated emissions units.)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram: **EU001**	2. Emission Point Type Code: **1**	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking:		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:		
5. Discharge Type Code: **N/A**	6. Stack Height: **40 FT**	7. Exit Diameter: **11.4 FT**
8. Exit Temperature: **1,566**	9. Actual Volumetric Flow Rate: **3,150**	10. Water Vapor: **N/A %**
11. Maximum Dry Standard Flow Rate: **N/A** dscfm	12. Nonstack Emission Point Height: **N/A feet**	
13. Emission Point UTM Coordinates... Zone: East (km): North (km):	14. Emission Point Latitude/Longitude... Latitude (DD/MM/SS) Longitude (DD/MM/SS)	
15. Emission Point Comment:		

EMISSIONS UNIT INFORMATION
Section [1] of [1]

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): **Landfill gas generated by anaerobic decay of municipal solid waste**		
2. Source Classification Code (SCC): **50100402**	3. SCC Units: **MMSCF waste gas burned**	
4. Maximum Hourly Rate: **N/A**	5. Maximum Annual Rate: **452**	6. Estimated Annual Activity Factor: **N/A**
7. Maximum % Sulfur: **N/A**	8. Maximum % Ash: **N/A**	9. Million Btu per SCC Unit: **N/A**
10. Segment Comment: **Based on maximum LFG generated by the landfill (see Part I, Att 1, year 2013) Assumed 512 BTU/CF LFG**		

Segment Description and Rate: Segment __ of __

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

D. SEGMENT (PROCESS/FUEL) INFORMATION (CONTINUED)

Segment Description and Rate: Segment __ of __

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

Segment Description and Rate: Segment __ of __

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

E. EMISSIONS UNIT POLLUTANTS

List of Pollutants Emitted by Emissions Unit

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
NO_X			**NS**
CO			**NS**
SO_2			**NS**
PM			**NS**

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **N/A**	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: **There were no Emissions Limited pollutants released by the facility.**	
11. Potential, Fugitive, and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code: **N/A**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

G. VISIBLE EMISSIONS INFORMATION

Complete Subsection G if this emissions unit is or would be subject to a unit-specific visible emissions limitation.

Visible Emissions Limitation: Visible Emissions Limitation 1 of 1

1. Visible Emissions Subtype: **VE00**	2. Basis for Allowable Opacity: [x] Rule [ ] Other
3. Allowable Opacity: **no visible emissions** Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed **5 min per 2 hr period**	
4. Method of Compliance: **EPA Method 22**	
5. Visible Emissions Comment:	

Visible Emissions Limitation: Visible Emissions Limitation __ of ____

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: [ ] Rule [ ] Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

H. CONTINUOUS MONITOR INFORMATION

Complete Subsection H if this emissions unit is or would be subject to continuous monitoring.

Continuous Monitoring System: Continuous Monitor **1** of **2**

1. Parameter Code: **TEMP**	2. Pollutant(s):**N/A**
3. CMS Requirement:	[x] Rule [ ] Other
4. Monitor Information... Manufacturer: **Honeywell** Model Number: **DR45AT-1100-00-000-A** Serial Number:	
5. Installation Date:	6. Performance Specification Test Date: **4/1/1993**
7. Continuous Monitor Comment: **Flame detection system for continuous presence of a flame**	

Continuous Monitoring System: Continuous Monitor **2** of **2**

1. Parameter Code: **FLOW**	2. Pollutant(s): **N/A**
3. CMS Requirement:	[x] Rule [ ] Other
4. Monitor Information... Manufacturer: **Dietrich Standard** Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date: **4/1/1993**
7. Continuous Monitor Comment: **Flow is recorded on a chart recorder**	

H. CONTINUOUS MONITOR INFORMATION (CONTINUED)

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	☐ Rule ☐ Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	☐ Rule ☐ Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

EMISSIONS UNIT INFORMATION
Section [1] of [1]

I. EMISSIONS UNIT ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1. Process Flow Diagram: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   [X] Attached, Document ID: **Att B** [ ] Previously Submitted, Date _____

2. Fuel Analysis or Specification: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   [X] Attached, Document ID: **Att G** [ ] Previously Submitted, Date _____

3. Detailed Description of Control Equipment: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   [X] Attached, Document ID: **Att H** [ ] Previously Submitted, Date _____

4. Procedures for Startup and Shutdown: (Required for all operation permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   [X] Attached, Document ID: **Att I** [ ] Previously Submitted, Date _____
   [ ] Not Applicable (construction application)

5. Operation and Maintenance Plan: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   [X] Attached, Document ID: **Att J** [ ] Previously Submitted, Date _____
   [ ] Not Applicable

6. Compliance Demonstration Reports/Records:
   [ ] Attached, Document ID: _____
   Test Date(s)/Pollutant(s) Tested: _____
   [ ] Previously Submitted, Date: _____
   Test Date(s)/Pollutant(s) Tested: _____
   [ ] To be Submitted, Date (if known): _____
   Test Date(s)/Pollutant(s) Tested: _____
   [X] Not Applicable
   Note: For FESOP applications, all required compliance demonstration records/reports must be submitted at the time of application. For Title V air operation permit applications, all required compliance demonstration reports/records must be submitted at the time of application, or a compliance plan must be submitted at the time of application.

7. Other Information Required by Rule or Statute:
   [ ] Attached, Document ID: _____ [X] Not Applicable

I. EMISSIONS UNIT ADDITIONAL INFORMATION (CONTINUED)

Additional Requirements for Air Construction Permit Applications N/A

1. Control Technology Review and Analysis (Rules 62-212.400(10) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)): ☐ Attached, Document ID: _____ ☐ Not Applicable
2. Good Engineering Practice Stack Height Analysis (Rules 62-212.400(4)(d) and 62-212.500(4)(f), F.A.C.): ☐ Attached, Document ID: _____ ☐ Not Applicable
3. Description of Stack Sampling Facilities: (Required for proposed new stack sampling facilities only) ☐ Attached, Document ID: _____ ☐ Not Applicable

Additional Requirements for Title V Air Operation Permit Applications

1. Identification of Applicable Requirements: ☒ Attached, Document ID: **Att K**
2. Compliance Assurance Monitoring: ☐ Attached, Document ID: _____ ☒ Not Applicable
3. Alternative Methods of Operation: ☐ Attached, Document ID: _____ ☒ Not Applicable
4. Alternative Modes of Operation (Emissions Trading): ☐ Attached, Document ID: _____ ☒ Not Applicable

Additional Requirements Comment

ATTACHMENT A

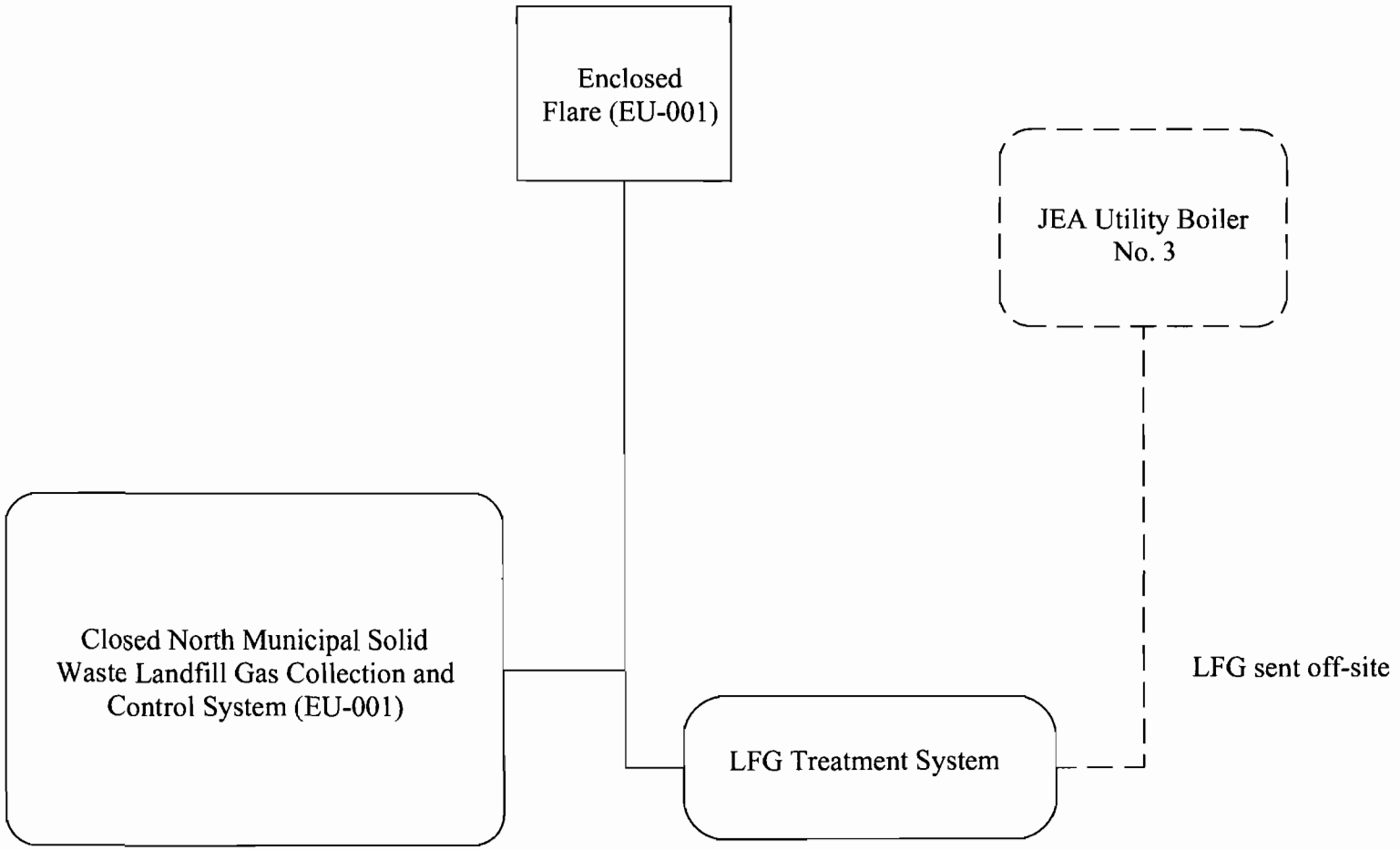
FACILITY PLOT PLAN

Attachment 2 – Facility Plot Plan

kelner engineering

ATTACHMENT B

PROCESS FLOW DIAGRAM



10/06/2013	City of Jacksonville North Municipal Solid Waste Landfill (Facility 0310340)		
	Scale: NTS	Sheet: 1 of 1	Kelner Engineering Project: 0470-02

Attachment B
Process Flow Diagram

ATTACHMENT C

PRECAUTIONS TO PREVENT EMISSIONS OF UNCONFINED PARTICULATE MATTER

PRECAUTIONS TO PREVENT EMISSIONS OF UNCONFINED PARTICULATE MATTER

The facility has negligible amounts of unconfined particulate matter – the facility is closed and has limited vehicular traffic.

Several precautionary measures were taken in the original design of the facility to prevent emissions of unconfined particulate matter. These include:

- Paving of roads, parking areas and equipment yards
- Landscaping and planting of vegetation

Additional operational measures which may be taken at the facility to minimize unconfined particulate matter emissions, include:

- Maintenance of paved areas as needed
- Regular mowing of grass and care of vegetation
- Limited access to the property by unnecessary vehicles

ATTACHMENT D

LIST OF INSIGNIFICANT ACTIVITIES

LIST OF INSIGNIFICANT ACTIVITIES

The below listed emissions units and / or activities are considered insignificant pursuant to Rule 62-213.430(6), F.A.C.

- Propane above ground storage tanks
- Flare ignition system (propane fired)
- On-site maintenance vehicles, machinery and heavy equipment
- Fugitive particulate matter emissions from mobile equipment operations on site
- Minor emissions from compressor used to compress landfill gas

ATTACHMENT E

COMPLIANCE REPORT AND PLAN

COMPLIANCE REPORT AND PLAN

The facility is in compliance with all permit requirements, except as noted below:

Description of Non-Compliance (1 of 1)

1. Emissions unit identification number
   EU-001

2. Specific permit condition number
   A.12 and A.13

3. Description of the requirement of the permit condition
   Operate wellheads with no positive pressure and with less than 5% oxygen by volume.

4. Basis for determination of non-compliance
   Wellfield monitoring per 40 CFR 60, Subpart WWW

5. Beginning and ending dates of periods of non-compliance
   Varies

6. Identification of the probable cause of non-compliance and description of corrective action or preventative measures.
   Since the landfill was closed in 1992, landfill gas production has declined at the Facility. Several of the wells have gas flows that are so low that even applying minimal or no vacuum results in exceedences of the 5 percent oxygen limit. It is believed that these exceedences are the result of the natural decline in landfill gas and do not adversely affect the wellfield performance, or indicate subsurface oxidation (landfill fire). These low production wells are typically closed until sufficient landfill gas pressure is generated to apply vacuum.

7. Dates of any reports previously submitted identifying this incident of non-compliance
   Wells are identified in the Facility Semi-Annual reports and, once sufficient data is collected, are requested to be added to the Facility Low Gas Production Well Schedule. The permittee submitted a request to add additional wells to the Low Gas Production Well Schedule on June 11, 2013.

8. Compliance Schedule

   The permittee will continue to work with the Department on Low Gas Production Wells as they are identified.

ATTACHMENT F

REQUESTED CHANGES TO CURRENT TITLE V AIR OPERATIONS PERMIT

REQUESTED CHANGES TO CURRENT TITLE V AIR OPERATIONS PERMIT

There are no requested changes to the Title V Air Operations Permit.

ATTACHMENT G

FUEL ANALYSIS OR SPECIFICATION

FUEL ANALYSIS OR SPECIFICATION

Landfill gas generated by the anaerobic decomposition of municipal solid waste generally consists of approximately 50% methane and 50% CO_2 by volume. Landfill gas composition by Method 3C was submitted January 27, 2009 by EarthTech AECOM and is on file with the Department.

The NMOC fraction of LFG was tested for recently on three separate occasions by the City, with analysis conducted by Triangle Environmental Services. The laboratory reports are attached and relevant data is summarized below:

Compound	**Reported Value – Triangle Report Dated**		
	3-22-2013	**10-18-2012**	**5-17-2012**
NMOC (ppm, as hexane)	22	133	60
Average (ppm)	72		

Method 3-C/25-C
Analytical Results

prepared for

SULLIVAN ENVIRONMENTAL
4448 13th Lane NE
St. Petersburg, FL 33703

by

Triangle Environmental Services, Inc.

We, the undersigned, certify to the best of our knowledge that all analytical data presented in this report have been checked for completeness; that the results are accurate, error-free, legible, and have been obtained in accordance with approved protocol; and that all deviations and analytical problems are summarized in the "Comments on the Analyses" page(s).

Approved by:
Wayne A. Stollings
President

Reviewed by:
Donna Nolen-Weathington
Method 25 Supervisor

Report
12048-25C

May 17, 2012

P.O. Box 13294 Research Triangle Park, NC 27709 (800) 367-4862

Triangle Environmental Services, Inc.
COMMENTS ON THE ANALYSES

Report #12048-25C for Sullivan Environmental
Project ID: none supplied

Tanks Received: 4/30/12

Samples Analyzed: 5/7-14/12 (25-C on Analyzer B)
Client Chain-of-Custody forms: 1 pg

Abbreviations and Definitions:

DF: dilution factor(s)
CL: calibration limit = lowest concentration of initial calibration standard ×DF*
RL: report limit = (Method 3-C) minimum detection limit (MDL) × DF*
= (Method 25-C) calibration limit (CL)
J: flag for reported concentrations between RL and CL (applicable for 3-C results only)

* and any applicable water vapor and air correction

All Samples: Laboratory preshipment and receipt pressure and temperature readings were used for the tank pre- and post-test tank data, respectively. Laboratory post-test barometric pressure and temperature data were used to determine the water vapor fraction.

The tank contents were diluted so as to bring the measured CH_4 and CO_2 concentrations for each of these samples within the Method 25 calibration range. The reported final tank pressure is the original final tank pressure multiplied by the dilution factor.

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 25-C TABLE OF RESULTS

Name: Sullivan Environmental ID#12048-25C Analyzed: 5/7-14/12

Project ID: Landfill

	Sample Description	Concentrations (ppm) CH4	CO2	As Carbon NMOC (ppm)	As Carbon Mass Conc. (mg/cu.m)
1	East LF	627104	414888	406	303
2	North LF	629665	389246	359	179

Correction of concentrations for the presence of air was made.
(2 sample(s) corrected using oxygen)

* Please refer to the "Comments on the Analyses" page of the report for additional information.

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 3-C TABLE OF RESULTS

Name: Sullivan Environmental ID#12048-25C Analyzed: 5/7-10/12

Project ID: Landfill

	Sample Description	Concentrations (ppm) O2	N2	CH4	CO2
1	East LF	12559	78837	559637	373371
2	North LF	25249	138466	528357	329552

Triangle Environmental Services, Inc.
CALIBRATION DATA FOR THE ANALYSES

Client: Sullivan Environmental ID#12048-25C

Project ID: none supplied

Method 3-C
10-MAY-12: Analyzer f
Preanalysis Calibration

Compound	Conc.	Area(1)	Area(2)	Area(3)	Average	%RSD	RF	IRF	%Diff.
O2	24600.0	694312	692755	692597	693221	0.1%	28.18	30.01	-6.10%
N2	99500.0	3068012	3061269	3061919	3063733	0.1%	30.79	31.27	-1.53%
CH4	20500.0	516283	515404	515847	515845	0.1%	25.16	25.50	-1.32%
CO2	243000.0	8848540	8835663	8845726	8843310	0.1%	36.39	36.61	-0.59%

Postanalysis Calibration

Compound	Conc.	Area(1)	Area(2)	Area(3)	Average	RF(post)	RF(pre)	%Diff
O2	24600	705085	704462	704284	704610	28.64	28.18	1.6%
N2	99500	3116522	3114151	3114012	3114895	31.31	30.79	1.7%
CH4	20500	522441	523101	523512	523018	25.51	25.16	1.4%
CO2	243000	8985682	8979876	8981276	8982278	36.96	36.39	1.6%

Sample # 1 N79
2 N146

Method 25-C
14-MAY-1: Analyzer b
Preanalysis Calibration

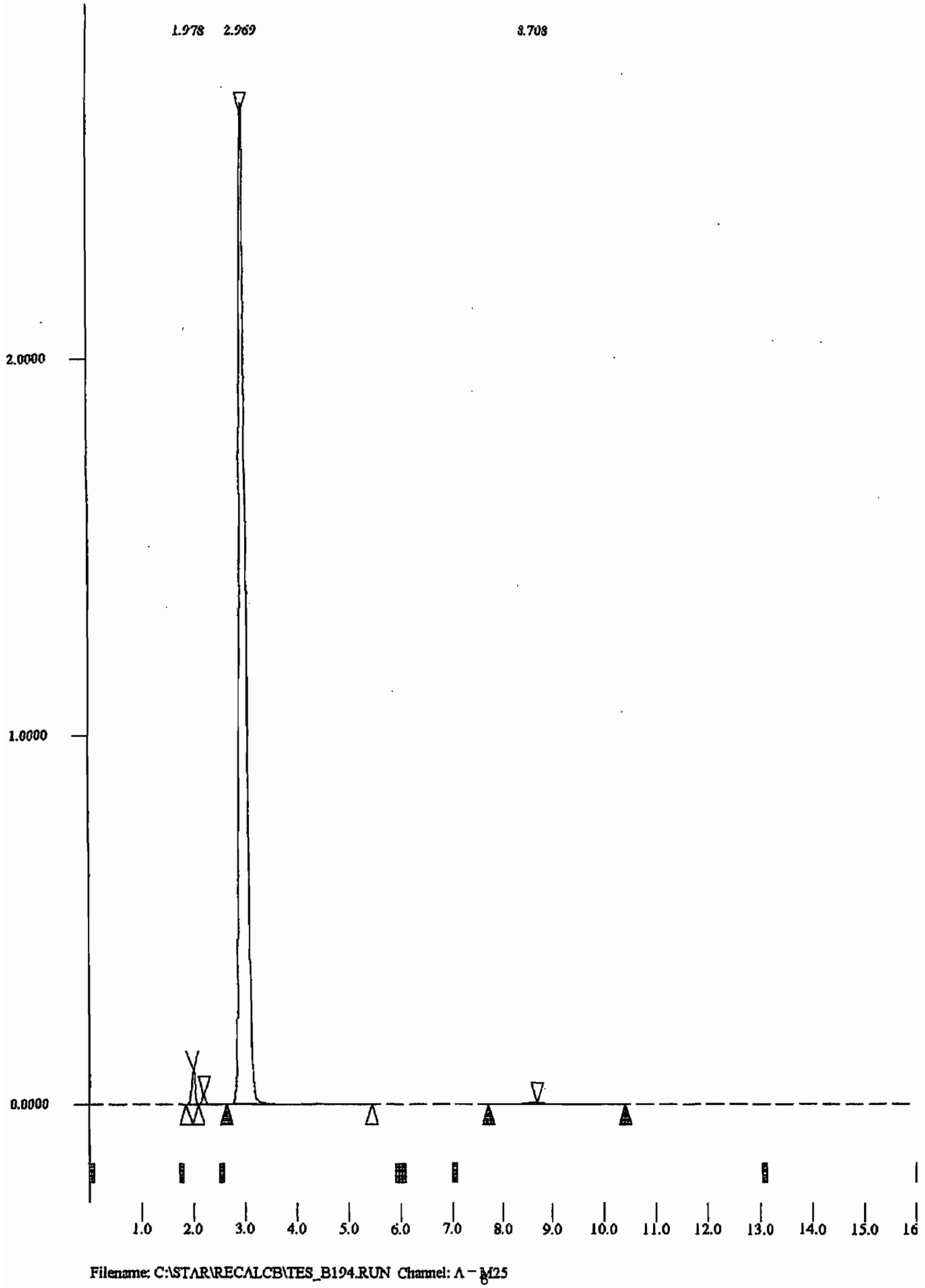
Compound	Conc.	Area(1)	Area(2)	Area(3)	Average	%RSD	RF	IRF	%Diff.
CO	200.5	43544	43422	43671	43546	0.3%	217.2	220.3	-1.4%
CH4	49.1	11742	11609	11647	11666	0.6%	237.5	243.1	-2.3%
CO2	9950.0	2460965	2462798	2458426	2460730	0.1%	247.3	241.2	2.5%
C2+	61.7	14456	14539	14483	14493	0.3%	235.1	242.4	-3.0%

Postanalysis Calibration

Compound	Conc.	Area(1)	Area(2)	Area(3)	Average	RF(post)	RF(pre)	%Diff
CO	200.5	43807	43691	43765	43754	218.2	217.2	0.5%
CH4	49.1	11737	11748	11747	11744	239.0	237.5	0.7%
CO2	9950.0	2464920	2464707	2463650	2464426	247.7	247.3	0.2%
C2+	61.7	14456	14681	14583	14573	236.4	235.1	0.6%

Sample # 1 N79
2 N146

Conc. = concentration in ppmC, %RSD = % relative standard deviation,
RF = response factor = Average Area/Conc., IRF = response factor from initial calibration,
%Diff. = %(RF-IRF)/IRF for preanalysis/= %(RF(post)-RF(pre)/RF(pre), C2+ = propane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2.0
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4.0
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8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
16
Filename: C:\STAR\RECALCB\TES_B194.RUN Channel: A – M25

Title :
Run File : C:\STAR\RECALCB\TES_B194.RUN
ethod File : C:\STAR\RECALCB.MTH
ample ID : 1- P mix CC61467

Injection Date: 14-MAY-12 11:13 AM Calculation Date: 15-MAY-12 9:11 AM

perator :
Workstation: VOLUME 1
Instrument : Varian Star #1
hannel : A = M25

Detector Type: ADCB (10 Volts)
Bus Address : 16
Sample Rate : 10.00 Hz
Run Time : 16.002 min

********** Star Chromatography Workstation ******* Version 4.5 **********

un Mode : Analysis - Subtract Blank Baseline
eak Measurement: Peak Area
Calculation Type: External Standard

Peak No.	Peak Name	Result ()	Ret. Time (min)	Time Offset (min)	Area (counts)	Sep. Code	Width 1/2 (sec)	Status Codes
1	CO	176.0274	1.978	0.002	43544	BV	4.2	U
2	CH4	46.9535	2.190	0.016	11742	VB	4.4	U
3	CO2	9842.6777	2.969	0.042	2460965	BB	8.6	
4	C2+	57.7043	11.500	0.000	14456	GR	0.0	U
	Totals:	10123.3629		0.060	2530707			

Status Codes:
- User-defined peak endpoint(s)

Total Unidentified Counts : 0 counts

etected Peaks: 4 Rejected Peaks: 0 Identified Peaks: 4

Multiplier: 1 Divisor: 1

aseline Offset: -2 microVolts

Noise (used): 50 microVolts - monitored before this run

ould not format the injection information for this run.
nstall the driver for the module at address 17 (type 8) to format this data.

Error Log:

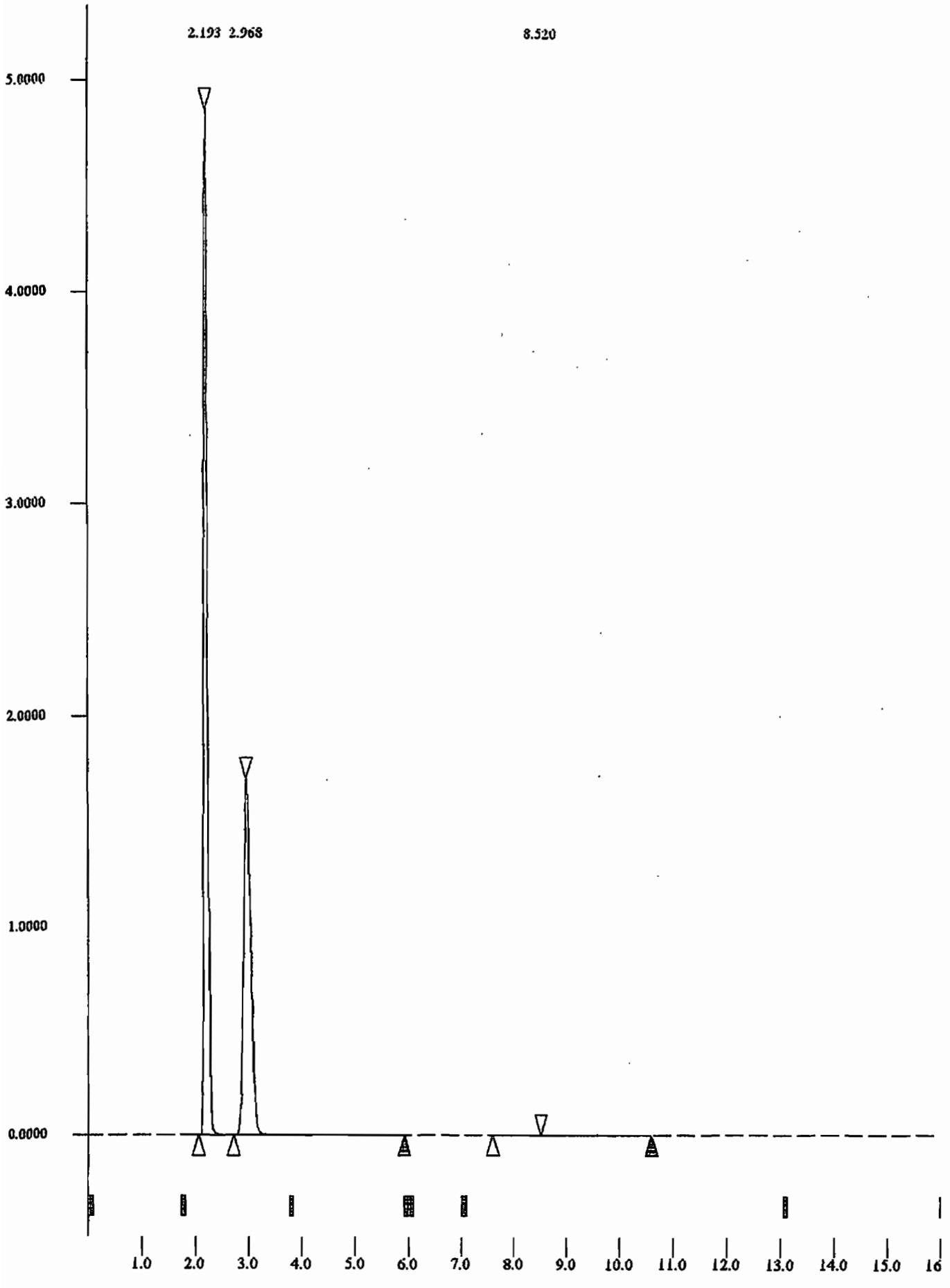
ould not format the error log for the module at address 17 (type 8).
Install the appropriate module driver to format this data.

DC Board:

Original Notes:

ppended Notes:

****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5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
16
Filename: C:\STAR\RECALCB\TES_B232.RUN Channel: A - M25

rint Date: Tue May 15 09:49:13 2012 Page 1 of 1

Title :
Run File : C:\STAR\RECALCB\TES_B232.RUN
ethod File : C:\STAR\RECALCB.MTH
ample ID : 13- tank N79

Injection Date: 14-MAY-12 11:09 PM Calculation Date: 15-MAY-12 9:44 AM

perator :
Workstation: VOLUME 1
Instrument : Varian Star #1
hannel : A = M25

Detector Type: ADCB (10 Volts)
Bus Address : 16
Sample Rate : 10.00 Hz
Run Time : 16.002 min

********** Star Chromatography Workstation ******* Version 4.5 **********

un Mode : Analysis - Subtract Blank Baseline
eak Measurement: Peak Area
Calculation Type: External Standard

Peak No.	Peak Name	Result ()	Ret. Time (min)	Time Offset (min)	Area (counts)	Sep. Code	Width 1/2 (sec)	Status Codes
1	CH4	9065.9414	2.193	0.019	2267120	BV	4.3	UC
2	CO2	6252.0762	2.967	0.040	1563207	VB	8.5	U
3	C2+	5.6887	11.500	0.000	1425	GR	0.0	U
	Totals:	15323.7063		0.059	3831752			

Status Codes:
U - User-defined peak endpoint(s)
- Out of calibration range

Total Unidentified Counts : 0 counts

etected Peaks: 3 Rejected Peaks: 0 Identified Peaks: 3

Multiplier: 1 Divisor: 1

aseline Offset: 4 microVolts

Noise (used): 60 microVolts - monitored before this run

ould not format the injection information for this run.
nstall the driver for the module at address 17 (type 8) to format this data.

Calib. out of range; No Recovery Action Specified

rror Log:

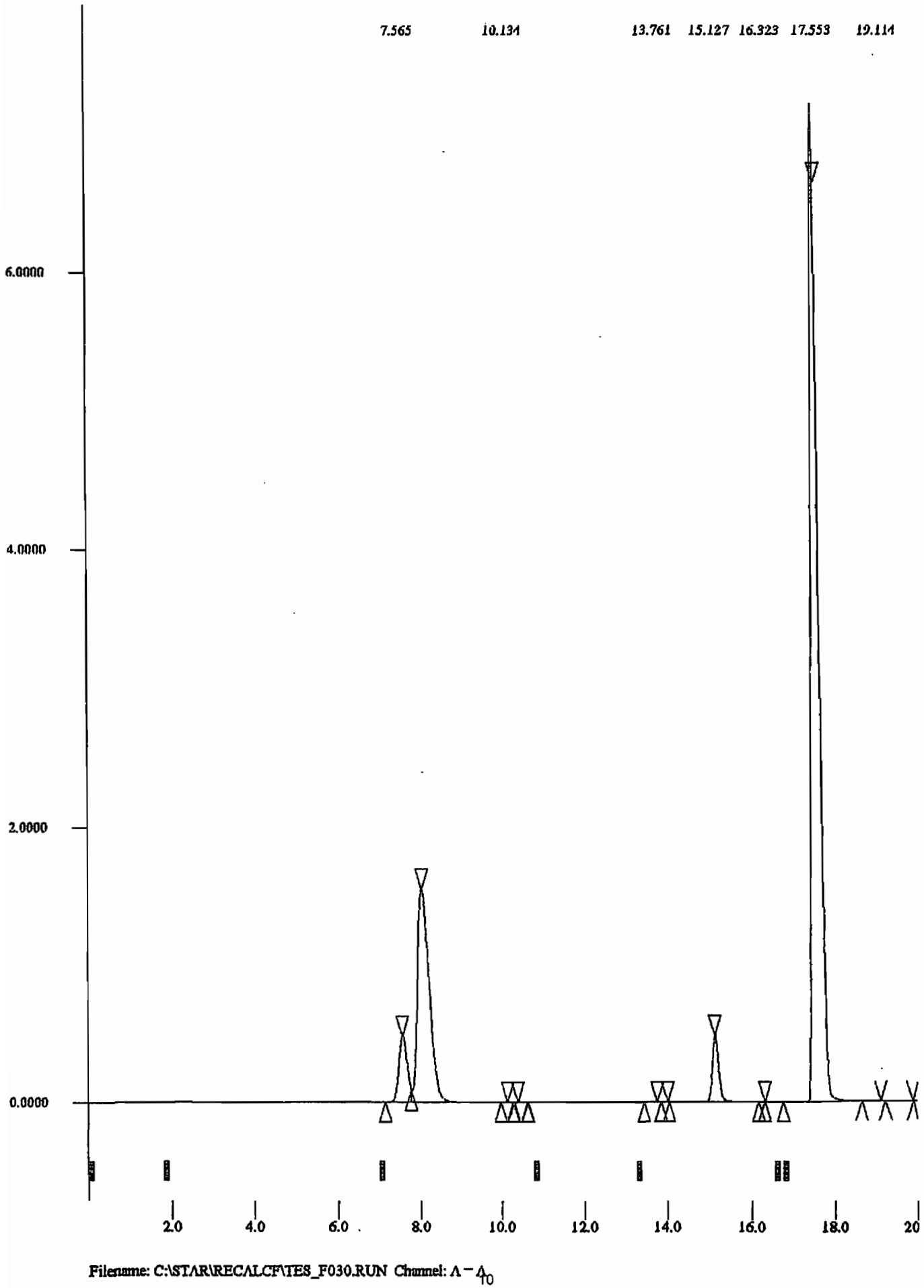
Could not format the error log for the module at address 17 (type 8).
nstall the appropriate module driver to format this data.

ADC Board:

riginal Notes:

Appended Notes:

****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6.0
8.0
10.0
12.0
14.0
16.0
18.0
20
Filename: C:\STAR\RECALCF\TES_F030.RUN Channel: A − A10

Title :
Run File : C:\STAR\RECALCF\TES_F030.RUN
ethod File : C:\STAR\CAL3C.MTH
ample ID : 1- 3C MIX CC93314

Injection Date: 10-MAY-12 1:51 PM Calculation Date: 10-MAY-12 2:11 PM

perator :
Workstation: MS-DOS_6
Instrument : Varian Star #1
hannel : A = A

Detector Type: ADCB (10 Volts)
Bus Address : 16
Sample Rate : 10.00 Hz
Run Time : 20.002 min

********** Star Chromatography Workstation ******* Version 4.5 ***************

un Mode : Analysis
eak Measurement: Peak Area
Calculation Type: Percent

Peak No.	Peak Name	Result ()	Ret. Time (min)	Time Offset (min)	Area (counts)	Sep. Code	Width 1/2 (sec)	Status Codes
1	O2	5.2891	7.565	-0.035	694312	BV	13.7	
2	N2	23.3715	8.042	-0.028	3068012	VB	18.4	
3	CH4	3.9329	15.127	-0.073	516283	PB	0.0	
4	CO2	67.4064	17.553	-0.147	8848540	BB	12.5	
	Totals:	99.9999		-0.283	13127147			

Total Unidentified Counts : 0 counts

etected Peaks: 11 Rejected Peaks: 7 Identified Peaks: 4

Multiplier: 1 Divisor: 1

aseline Offset: 22 microVolts

Noise (used): 30 microVolts - fixed value
oise (monitored before this run): 180 microVolts

Could not format the injection information for this run.
Install the driver for the module at address 17 (type 8) to format this data.

evision Log:

10-MAY-12 2:11 PM: Calculated results from channel A using method:
'C:\STAR\CAL3C.MTH'

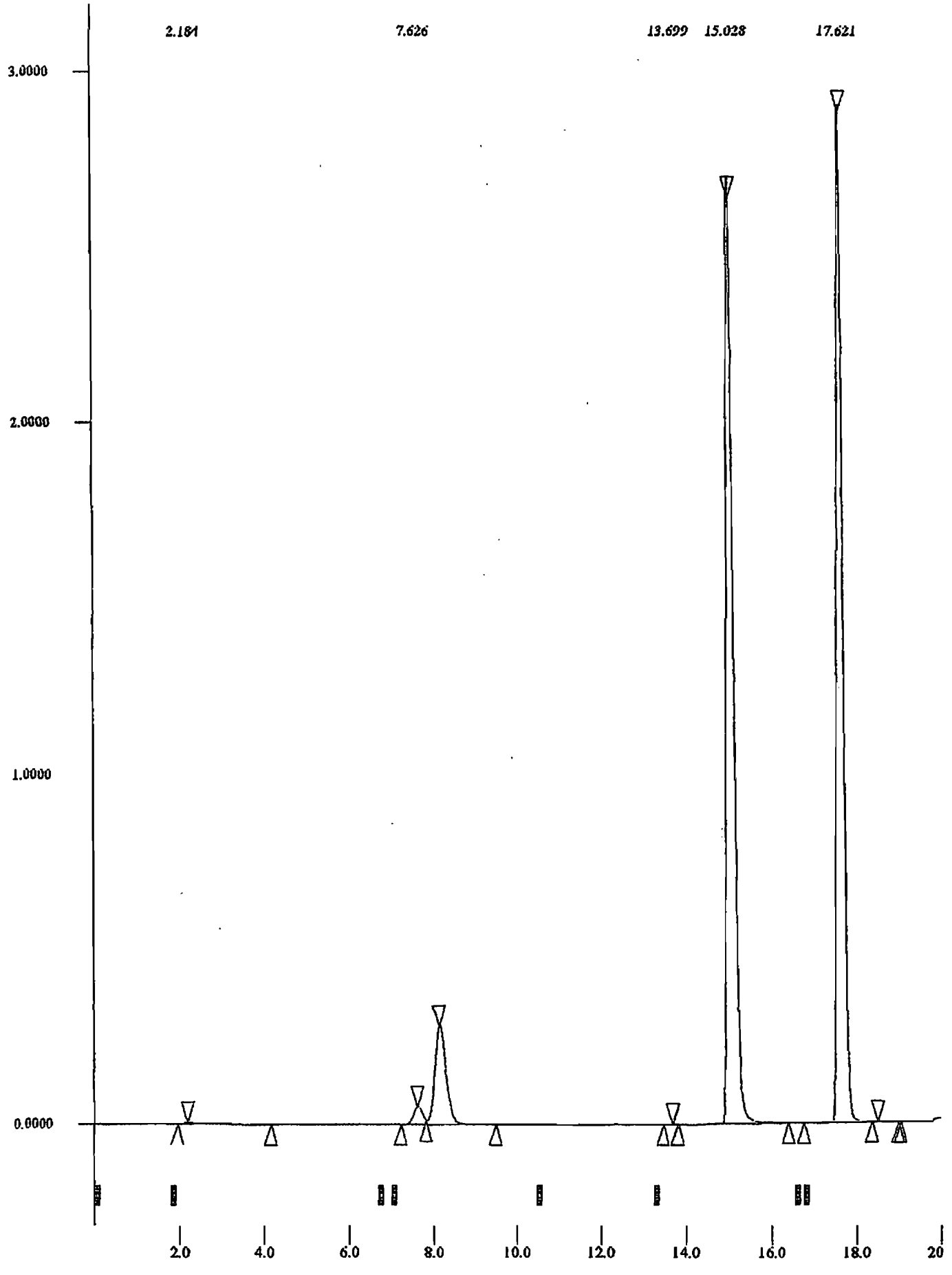
Error Log:

ould not format the error log for the module at address 17 (type 8).
nstall the appropriate module driver to format this data.

ADC Board:

riginal Notes:

****



Filename: C:\STAR\RECALCF\TES_F036.RUN Channel: A - A12

Print Date: Fri May 11 10:09:10 2012 Page 1 of 1

Title :
Run File : C:\STAR\RECALCF\TES_F036.RUN
Method File : C:\STAR\3C.MTH
Sample ID : 12- tank N79

Injection Date: 10-MAY-12 4:45 PM Calculation Date: 10-MAY-12 5:05 PM

Operator :
Workstation: MS-DOS_6
Instrument : Varian Star #1
Channel : A = A

Detector Type: ADCB (10 Volts)
Bus Address : 16
Sample Rate : 10.00 Hz
Run Time : 20.002 min

********** Star Chromatography Workstation ******* Version 4.5 **********

Run Mode : Analysis
Peak Measurement: Peak Area
Calculation Type: Percent

Peak No.	Peak Name	Result ()	Ret. Time (min)	Time Offset (min)	Area (counts)	Sep. Code	Width 1/2 (sec)	Status Codes
1	O2	1.1611	7.626	0.026	77519	BV	14.6	
2	N2	7.9698	8.154	0.084	532099	VB	17.3	
3	CH4	46.1860	15.028	-0.172	3083578	PB	10.8	
4	CO2	44.4543	17.621	-0.079	2967960	BB	9.7	
	Totals:	99.7712		-0.141	6661156			

Total Unidentified Counts : 15280 counts

Detected Peaks: 7 Rejected Peaks: 1 Identified Peaks: 4

Multiplier: 1 Divisor: 1

Baseline Offset: 19 microVolts

Noise (used): 60 microVolts - monitored before this run

Could not format the injection information for this run.
Install the driver for the module at address 17 (type 8) to format this data.

Error Log:

Could not format the error log for the module at address 17 (type 8).
Install the appropriate module driver to format this data.

ADC Board:

****

Triangle Environmental Services, Inc.
METHOD 25-C PROCEDURES

Report #12048-25C

CALIBRATION

The calibrations satisfy the requirements for Methods 25, 25-C, and 10-B.

Triplicate injections of a calibration gas mixture consisting of carbon monoxide (≈200 ppm), methane (≈50 ppm), carbon dioxide (≈10,000 ppm), and propane (≈20 ppm) are made immediately before and after each batch of samples. Daily response factors are calculated from the pre-batch integrated responses (average area count / concentration in ppmC) and must agree within 10% of the response factors of the initial calibrations. Further, the post-batch response factors must agree within 2% of the pre-batch response factors. Both criteria must be met before the analyses are considered valid.

ANALYSIS

All samples, which include the daily calibration gas mixture and sample tanks, are analyzed in triplicate using a computer-interfaced gas chromatograph equipped with an automated gas sampling system and a flame ionization detector (FID). CO, CH_4, and CO_2 are eluted from the Unibead 1S-Carbosieve G column and pass through the analytical oxidation and reduction catalyst to the FID. The column is then backflushed to elute the nonmethane organic (NMO) fraction, which passes through the analytical oxidation and reduction catalysts to the FID.

CALCULATIONS

Calculations are done in accord with USEPA Method 25-C procedures. A sample calculation for one of the samples is provided in the report.

EQUIPMENT

Tanks are at a minimum twice evacuated and filled with ambient air filtered through charcoal and are then evacuated to below 10 mm Hg and monitored for at least an hour to check that the tanks do not leak more than 1 mm Hg/hour. They are then pressurized to greater than ambient pressure with helium, analyzed to ensure < 2 ppmC NMO, and stored for later use. Prior to shipping, tanks are evacuated to ≈325 mm Hg absolute. The tank absolute pressure and temperature and the barometric pressure are recorded on a data sheet enclosed with the shipment. The absolute pressure can be verified by measurement in the field.

Sampling units are reconditioned by checking that all sections operate properly. The unit is flushed with zero air for at least thirty minutes before an aliquot of this flow is injected into the analyzer. If the total carbon concentration is below 10 ppm, the unit is made ready for use and stored for shipment.

Certifications:

South Coast Air Quality Management District: ID# 94 LA 0401
New Jersey NELAP ID: NC004
Pennsylvania DEP: Registration #68-3321

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 25-C SAMPLE CALCULATION

Note: All pressure values have been converted when necessary to mm Hg and all temperature values to Kelvin.

Name: Sullivan Environmental ID#12048-25C Analyzed: 5/7-14/12

Project ID: Landfill

Sample # 1 East LF

D A T A

Tank N79:
Volume = 0.004548 cu.m

	Pressure (mm Hg)	Temp.(K)
Presampling	324.0	296.2
Postsampling	760.0	301.2
Final	25577.0	301.2
Barometric	757.0	
Water Vapor	28.3	

Water fraction = 0.0374
O2 fraction = 0.012559 (dry basis)

Calibration Data:

	CH4	CO2	NMOC
Response Factor (area units/ppmC)	237.5	247.3	235.1

Areas:

CH4	2,267,120	2,268,657	2,275,441
CO2	1,563,207	1,565,126	1,563,865
NMOC	1,425	1,477	1,464

C A L C U L A T I O N S

Measured Concentrations (ppmC):

Cm(CH4) = Area(CH4)/RF(CH4)
= 2267120 /237.5 = 9545.8
= 2268657 /237.5 = 9552.2
= 2275441 /237.5 = 9580.8

Cm(CO2) = Area(CO2)/RF(CO2)
= 1563207 /247.3 = 6321.1
= 1565126 /247.3 = 6328.9
= 1563865 /247.3 = 6323.8

Cm(NMOC) = Area(NMOC)/RF(NMOC)
= 1425 /235.1 = 6.1
= 1477 /235.1 = 6.3
= 1464 /235.1 = 6.2

TRIANGLE ENVIRONMENTAL SERVICES, INC. METHOD 25-C SAMPLE CALCULATION
ID#12048-25C

Pressure-Temperature Ratio, Q(i) = P(i)/T(i):

postsampling tank: Q(1) = 760 / 301.15 = 2.52366
presampling tank: Q(2) = 324 / 296.15 = 1.09404
final tank: Q(3) = 25577.04 / 301.15 = 84.93122

Volume Sampled (dscm) = 0.3857 x Tank Volume x [Q(1)-Q(2)]
= 0.3857 x .004548 x [2.5237 - 1.0940]
= 0.002508

Averages and % Relative Standard Deviations (%RSD) of Cm's are calculated.
(%RSD of C = %RSD of Cm)

Moisture and Air (Oxygen dry basis) Correction Factor, CF:

CF = 1 - Water fraction - (99/21)xOxygen fraction (wet basis)
= (1 - Water fraction)x(1 - (99/21)xOxygen fraction (dry basis))
= (1 - 0.0374) x (1 - (99/21)x0.012559) = 0.9056

Calculated Concentrations (ppm):

C(CH4) = Q(3)/[Q(1)-Q(2)] x Cm(CH4)/CF
= 84.9312/(2.5237 - 1.0940) x 9559.6/0.9056 = 627104.3

C(CO2) = Q(3)/[Q(1)-Q(2)] x Cm(CO2)/CF
= 84.9312/(2.5237 - 1.0940) x 6324.6/0.9056 = 414888.0

C(NMOC as Carbon) = Q(3)/[Q(1)-Q(2)] x Cm(NMOC)/(CF x Carbon Number)
= 84.9312/(2.5237 - 1.0940) x 6.2/(0.9056 x 1)
= 406.1

Carbon Mass Concentration (mg/cu.m)
= (12.011 /24.056) x C(NMOC)
= 0.4993 x 406.1 = 202.8

Triangle Environmental Services, Inc.
METHOD 25-C SAMPLE QA/QC DATA

Report #12048-25C

DAILY ANALYZER CHECKS

10.2* ***Daily Calibration***

Response Factor (RF) Checks

Requirement: Daily RF = Initial RF ± 10%

Triplicate injections of a mixture of CO, CH_4, CO_2, and C_3H_8 are made before and after each batch of samples.

See the individual sample data sheet for the daily response factor

10.1.2.3* ***Initial Calibration/Linearity***

Triplicate injections of a calibration gas is made for each compound at four levels:

	Nominal Concentrations (ppm)				Initial RF for Analyzer A 10/22/10	Initial RF for Analyzer B 03/23/12
CO	5	200	1,000	5,000	175.65	220.28
CH_4	3	50	500	10,000	181.49	243.06
CO_2	3	50	500	10,000	173.94	241.20
propane	2	20	3,000	10,000	178.80	242.35

INITIAL NMO ANALYZER PERFORMANCE CHECKS

10.1.2.1* **Oxidation Catalyst Efficiency Check** Analyzer A, 4/8/98; Analyzer B, 4/21/98

FID response with reduction catalyst in bypass mode = 0, 0

Requirement: ≤1%

10.1.2.2* **Reduction Catalyst Efficiency Check** Analyzer A, 4/8/98; Analyzer B, 4/21/98

Response of CH_4 with oxidation and reduction catalysts in series mode and response with both catalysts in bypass mode to be within 5% of the average:

1.05 x Average Response > Response > 0.95 x Average Response

or Higher Response/Lower Response < 1.105263

100.0%, 100.0% Requirement: <110.5%

* USEPA Method 25 Protocol (2000) Reference Number

Report #12048-25C

10.1.2.3* **Analyzer Linearity Check+NMO Calibration** Analyzer A, 10/22/10;Analyzer B, 03/23/12

	100×(1-RF/$RF_{average}$)	Requirement:
max. dev. CO:	+1.876%,+1.697%	± 2.5%
max. dev. CH_4:	-1.775%,+2.476%	± 2.5%
max. dev. CO_2:	+1.738%,-2.231%	± 2.5%
max. dev. NMO:	+2.427%,-1.674%	± 2.5%
max. %RSD:	1.67%, 1.05%	≤ 2%
$\frac{RF\ (NMO)}{RF\ (CO_2)}$ =	0.97, 1.00	1.0 ± 0.1

10.1.2.4* **System Performance Check** Analyzer A, 4/8/98; Analyzer B, 4/21/98, 5/1/98

	Measured Value, Expected Value		Requirement
	Analyzer A	Analyzer B	
Propane in Mix	19.6, 20.0	20.22, 20.0	± 5%
Hexane	50.6, 51.6	51.6, 51.6	± 5%
Toluene	20.3, 20.0	19.34, 20.0	± 5%
Methanol	104.5, 109.1	109.55, 109.0	± 5%

EQUIPMENT CHECKS

8.1.1* **Clean Sampling Equipment Check** (Method 25)

Sample Unit	<10	ppmC total C	@ 100%
Tank	< 2	ppmC NMO	@ 100%

8.1.2* **Sample Tank Evacuation and Leak Check** (Method 25)

Tank evacuated to ≤10 mm Hg absolute pressure, monitored for ≥1 hour, and passed for use if no pressure change (< 1 mm Hg/hr) is noted. (Method 25C: ± 2 mm Hg after 30 minutes)

10.3* **Sample Tank Volumes**

Tank weighed empty, filled with deionized distilled water (temperature recorded), and weighed to the nearest 2 g. Volume calculated based on density of water at that temperature and results recorded in permanent file.

* USEPA Method 25 Protocol (2000) Reference Number

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 25-C DATA REPORT

Name: Sullivan Environmental ID#12048-25C Analyzed: 5/7-14/12

Project ID: Landfill

Sample # 1 East LF

TANK N79:
Volume = 0.004548 cu.m

	Pressure (mm Hg)	Temperature (K)	P/T
Presampling	324.0	296.15	1.094
Postsampling	760.0	301.15	2.524
Lab receipt	760.0	301.15	2.524
Final	25577.0	301.15	84.931
Barometric	757.0		
Water Vapor	28.3		

Field and laboratory postsampling pressure-temperature comparison:

Laboratory receipt P/T / Field postsampling P/T = 1.000

Volume Sampled = 0.002508 dscm
Water fraction = 0.0374
Oxygen fraction = 0.012559 (dry basis)

Calibration Data:

	CH4	CO2	NMOC	
Response Factor (area units/ppmC)	237.5	247.3	235.1	
Report Limit (ppm)	198	198	132	(as Carbon)

Areas:

CH4	2,267,120	2,268,657	2,275,441
CO2	1,563,207	1,565,126	1,563,865
NMOC	1,425	1,477	1,464

Concentrations:

	ppm	
	Amount ± SD	%RSD
CH4	627104 ±1223	0.2
CO2	414888 ± 259	0.1
NMOC as Carbon	406 ± 8	1.9
	(= 203 mg Carbon/cu.m)	

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 25-C DATA REPORT

Name: Sullivan Environmental ID#12048-25C Analyzed: 5/7-14/12

Project ID: Landfill

Sample # 2 North LF

TANK N146:
Volume = 0.004541 cu.m

	Pressure (mm Hg)	Temperature (K)	P/T
Presampling	324.0	296.15	1.094
Postsampling	748.0	301.15	2.484
Lab receipt	748.0	301.15	2.484
Final	26225.8	301.15	87.086
Barometric	757.0		
Water Vapor	28.3		

Field and laboratory postsampling pressure-temperature comparison:

Laboratory receipt P/T / Field postsampling P/T = 1.000

Volume Sampled = 0.002434 dscm
Water fraction = 0.0374
Oxygen fraction = 0.025249 (dry basis)

Calibration Data:

	CH4	CO2	NMOC	
Response Factor (area units/ppmC)	237.5	247.3	235.1	
Report Limit (ppm)	222	222	149	(as Carbon)

Areas:

CH4	2,022,754	2,027,024	2,021,851
CO2	1,303,202	1,303,887	1,301,145
NMOC	1,145	1,149	1,132

Concentrations:

	ppm		
	Amount	± SD	%RSD
CH4	629665	± 860	0.1
CO2	389246	± 426	0.1
NMOC as Carbon	359	± 3	0.8
	(= 179 mg Carbon/cu.m)		

Triangle Environmental Services, Inc.
METHOD 3-C PROCEDURES

Report #12048-25C

CALIBRATION

Triplicate injections of a calibration gas mixture consisting of oxygen (≈2.5%), nitrogen (≈10%), carbon dioxide (≈25%), and methane (≈2%) are made immediately before and after each batch of samples. Daily response factors are calculated from the pre-batch integrated responses (average area count / concentration in ppm) and must agree within 20% of the response factors of the initial calibrations. Further, the post-batch response factors must agree within 5% of the pre-batch response factors. Both criteria must be met before the analyses are considered valid.

ANALYSIS

All samples, which include the daily calibration gas mixture and sample tanks, are analyzed in triplicate using a computer-interfaced gas chromatograph equipped with an automated gas sampling system and a thermal conductivity detector (TCD). O_2, N_2, CO, CH_4, and CO_2 are eluted from the column and pass to the TCD.

CALCULATIONS

Calculations are done in accord with USEPA Method 3-C procedures. A sample calculation for one of the samples is provided in the report.

EQUIPMENT

Tanks are at a minimum twice evacuated and filled with ambient air filtered through charcoal and are then evacuated to below 10 mm Hg and monitored for at least an hour to check that the tanks do not leak more than 1 mm Hg/hour. They are then pressurized to greater than ambient pressure with helium, analyzed to ensure < 2 ppm CH_4 and < 20 ppm CO_2, and stored for later use.

Certifications:

South Coast Air Quality Management District: ID# 94 LA 0401
New Jersey NELAP ID: NC004
Pennsylvania DEP: Registration #68-3321

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 3-C SAMPLE CALCULATION

Note: All pressure values have been converted when necessary to mm Hg and all temperature values to Kelvin.

Name: Sullivan Environmental ID#12048-25C Analyzed: 5/7-10/12
Project ID: Landfill

Sample # 1 East LF

D A T A

Tank N79:
Volume (cu.m) = 0.004548

	Pressure (mm Hg)	Temp.(K)
Presampling	324.0	296.15
Postsampling	760.0	301.15
Final	1892.0	301.15
Barometric	757.0	
Water Vapor	28.3	

Calibration Data:

	O2	N2	CH4	CO2
Response Factor (area units/ppmC)	28.18	30.79	25.16	36.39

Areas:

O2	77,519	77,287	77,760
N2	532,099	531,129	531,897
CH4	3,083,578	3,086,879	3,082,339
CO2	2,967,960	2,980,528	2,980,030

C A L C U L A T I O N S

Measured Concentrations (ppmC):

Cm(O2) = Area(O2) / RF(O2)
= 77519 / 28.2 = 2750.9
= 77287 / 28.2 = 2742.6
= 77760 / 28.2 = 2759.4

Cm(N2) = Area(N2)/RF(N2)
= 532099 / 30.8 = 17281.6
= 531129 / 30.8 = 17250.0
= 531897 / 30.8 = 17275.0

Cm(CH4) = Area(CH4)/RF(CH4)
= 3083578 / 25.2 = 122558.7
= 3086879 / 25.2 = 122690.0
= 3082339 / 25.2 = 122509.5

Cm(CO2) = Area(CO2)/RF(CO2)
= 2967960 / 36.4 = 81559.8
= 2980528 / 36.4 = 81905.1
= 2980030 / 36.4 = 81891.5

TRIANGLE ENVIRONMENTAL SERVICES, INC. ID#12048-25C

METHOD 3-C SAMPLE CALCULATION

Pressure-Temperature Ratio, Q(i) = P(i)/T(i):

postsampling tank: Q(1) = 760 / 301.15 = 2.52366
presampling tank: Q(2) = 324 / 296.15 = 1.09404
final tank: Q(3) = 1892 / 301.15 = 6.282584

Volume Sampled (dscm) = 0.3857 x Tank Volume x [Q(1)-Q(2)]
= 0.3857 x .004548 x [2.5237 - 1.0940]
= 0.002508

Averages and % Relative Standard Deviations (%RSD) of Cm's are calculated.
(%RSD of C = %RSD of Cm)

Moisture Correction Factor, MCF:

MCF = 1 - Water Vapor Pressure/Barometric Pressure
= 1 - 28.3/ 757.0 = 0.9626

Calculated Concentrations (ppm):

C(O2) = Q(3)/[Q(1)-Q(2)] x Cm(O2)/MCF
= 6.2826/(2.5237 - 1.0940) x 2751.0/0.9626 = 12558.8

C(N2) = Q(3)/[Q(1)-Q(2)] x Cm(N2)/MCF
= 6.2826/(2.5237 - 1.0940) x 17268.9/0.9626 = 78836.8

C(CH4) = Q(3)/[Q(1)-Q(2)] x Cm(CH4)/MCF
= 6.2826/(2.5237 - 1.0940) x 122586.1/0.9626 = 559636.6

C(CO2) = Q(3)/[Q(1)-Q(2)] x Cm(CO2)/MCF
= 6.2826/(2.5237 - 1.0940) x 81785.5/0.9626 = 373371.4

Triangle Environmental Services, Inc.
METHOD 3-C SAMPLE QA/QC DATA

Report #12048-25C

DAILY ANALYZER CHECKS

Daily Calibration

Response Factor (RF) Checks

Requirement: Daily RF = Initial RF ± 20%

Triplicate injections of a mixture of O_2, N_2, CH_4, and CO_2 are made before and after each batch of samples.

Initial Calibration/Linearity

Triplicate injections of a calibration gas is made for each compound at three levels:

	Nominal Concentrations (ppm)			Initial RF 10/10/08
O_2	500	10,000	200,000	30.01
N_2	500	50,000	700,000	31.27
CH_4	500	50,000	500,000	25.50
CO_2	500	50,000	250,000	36.61

Analyzer Linearity Check 10/10/08

	$100x(1-RF/RF_{average})$	Requirement:
max. dev. O_2:	- 5.0%	± 10%
max. dev. N_2:	- 4.0%	± 10%
max. dev. CH_4:	- 0.8%	± 10%
max. dev. CO_2:	+ 2.5%	± 10%

EQUIPMENT CHECKS

Clean Sampling Equipment Check

Tank	< 2	ppm CH_4	@ 100%
	< 20	ppm CO_2	@ 100%

Sample Tank Evacuation and Leak Check

Tank evacuated to ≤ 10 *mm* Hg absolute pressure, monitored for ≥ 1 hour, and passed for use if no pressure change (< 1 mm Hg/hr) is noted.

Sample Tank Volumes

Tank weighed empty, filled with deionized distilled water (temperature recorded), and weighed to the nearest 2 g. Volume calculated based on density of water at that temperature and results recorded in permanent file.

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 3-C DATA REPORT

Name: Sullivan Environmental ID#12048-25C Analyzed: 5/7-10/12

Project ID: Landfill

Sample # 1 East LF

TANK N79:
Volume (cu.m) = 0.004548

	Pressure (mm Hg)	Temperature (K)	P/T
Presampling	324.0	296.15	1.094
Postsampling	760.0	301.15	2.524
Lab receipt	760.0	301.15	2.524
Final	1892.0	301.15	6.283
Barometric	757.0		
Water Vapor	28.3		

Field and laboratory postsampling pressure-temperature comparison:

Laboratory receipt P/T / Field postsampling P/T = 1.000

Volume Sampled (dscm) = 0.002508

Calibration Data:

	O2	N2	CH4	CO2
Response Factor (area units/ppmC)	28.18	30.79	25.16	36.39
Report Limit [RL] (ppm)	160	343	69	115
Calibration Limit [CL] (ppm)	2293	2293	2242	2297

Areas:

O2	77,519	77,287	77,760
N2	532,099	531,129	531,897
CH4	3,083,578	3,086,879	3,082,339
CO2	2,967,960	2,980,528	2,980,030

Concentrations:

	ppm			
	Amount	±	SD	%RSD
O2	12559	±	38	0.3
N2	78837	±	76	0.1
CH4	559637	±	426	0.1
CO2	373371	±	893	0.2

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 3-C DATA REPORT

Name: Sullivan Environmental ID#12048-25C Analyzed: 5/7-10/12

Project ID: Landfill

Sample # 2 North LF

TANK N146:
Volume (cu.m) = 0.004541

	Pressure (mm Hg)	Temperature (K)	P/T
Presampling	324.0	296.15	1.094
Postsampling	748.0	301.15	2.484
Lab receipt	748.0	301.15	2.484
Final	1921.0	301.15	6.379
Barometric	757.0		
Water Vapor	28.3		

Field and laboratory postsampling pressure-temperature comparison:

Laboratory receipt P/T / Field postsampling P/T = 1.000

Volume Sampled (dscm) = 0.002434

Calibration Data:

	O2	N2	CH4	CO2
Response Factor (area units/ppmC)	28.18	30.79	25.16	36.39
Report Limit [RL] (ppm)	168	359	72	120
Calibration Limit [CL] (ppm)	2395	2395	2342	2399

Areas:

O2	148,891	149,173	149,608
N2	893,122	894,149	895,151
CH4	2,783,122	2,794,878	2,785,950
CO2	2,515,986	2,506,956	2,522,407

Concentrations:

	ppm			
	Amount	±	SD	%RSD
O2	25249	±	61	0.2
N2	138466	±	157	0.1
CH4	528357	±	1163	0.2
CO2	329552	±	1017	0.3

Chain of Custody

Triangle Environmental Services, Inc.
LABORATORY SAMPLE INFORMATION AND CHAIN-OF-CUSTODY FORM

Company Name: Sullivan Environmental		Project/Client ID:	Date: 4/23/12
Contact Person: John Sullivan	Phone #: (813) 210-1295	Process Type:	
Email: john@sullivanenv.com	Note: Normal Turnaround is 15 working days after receipt of complete set of samples	Results Due Date:	Extra charge will apply for rush results
☒ Electronic Report ☐ Hard copy Report ☐ Fax Results		Report Package Due Date:	

Send Report to: (Street address required for Fed Ex shipment of report)	*Person* John Sullivan	Send Invoice to: (if different from report address)	*Person*
	Company Sullivan Environmental		*Company*
	Address 4448 13th Lane NE		*Address*
Phone #	*FAX #*		*PO#*

✓ all applicable boxes

Analysis

US EPA: ☐ Method 25 ☒ Method 3-C ☒ Method 25-C (NMOC as C [default]) ☐ Method 10-B ☐ Mod. M 3-C GHG/CO ☐ Mod. M25 Methane/Ethane

# of Tank & Trap Samples:	# of Tank-Only Samples: 2	# of Trap-Only Samples:	# of Bag Samples:
☐ Audit with Delay (*extra charge*)	☐ Rush Turnaround (*extra charge*)	☐ High Concentrations Possible ☐ Call if Concentrations High	☐ Dilute High Concentrations (*extra charge*)

Special Instructions:

Tanks for Analysis (Bags) (List IDs): N79, N146

Traps for Analysis (List IDs): _____

☒ TES Equipment	☐ Client Equipment	☐ Client Equipment to be Reconditioned
Tanks, Unused for Reconditioning (List IDs): _____		Traps, Unused for Reconditioning (List IDs): _____

Relinquished by:		Date: 4/26/12	Time: 856	To: (Carrier) FED EX			
Tanks received at TES by:	Condition: good	Date: 4/30/12	Time: 12:30	Traps received at TES by:	Condition:	Date:	Time:

Method 3-C/25-C
Analytical Results

prepared for

SULLIVAN ENVIRONMENTAL
4448 13th Lane NE
St. Petersburg, FL 33703

by

Triangle Environmental Services, Inc.

We, the undersigned, certify to the best of our knowledge that all analytical data presented in this report have been checked for completeness; that the results are accurate, error-free, legible, and have been obtained in accordance with approved protocol; and that all deviations and analytical problems are summarized in the "Comments on the Analyses" page(s).

Approved by:
Wayne A. Stollings
President

Reviewed by:
Donna Nolen-Weathington
Method 25 Supervisor

Report
12110-25C

October 18, 2012

P.O. Box 13294 Research Triangle Park, NC 27709 (800) 367-4862

Triangle Environmental Services, Inc.
COMMENTS ON THE ANALYSES

Report #12110-25C for Sullivan Environmental
Project ID: Landfill Gas

Tanks Received: 9/27/12

Samples Analyzed: 10/2-16/12 (25-C on Analyzer B)
Client Chain-of-Custody forms: 1 pg

Abbreviations and Definitions:

DF: dilution factor(s)
CL: calibration limit = lowest concentration of initial calibration standard ×DF*
RL: report limit = (Method 3-C) minimum detection limit (MDL) × DF*
= (Method 25-C) calibration limit (CL)
J: flag for reported concentrations between RL and CL (applicable for 3-C results only)

* and any applicable water vapor and air correction

All Samples: Laboratory preshipment and receipt pressure and temperature readings were used for the tank pre- and post-test tank data, respectively. However, client post-test barometric pressure and temperature data were used to determine the water vapor fraction.

The tank contents were diluted so as to bring the measured CH_4 and CO_2 concentrations for each of these samples within the Method 25 calibration range. The reported final tank pressure is the original final tank pressure multiplied by the dilution factor.

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 25-C TABLE OF RESULTS

Name: Sullivan Environmental ID#12110-25C Analyzed: 10/2-16/12

Project ID: Landfill Gas

	Sample Description	Concentrations (ppm) CH4	CO2	As Carbon NMOC (ppm)	As Carbon Mass Conc. (mg/cu.m)
1	East LF	554583	305407	831	410
2	North LF	590861	371072	800	400

Correction of concentrations for the presence of air was made
(2 sample(s) corrected using oxygen)

* Please refer to the "Comments on the Analyses" page of the report for additional information.

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 3-C TABLE OF RESULTS

Name: Sullivan Environmental ID#12110-25C Analyzed: 10/2/12

Project ID: Landfill Gas

	Sample Description	Concentrations (ppm) O2	N2	CH4	CO2
1	East LF	4197	78107	544678	380806
2	North LF	9815	87569	562135	346478

Triangle Environmental Services, Inc.
CALIBRATION DATA FOR THE ANALYSES

Client: Sullivan Environmental ID#12110-25C

Project ID: Landfill Gas

Method 3-C
2-OCT-12: Analyzer f
Preanalysis Calibration

Compound	Conc.	Area(1)	Area(2)	Area(3)	Average	%RSD	RF	IRF	%Diff.
O2	24600.0	695194	695337	695935	695489	0.1%	28.27	30.01	-5.79%
N2	99500.0	3068508	3067490	3071504	3069167	0.1%	30.85	31.27	-1.36%
CH4	20500.0	519695	518570	520773	519679	0.2%	25.35	25.50	-0.59%
CO2	243000.0	8896750	8891320	8900205	8896092	0.1%	36.61	36.61	-0.00%

Postanalysis Calibration

Compound	Conc.	Area(1)	Area(2)	Area(3)	Average	RF(post)	RF(pre)	%Diff
O2	24600	696218	698620	696973	697270	28.34	28.27	0.3%
N2	99500	3076018	3083657	3078952	3079542	30.95	30.85	0.3%
CH4	20500	519780	521689	521677	521049	25.42	25.35	0.3%
CO2	243000	8912939	8936892	8920405	8923412	36.72	36.61	0.3%

Sample # 1 N407
2 N10

Method 25-C
16-OCT-1: Analyzer B
Preanalysis Calibration

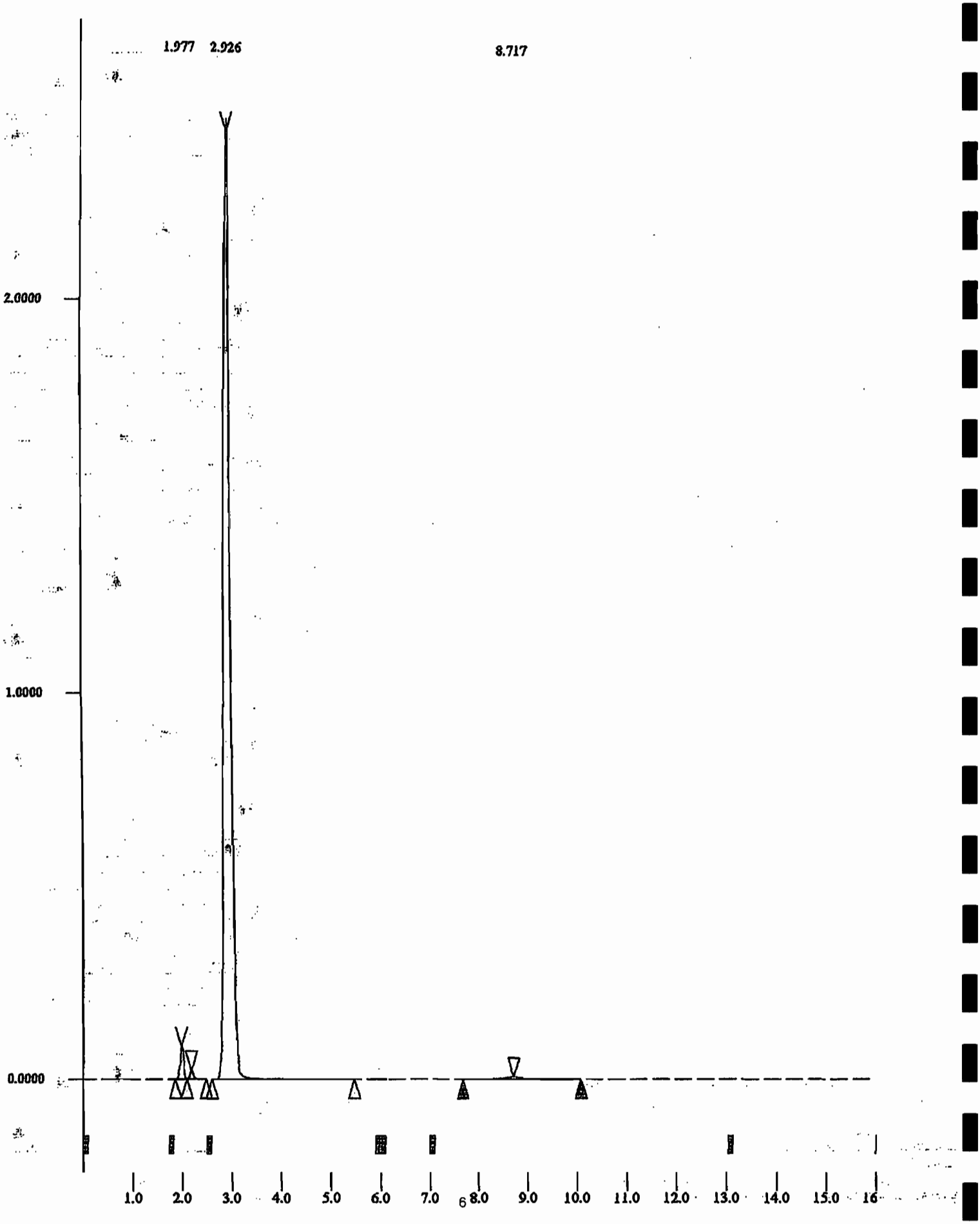
Compound	Conc.	Area(1)	Area(2)	Area(3)	Average	%RSD	RF	IRF	%Diff.
CO	200.5	40181	40338	40024	40181	0.4%	200.4	220.3	-9.0%
CH4	49.1	11163	11101	11056	11107	0.5%	226.1	243.1	-7.0%
CO2	9950.0	2281155	2277328	2279476	2279320	0.1%	229.1	241.2	-5.0%
C2+	61.7	13847	13757	13857	13820	0.4%	224.2	242.4	-7.5%

Postanalysis Calibration

Compound	Conc.	Area(1)	Area(2)	Area(3)	Average	RF(post)	RF(pre)	%Diff
CO	200.5	39997	40013	40045	40018	199.6	200.4	-0.4%
CH4	49.1	11273	11209	11211	11231	228.6	226.1	1.1%
CO2	9950.0	2265110	2269544	2264435	2266363	227.8	229.1	-0.6%
C2+	61.7	13744	13810	13523	13692	222.1	224.2	-0.9%

Sample # 1 N407
2 N10

Conc. = concentration in ppmC, %RSD = % relative standard deviation,
RF = response factor = Average Area/Conc., IRF = response factor from initial calibration,
%Diff. = %(RF-IRF)/IRF for preanalysis/= %(RF(post)-RF(pre)/RF(pre), C2+ = propane


1.977
2.926
8.717
2.0000
1.0000
0.0000
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
16

rint Date: Wed Oct 17 10:52:53 2012 Page 1 of 1

tle :
un File : C:\STAR\RECALCB\TES_B403.RUN
ethod File : C:\STAR\MODULE16.MTH
mple ID : 1- P mix CC61467

njection Date: 16-OCT-12 8:11 AM Calculation Date: 16-OCT-12 11:06 AM

erator :
rkstation: VOLUME 1
nstrument : Varian Star #1
hannel : A = M25

Detector Type: ADCB (10 Volts)
Bus Address : 16
Sample Rate : 10.00 Hz
Run Time : 16.002 min

********* Star Chromatography Workstation ******* Version 4.5 ***************

un Mode : Analysis - Subtract Blank Baseline
ak Measurement: Peak Area
lculation Type: External Standard

ak o.	Peak Name	Result ()	Ret. Time (min)	Time Offset (min)	Area (counts)	Sep. Code	Width 1/2 (sec)	Status Codes
1	CO	162.4316	1.977	0.001	40181	BV	4.2	
2	CH4	44.6395	2.180	0.006	11163	VB	4.5	
3	CO2	9123.5244	2.926	-0.001	2281155	BB	8.8	
4	C2+	55.2714	11.500	0.000	13847	GR	0.0	U
	Totals:	9385.8669		0.006	2346346			

tatus Codes:
- User-defined peak endpoint(s)

tal Unidentified Counts : 0 counts

etected Peaks: 4 Rejected Peaks: 0 Identified Peaks: 4

ltiplier: 1 Divisor: 1

aseline Offset: -3 microVolts

oise (used): 40 microVolts - monitored before this run

ould not format the injection information for this run.
nstall the driver for the module at address 17 (type 8) to format this data.

rror Log:

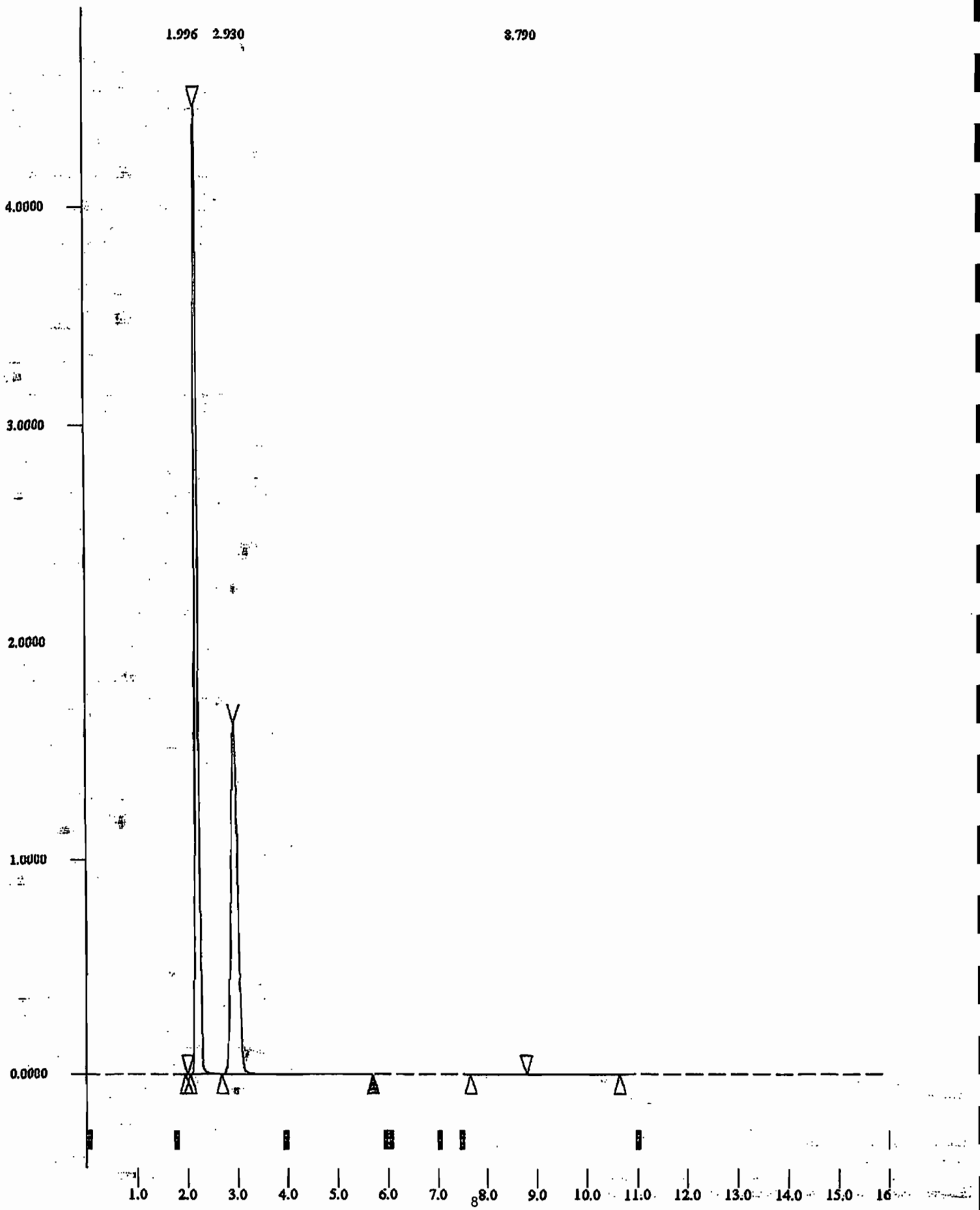
ould not format the error log for the module at address 17 (type 8).
nstall the appropriate module driver to format this data.

ADC Board:

riginal Notes:

ppended Notes:

****


1.996
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2.0000
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1.0
2.0
3.0
4.0
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6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
16

Print Date: Wed Oct 17 10:53:04 2012 Page 1 of 1

Title :
Run File : C:\STAR\RECALCB\TES_B420.RUN
Method File : C:\STAR\RECALCB.MTH
Sample ID : 5- tank N407

Injection Date: 16-OCT-12 2:01 PM Calculation Date: 17-OCT-12 10:04 AM

Operator :
Workstation: VOLUME 1
Instrument : Varian Star #1
Channel : A = M25

Detector Type: ADCB (10 Volts)
Bus Address : 16
Sample Rate : 10.00 Hz
Run Time : 16.002 min

********** Star Chromatography Workstation ******* Version 4.5 ***************

Run Mode : Analysis - Subtract Blank Baseline
Peak Measurement: Peak Area
Calculation Type: External Standard

Peak No.	Peak Name	Result ()	Ret. Time (min)	Time Offset (min)	Area (counts)	Sep. Code	Width 1/2 (sec)	Status Codes
1	CO	0.1229	1.996	0.020	30	BP	2.4	
2	CH4	8392.2510	2.186	0.012	2098650	PV	4.4	UC
3	CO2	6054.0459	2.930	0.003	1513693	VB	8.6	U
4	C2+	12.5295	11.500	0.000	3139	GR	0.0	U
	Totals:	14458.9493		0.035	3615512			

Status Codes:
U - User-defined peak endpoint(s)
C - Out of calibration range

Total Unidentified Counts : 0 counts

Detected Peaks: 4 Rejected Peaks: 0 Identified Peaks: 4

Multiplier: 1 Divisor: 1

Baseline Offset: -1 microVolts

Noise (used): 40 microVolts - monitored before this run

Could not format the injection information for this run.
Install the driver for the module at address 17 (type 8) to format this data.

Calib. out of range; No Recovery Action Specified

Error Log:

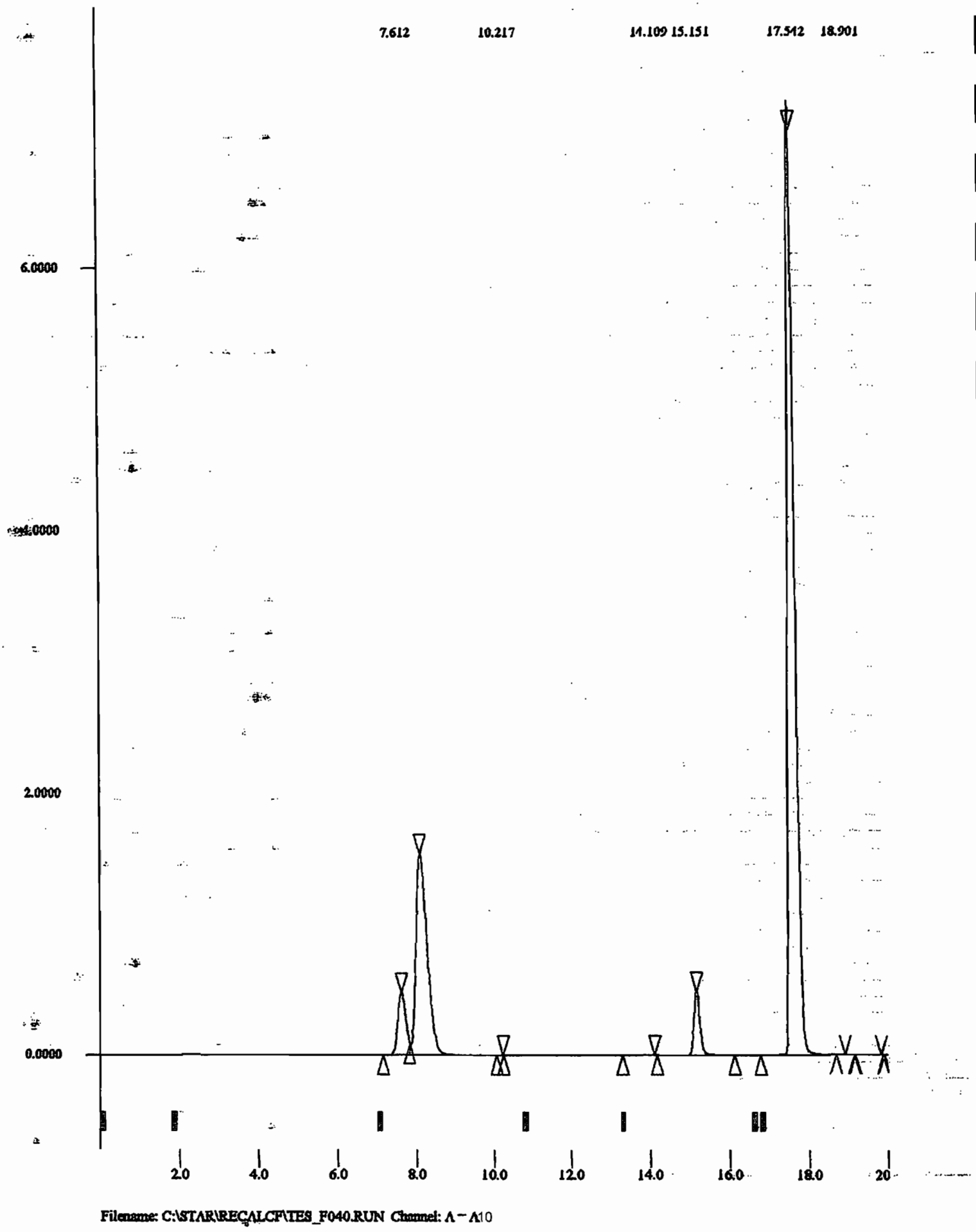
Could not format the error log for the module at address 17 (type 8).
Install the appropriate module driver to format this data.

ADC Board:

Original Notes:

Appended Notes:

****


7.612
10.217
14.109
15.151
17.542
18.901
6.0000
4.0000
2.0000
0.0000
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20
Filename: C:\STAR\RECALCF\TES_F040.RUN Channel: A – A10

itle :
un File : C:\STAR\RECALCF\TES_F040.RUN
ethod File : C:\STAR\CAL3C.MTH
ample ID : 1- 3C MIX CC93314

njection Date: 2-OCT-12 3:10 PM Calculation Date: 2-OCT-12 3:30 PM

perator :
orkstation: MS-DOS_6
nstrument : Varian Star #1
annel : A = A

Detector Type: ADCB (10 Volts)
Bus Address : 16
Sample Rate : 10.00 Hz
Run Time : 20.002 min

********** Star Chromatography Workstation ******* Version 4.5 **********

n Mode : Analysis
eak Measurement: Peak Area
alculation Type: Percent

eak No.	Peak Name	Result ()	Ret. Time (min)	Time Offset (min)	Area (counts)	Sep. Code	Width 1/2 (sec)	Status Codes
1	O2	5.2746	7.612	0.012	695194	BV	13.8	
2	N2	23.2813	8.096	0.026	3068508	VP	18.5	
3	CH4	3.9430	15.151	-0.049	519695	PB	9.7	
4	CO2	67.5011	17.542	-0.159	8896750	BB	12.1	
	Totals:	100.0000		-0.170	13180147			

otal Unidentified Counts : 0 counts

etected Peaks: 8 Rejected Peaks: 4 Identified Peaks: 4

ultiplier: 1 Divisor: 1

aseline Offset: 9 microVolts

oise (used): 30 microVolts - fixed value
oise (monitored before this run): 180 microVolts

ould not format the injection information for this run.
nstall the driver for the module at address 17 (type 8) to format this data.

evision Log:

-OCT-12 3:30 PM: Calculated results from channel A using method:
'C:\STAR\CAL3C.MTH'

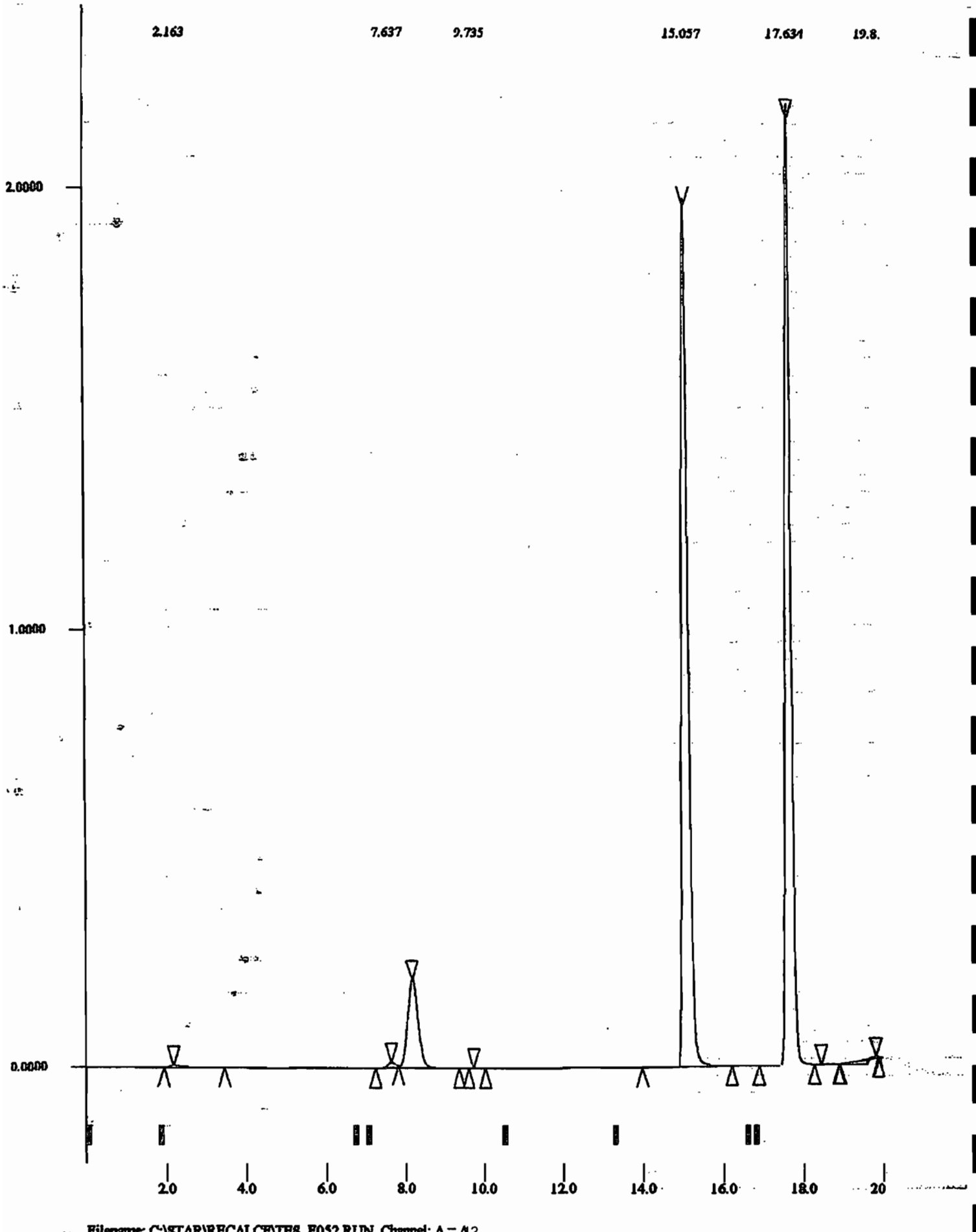
rror Log:

ould not format the error log for the module at address 17 (type 8).
nstall the appropriate module driver to format this data.

DC Board:

riginal Notes:

****


2.163
7.637
9.735
15.057
17.634
19.8.
2.0000
1.0000
0.0000
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20
Filename: C:\STAR\RECALCF\TE8_F052.RUN Channel: A - A2

2.169
7.637
9.735
15.057
17.631
19.8..
2.0000
1.0000
0.0000
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20

Print Date: Fri Oct 05 15:48:39 2012 Page 1 of 1

Title :
Run File : C:\STAR\RECALCF\TES_F052.RUN
Method File : C:\STAR\3C.MTH
Sample ID : 5- tank N407

Injection Date: 2-OCT-12 9:15 PM Calculation Date: 2-OCT-12 9:35 PM

Operator :
Workstation: MS-DOS_6
Instrument : Varian Star #1
Channel : A = A

Detector Type: ADCB (10 Volts)
Bus Address : 16
Sample Rate : 10.00 Hz
Run Time : 20.002 min

********** Star Chromatography Workstation ******* Version 4.5 ***************

Run Mode : Analysis
Peak Measurement: Peak Area
Calculation Type: Percent

Peak No.	Peak Name	Result ()	Ret. Time (min)	Time Offset (min)	Area (counts)	Sep. Code	Width 1/2 (sec)	Status Codes
1	O2	0.3896	7.637	0.037	18650	BV	15.1	
2	N2	7.9270	8.167	0.097	379481	VB	17.2	
3	CH4	45.5407	15.057	-0.143	2180133	BB	10.3	
4	CO2	45.8384	17.634	-0.066	2194383	BP	9.5	
	Totals:	99.6957		-0.075	4772647			

Total Unidentified Counts : 14567 counts

Detected Peaks: 8 Rejected Peaks: 2 Identified Peaks: 4

Multiplier: 1 Divisor: 1

Baseline Offset: -7 microVolts

Noise (used): 80 microVolts - monitored before this run

Could not format the injection information for this run.
Install the driver for the module at address 17 (type 8) to format this data.

Error Log:

Could not format the error log for the module at address 17 (type 8).
Install the appropriate module driver to format this data.

ADC Board:

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Title :
Run File : C:/STAR/RESEARCH/TES_P052.RUN
Method File : C:/STAR/3C.MTH
Sample ID : 5- tank N407

Injection Date: 2-OCT-12 9:15 PM   Calculation Date: 2-OCT-12 9:35 PM

Operator : Detector Type: ADCB (10 Volts)
Workstation: MS-DOS_6   Bus Address : 16
Instrument : Varian Star #1   Sample Rate : 10.00 Hz
Channel : A = A   Run Time : 20.002 min

******** Star Chromatography Workstation ****** Version 4.5 ****************

Run Mode : Analysis
Peak Measurement: Peak Area
Calculation Type: Percent

Peak No.	Peak Name	Result ()	Ret. Time (min)	Time Offset (min)	Area (counts)	Sep. Code	Width 1/2 (sec)	Status Codes
1	O2	0.3896	7.637	0.037	18550	BV	15.1	
2	N2	7.9270	8.167	0.037	379481	VB	17.2	
3	CH4	45.5407	15.057	-0.143	2180133	BB	10.3	
4	CO2	45.8384	17.634	-0.066	2194383	BP	9.5	
	Totals:	99.6957		-0.075	4772547			

Total Unidentified Counts : 14567 counts

Detected Peaks: 6   Rejected Peaks: 2   Identified Peaks: 4

Multiplier: 1   Divisor: 1

Baseline Offset: -7 microVolts

Noise (used): 80 microVolts - monitored before this run

Could not format the injection information for this run.
Install the driver for the module at address 17 (type 8) to format this data.

Error Log:

Could not format the error log for the module at address 17 (type 8).
Install the appropriate module driver to format this data.

ADC Board:

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Triangle Environmental Services, Inc.
METHOD 25-C PROCEDURES

Report #12110-25C

CALIBRATION

The calibrations satisfy the requirements for Methods 25, 25-C, and 10-B.

Triplicate injections of a calibration gas mixture consisting of carbon monoxide (≈200 ppm), methane (≈50 ppm), carbon dioxide (≈ 10,000 ppm), and propane (≈20 ppm) are made immediately before and after each batch of samples. Daily response factors are calculated from the pre-batch integrated responses (average area count / concentration in ppmC) and must agree within 10% of the response factors of the initial calibrations. Further, the post-batch response factors must agree within 2% of the pre-batch response factors. Both criteria must be met before the analyses are considered valid.

ANALYSIS

All samples, which include the daily calibration gas mixture and sample tanks, are analyzed in triplicate using a computer-interfaced gas chromatograph equipped with an automated gas sampling system and a flame ionization detector (FID). CO, CH_4, and CO_2 are eluted from the Unibead 1S-Carbosieve G column and pass through the analytical oxidation and reduction catalyst to the FID. The column is then backflushed to elute the nonmethane organic (NMO) fraction, which passes through the analytical oxidation and reduction catalysts to the FID.

CALCULATIONS

Calculations are done in accord with USEPA Method 25-C procedures. A sample calculation for one of the samples is provided in the report.

EQUIPMENT

Tanks are at a minimum twice evacuated and filled with ambient air filtered through charcoal and are then evacuated to below 10 mm Hg and monitored for at least an hour to check that the tanks do not leak more than 1 mm Hg/hour. They are then pressurized to greater than ambient pressure with helium, analyzed to ensure < 2 ppmC NMO, and stored for later use. Prior to shipping, tanks are evacuated to ≈325 mm Hg absolute. The tank absolute pressure and temperature and the barometric pressure are recorded on a data sheet enclosed with the shipment. The absolute pressure can be verified by measurement in the field.

Sampling units are reconditioned by checking that all sections operate properly. The unit is flushed with zero air for at least thirty minutes before an aliquot of this flow is injected into the analyzer. If the total carbon concentration is below 10 ppm, the unit is made ready for use and stored for shipment.

Certifications:

South Coast Air Quality Management District: ID# 94 LA 0401
New Jersey NELAP ID: NC004
Pennsylvania DEP: Registration #68-3321

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 25-C SAMPLE CALCULATION

Note: All pressure values have been converted when necessary to mm Hg and all temperature values to Kelvin.

Name: Sullivan Environmental ID#12110-25C Analyzed: 10/2-16/12

Project ID: Landfill Gas

Sample # 1 East LF

D A T A

Tank N407:
Volume = 0.004480 cu.m

	Pressure (mm Hg)	Temp.(K)
Presampling	324.0	296.2
Postsampling	650.0	301.2
Final	18115.6	301.2
Barometric	760.0	
Water Vapor	28.3	

Water fraction = 0.0372
O2 fraction = 0.004197 (dry basis)

Calibration Data:

	CH4	CO2	NMOC
Response Factor (area units/ppmC)	226.1	229.1	224.2

Areas:

CH4	2,098,650	2,090,170	2,092,407
CO2	1,513,693	1,512,628	1,511,490
NMOC	3,139	3,076	3,010

C A L C U L A T I O N S

Measured Concentrations (ppmC):

Cm(CH4) = Area(CH4)/RF(CH4)
= 2098650 /226.1 = 9282.0
= 2090170 /226.1 = 9244.4
= 2092407 /226.1 = 9254.3

Cm(CO2) = Area(CO2)/RF(CO2)
= 1513693 /229.1 = 6607.1
= 1512628 /229.1 = 6602.5
= 1511490 /229.1 = 6597.5

Cm(NMOC) = Area(NMOC)/RF(NMOC)
= 3139 /224.2 = 14.0
= 3076 /224.2 = 13.7
= 3010 /224.2 = 13.4

TRIANGLE ENVIRONMENTAL SERVICES, INC. METHOD 25-C SAMPLE CALCULATION
ID#12110-25C

Pressure-Temperature Ratio, Q(i) = P(i)/T(i):

postsampling tank: Q(1) = 650 / 301.15 = 2.158393
presampling tank: Q(2) = 324 / 296.15 = 1.09404
final tank: Q(3) = 18115.57 / 301.15 = 60.15464

Volume Sampled (dscm) = 0.3857 x Tank Volume x [Q(1)-Q(2)]
= 0.3857 x .00448 x [2.1584 - 1.0940]
= 0.001839

Averages and % Relative Standard Deviations (%RSD) of Cm's are calculated.
(%RSD of C = %RSD of Cm)

Moisture and Air (Oxygen dry basis) Correction Factor, CF:

CF = 1 - Water fraction - (99/21)xOxygen fraction (wet basis)
= (1 - Water fraction)x(1 - (99/21)xOxygen fraction (dry basis))
= (1 - 0.0372) x (1 - (99/21)x0.004197) = 0.9437

Calculated Concentrations (ppm):

C(CH4) = Q(3)/[Q(1)-Q(2)] x Cm(CH4)/CF
= 60.1546/(2.1584 - 1.0940) x 9260.2/0.9437 = 554583.0

C(CO2) = Q(3)/[Q(1)-Q(2)] x Cm(CO2)/CF
= 60.1546/(2.1584 - 1.0940) x 6602.4/0.9437 = 395406.6

C(NMOC as Carbon) = Q(3)/[Q(1)-Q(2)] x Cm(NMOC)/(CF x Carbon Number)
= 60.1546/(2.1584 - 1.0940) x 13.7/(0.9437 x 1)
= 821.4

Carbon Mass Concentration (mg/cu.m)
= (12.011 /24.056) x C(NMOC)
= 0.4993 x 821.4 = 410.1

Triangle Environmental Services, Inc.
METHOD 25-C SAMPLE QA/QC DATA

Report #12110-25C

DAILY ANALYZER CHECKS

10.2* **Daily Calibration**

Response Factor (RF) Checks

Requirement: Daily RF = Initial RF ± 10%

Triplicate injections of a mixture of CO, CH_4, CO_2, and C_3H_8 are made before and after each batch of samples. See the individual sample data sheet for the daily response factor

10.1.2.3* **Initial Calibration/Linearity**

Triplicate injections of a calibration gas is made for each compound at four levels:

	Nominal Concentrations (ppm)				Initial RF for Analyzer A 10/22/10	Initial RF for Analyzer B 03/23/12
CO	5	200	1,000	5,000	175.65	220.28
CH_4	3	50	500	10,000	181.49	243.06
CO_2	3	50	500	10,000	173.94	241.20
propane	2	20	3,000	10,000	178.80	242.35

INITIAL NMO ANALYZER PERFORMANCE CHECKS

10.1.2.1* **Oxidation Catalyst Efficiency Check** Analyzer A, 4/8/98; Analyzer B, 4/21/98

FID response with reduction catalyst in bypass mode = 0, 0

Requirement: ≤1%

10.1.2.2* **Reduction Catalyst Efficiency Check** Analyzer A, 4/8/98; Analyzer B, 4/21/98

Response of CH_4 with oxidation and reduction catalysts in series mode and response with both catalysts in bypass mode to be within 5% of the average:

1.05 x Average Response > Response > 0.95 x Average Response

or Higher Response/Lower Response < 1.105263

100.0%, 100.0% Requirement: <110.5%

* USEPA Method 25 Protocol (2000) Reference Number

Report #12110-25C

10.1.2.3* **Analyzer Linearity Check+NMO Calibration** Analyzer A, 10/22/10;Analyzer B, 03/23/12

	$100\times(1-RF/RF_{average})$	Requirement:
max. dev. CO:	+1.876%,-1.697%	± 2.5%
max. dev. CH_4:	-1.775%,+2.476%	± 2.5%
max. dev. CO_2:	+1.738%,-2.231%	± 2.5%
max. dev. NMO:	+2.427%,-1.674%	± 2.5%
max. %RSD:	1.67%, 1.05%	≤ 2%
$\frac{RF\ (NMO)}{RF\ (CO_2)}$ =	0.97, 1.00	1.0 ± 0.1

10.1.2.4* **System Performance Check** Analyzer A, 4/8/98; Analyzer B, 4/21/98, 5/1/98

	Measured Value, Expected Value		Requirement
	Analyzer A	Analyzer B	
Propane in Mix	19.6, 20.0	20.22, 20.0	± 5%
Hexane	50.6, 51.6	51.6, 51.6	± 5%
Toluene	20.3, 20.0	19.34, 20.0	± 5%
Methanol	104.5, 109.1	109.55, 109.0	± 5%

EQUIPMENT CHECKS

8.1.1* **Clean Sampling Equipment Check** (Method 25)

Sample Unit	< 10	ppmC total C	@ 100%
Tank	< 2	ppmC NMO	@ 100%

8.1.2* **Sample Tank Evacuation and Leak Check** (Method 25)

Tank evacuated to ≤ 10 mm Hg absolute pressure, monitored for ≥ 1 hour, and passed for use if no pressure change (< 1 mm Hg/hr) is noted. (Method 25C: ± 2 mm Hg after 30 minutes)

10.3* **Sample Tank Volumes**

Tank weighed empty, filled with deionized distilled water (temperature recorded), and weighed to the nearest 2 g. Volume calculated based on density of water at that temperature and results recorded in permanent file.

* USEPA Method 25 Protocol (2000) Reference Number

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 25-C DATA REPORT

Name: Sullivan Environmental ID#12110-25C Analyzed: 10/2-16/12

Project ID: Landfill Gas

Sample # 1 East LF

TANK N407:
Volume = 0.004480 cu.m

	Pressure (mm Hg)	Temperature (K)	P/T
Presampling	324.0	296.15	1.094
Postsampling	650.0	301.15	2.158
Lab receipt	650.0	301.15	2.158
Final	18115.6	301.15	60.155
Barometric	760.0		
Water Vapor	28.3		

Field and laboratory postsampling pressure-temperature comparison:

Laboratory receipt P/T / Field postsampling P/T = 1.000

Volume Sampled = 0.001839 dscm
Water fraction = 0.0372
Oxygen fraction = 0.004197 (dry basis)

Calibration Data:

	CH4	CO2	NMOC	
Response Factor (area units/ppmC)	226.1	229.1	224.2	
Report Limit (ppm)	181	181	121	(as Carbon)

Areas:

CH4	2,098,650	2,090,170	2,092,407
CO2	1,513,693	1,512,628	1,511,490
NMOC	3,139	3,076	3,010

Concentrations:

	ppm		
	Amount	± SD	%RSD
CH4	554583	±1164	0.2
CO2	395407	± 288	0.1
NMOC as Carbon	821	± 17	2.1
	(= 410 mg Carbon/cu.m)		

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 25-C DATA REPORT

Name: Sullivan Environmental ID#12110-25C Analyzed: 10/2-16/12

Project ID: Landfill Gas

Sample # 2 North LF

TANK N10:
Volume = 0.004525 cu.m

	Pressure (mm Hg)	Temperature (K)	P/T
Presampling	325.0	296.15	1.097
Postsampling	652.0	301.15	2.165
Lab receipt	652.0	301.15	2.165
Final	19131.6	301.15	63.529
Barometric	760.0		
Water Vapor	28.3		

Field and laboratory postsampling pressure-temperature comparison:

Laboratory receipt P/T / Field postsampling P/T = 1.000

Volume Sampled = 0.001863 dscm
Water fraction = 0.0372
Oxygen fraction = 0.009815 (dry basis)

Calibration Data:

	CH4	CO2	NMOC	
Response Factor (area units/ppmC)	226.1	229.1	224.2	
Report Limit (ppm)	195	195	131	(as Carbon)

Areas:

CH4	2,066,971	2,061,026	2,056,399
CO2	1,312,706	1,311,461	1,311,287
NMOC	2,746	2,759	2,800

Concentrations:

	ppm Amount ± SD	%RSD
CH4	590861 ±1519	0.3
CO2	371072 ± 219	0.1
NMOC as Carbon	800 ± 8	1.0
	(= 400 mg Carbon/cu.m)	

Triangle Environmental Services, Inc.
METHOD 3-C PROCEDURES

Report #12110-25C

CALIBRATION

Triplicate injections of a calibration gas mixture consisting of oxygen (≈2.5%), nitrogen (≈10%), carbon dioxide (≈25%), and methane (≈2%) are made immediately before and after each batch of samples. Daily response factors are calculated from the pre-batch integrated responses (average area count / concentration in ppm) and must agree within 20% of the response factors of the initial calibrations. Further, the post-batch response factors must agree within 5% of the pre-batch response factors. Both criteria must be met before the analyses are considered valid.

ANALYSIS

All samples, which include the daily calibration gas mixture and sample tanks, are analyzed in triplicate using a computer-interfaced gas chromatograph equipped with an automated gas sampling system and a thermal conductivity detector (TCD). O_2, N_2, CO, CH_4, and CO_2 are eluted from the column and pass to the TCD.

CALCULATIONS

Calculations are done in accord with USEPA Method 3-C procedures. A sample calculation for one of the samples is provided in the report.

EQUIPMENT

Tanks are at a minimum twice evacuated and filled with ambient air filtered through charcoal and are then evacuated to below 10 mm Hg and monitored for at least an hour to check that the tanks do not leak more than 1 mm Hg/hour. They are then pressurized to greater than ambient pressure with helium, analyzed to ensure < 2 ppm CH_4 and < 20 ppm CO_2, and stored for later use.

Certifications:

South Coast Air Quality Management District: ID# 94 LA 0401
New Jersey NELAP ID: NC004
Pennsylvania DEP: Registration #68-3321

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 3-C SAMPLE CALCULATION

Note: All pressure values have been converted when necessary to mm Hg and all temperature values to Kelvin.

Name: Sullivan Environmental ID#12110-25C Analyzed: 10/2/12
Project ID: Landfill Gas

Sample # 1 East LF

D A T A

Tank N407:

Volume (cu.m) = 0.004480

	Pressure (mm Hg)	Temp.(K)
Presampling	324.0	296.15
Postsampling	650.0	301.15
Final	1956.0	301.15
Barometric	760.0	
Water Vapor	28.3	

Calibration Data:

	O2	N2	CH4	CO2
Response Factor (area units/ppmC)	28.27	30.85	25.35	36.61

Areas:

O2	18,650	18,722	18,781
N2	379,481	381,052	379,934
CH4	2,180,133	2,175,612	2,179,434
CO2	2,194,383	2,201,648	2,202,433

C A L C U L A T I O N S

Measured Concentrations (ppmC):

Cm(O2) = Area(O2) / RF(O2)
= 18650 / 28.3 = 659.7
= 18722 / 28.3 = 662.3
= 18781 / 28.3 = 664.3

Cm(N2) = Area(N2)/RF(N2)
= 379481 / 30.9 = 12300.8
= 381052 / 30.9 = 12351.8
= 379934 / 30.9 = 12315.5

Cm(CH4) = Area(CH4)/RF(CH4)
= 2180133 / 25.4 = 86001.3
= 2175612 / 25.4 = 85823.0
= 2179434 / 25.4 = 85973.7

Cm(CO2) = Area(CO2)/RF(CO2)
= 2194383 / 36.6 = 59939.4
= 2201648 / 36.6 = 60137.9
= 2202433 / 36.6 = 60159.3

TRIANGLE ENVIRONMENTAL SERVICES, INC. ID#12110-25C

METHOD 3-C SAMPLE CALCULATION

Pressure-Temperature Ratio, Q(i) = P(i)/T(i):

postsampling tank: Q(1) = 650 / 301.15 = 2.158393
presampling tank: Q(2) = 324 / 296.15 = 1.09404
final tank: Q(3) = 1956 / 301.15 = 6.495103

Volume Sampled (dscm) = 0.3857 x Tank Volume x [Q(1)-Q(2)]
= 0.3857 x .00448 x [2.1584 - 1.0940]
= 0.001839

Averages and % Relative Standard Deviations (%RSD) of Cm's are calculated. (%RSD of C = %RSD of Cm)

Moisture Correction Factor, MCF:

MCF = 1 - Water Vapor Pressure/Barometric Pressure
= 1 - 28.3/ 760.0 = 0.9628

Calculated Concentrations (ppm):

C(O2) = Q(3)/[Q(1)-Q(2)] x Cm(O2)/MCF
= 6.4951/(2.1584 - 1.0940) x 662.1/0.9628 = 4196.7

C(N2) = Q(3)/[Q(1)-Q(2)] x Cm(N2)/MCF
= 6.4951/(2.1584 - 1.0940) x 12322.7/0.9628 = 78106.6

C(CH4) = Q(3)/[Q(1)-Q(2)] x Cm(CH4)/MCF
= 6.4951/(2.1584 - 1.0940) x 85932.7/0.9628 = 544678.1

C(CO2) = Q(3)/[Q(1)-Q(2)] x Cm(CO2)/MCF
= 6.4951/(2.1584 - 1.0940) x 60078.9/0.9628 = 380805.8

Triangle Environmental Services, Inc.
METHOD 3-C SAMPLE QA/QC DATA

Report #12110-25C

DAILY ANALYZER CHECKS

Daily Calibration

Response Factor (RF) Checks

Requirement: Daily RF = Initial RF ± 20%

Triplicate injections of a mixture of O_2, N_2, CH_4, and CO_2 are made before and after each batch of samples.

Initial Calibration/Linearity

Triplicate injections of a calibration gas is made for each compound at three levels:

	Nominal Concentrations (ppm)			Initial RF 10/10/08
O_2	500	10,000	200,000	30.01
N_2	500	50,000	700,000	31.27
CH_4	500	50,000	500,000	25.50
CO_2	500	50,000	250,000	36.61

Analyzer Linearity Check 10/10/08

	$100x(1-RF/RF_{average})$	Requirement:
max. dev. O_2:	- 5.0%	± 10%
max. dev. N_2:	- 4.0%	± 10%
max. dev. CH_4:	- 0.8%	± 10%
max. dev. CO_2:	+ 2.5%	± 10%

EQUIPMENT CHECKS

Clean Sampling Equipment Check

Tank < 2 ppm CH_4 @ 100%
< 20 ppm CO_2 @ 100%

Sample Tank Evacuation and Leak Check

Tank evacuated to ≤ 10 mm Hg absolute pressure, monitored for ≥ 1 hour, and passed for use if no pressure change (< 1 mm Hg/hr) is noted.

Sample Tank Volumes

Tank weighed empty, filled with deionized distilled water (temperature recorded), and weighed to the nearest 2 g. Volume calculated based on density of water at that temperature and results recorded in permanent file.

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 3-C DATA REPORT

Name: Sullivan Environmental ID#12110-25C Analyzed: 10/2/12

Project ID: Landfill Gas

Sample # 1 East LF

TANK N407:
Volume (cu.m) = 0.004480

	Pressure (mm Hg)	Temperature (K)	P/T
Presampling	324.0	296.15	1.094
Postsampling	650.0	301.15	2.158
Lab receipt	650.0	301.15	2.158
Final	1956.0	301.15	6.495
Barometric	760.0		
Water Vapor	28.3		

Field and laboratory postsampling pressure-temperature comparison:

Laboratory receipt P/T / Field postsampling P/T = 1.000

Volume Sampled (dscm) = 0.001839

Calibration Data:

	O2	N2	CH4	CO2
Response Factor (area units/ppmC)	28.27	30.85	25.35	36.61
Report Limit [RL] (ppm)	223	476	96	159
Calibration Limit [CL] (ppm)	3183	3183	3113	3189

Areas:

O2	18,650	18,722	18,781
N2	379,481	381,052	379,934
CH4	2,180,133	2,175,612	2,179,434
CO2	2,194,383	2,201,648	2,202,433

Concentrations:

	ppm Amount	±	SD	%RSD
O2	4197	±	15	0.4
N2	78107	±	166	0.2
CH4	544678	±	608	0.1
CO2	380806	±	768	0.2

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 3-C DATA REPORT

Name: Sullivan Environmental ID#12110-25C Analyzed: 10/2/12

Project ID: Landfill Gas

Sample # 2 North LF

TANK N10:
Volume (cu.m) = 0.004525

	Pressure (mm Hg)	Temperature (K)	P/T
Presampling	325.0	296.15	1.097
Postsampling	652.0	301.15	2.165
Lab receipt	652.0	301.15	2.165
Final	1952.0	301.15	6.482
Barometric	760.0		
Water Vapor	28.3		

Field and laboratory postsampling pressure-temperature comparison:

Laboratory receipt P/T / Field postsampling P/T = 1.000

Volume Sampled (dscm) = 0.001863

Calibration Data:

	O2	N2	CH4	CO2
Response Factor (area units/ppmC)	28.27	30.85	25.35	36.61
Report Limit [RL] (ppm)	222	474	96	158
Calibration Limit [CL] (ppm)	3166	3166	3098	3173

Areas:

O2	44,130	43,968	43,903
N2	428,063	428,944	428,170
CH4	2,259,072	2,258,002	2,262,110
CO2	2,007,078	2,010,516	2,016,806

Concentrations:

	ppm			
	Amount	±	SD	%RSD
O2	9815	±	26	0.3
N2	87569	±	98	0.1
CH4	562135	±	530	0.1
CO2	346478	±	850	0.2

Chain of Custody

Triangle Environmental Services, Inc.
LABORATORY SAMPLE INFORMATION AND CHAIN-OF-CUSTODY FORM

Company Name: Sullivan Environmental		Project/Client ID:	Date: 9/21/12
Contact Person: John Sullivan	Phone #: (813) 210-1295	Process Type:	
Email: john@sullivanenv.com	Note: Normal Turnaround is 15 working days after receipt of complete set of samples	Results Due Date: Normal turnaround	Extra charge will apply for rush results
☒ Electronic Report ☐ Hard copy Report ☐ Fax Results		Report Package Due Date: Same	

Send Report to: (Street address required for Fed Ex shipment of report)	*Person* John Sullivan	Send Invoice to: (if different from report address)	*Person*
	Company Sullivan Environmental		*Company*
	Address 4448 13th Lane NE		*Address*
	St. Petersburg, FL 33703		
Phone # (813) 210-1295	*FAX #* (727) 498-2930		*PO#*

✓ all applicable boxes

Analysis

US EPA: ☒ Method 25 ☒ Method 3-C ☐ Method 25-C (NMOC as C [default]) ☐ Method 10-B ☐ Mod. M 3-C GHG/CO ☐ Mod. M25 Methane/Ethane

# of Tank & Trap Samples: 2	# of Tank-Only Samples: 2	# of Trap-Only Samples:	# of Bag Samples:
☐ Audit with Delay (*extra charge*)	☐ Rush Turnaround (*extra charge*)	☐ High Concentrations Possible ☐ Call if Concentrations High	☐ Dilute High Concentrations (*extra charge*)

Special Instructions:

Tanks for Analysis (Bags) (List IDs): N10, N1407	**Traps** for Analysis (List IDs):

☒ TES Equipment	☐ Client Equipment	☐ Client Equipment to be Reconditioned
Tanks, Unused for Reconditioning (List IDs):		Traps, Unused for Reconditioning (List IDs):

Relinquished by: John Sullivan		Date: 9/28/12	Time: 9:22	To: (Carrier) Fed Ex			
Tanks received at TES by:	Condition: good	Date: 9-27-12	Time: 9:45	Traps received at TES by:	Condition:	Date:	Time:

Method 3-C/25-C
Analytical Results

prepared for

SULLIVAN ENVIRONMENTAL
4448 13th Lane NE
St. Petersburg, FL 33703

by

Triangle Environmental Services, Inc.

We, the undersigned, certify to the best of our knowledge that all analytical data presented in this report have been checked for completeness; that the results are accurate, error-free, legible, and have been obtained in accordance with approved protocol; and that all deviations and analytical problems are summarized in the "Comments on the Analyses" page(s).

Approved by:

Wayne A. Stollings
President

Reviewed by:

Donna Nolen-Weathington
Method 25 Supervisor

Report
13018-25C

March 22, 2013

P.O. Box 13294 Research Triangle Park, NC 27709 (800) 367-4862

SCAQMD #94 LA 0401
NJ NELAP ID - NC004
PADEP Registration #68-3321

Triangle Environmental Services, Inc.
COMMENTS ON THE ANALYSES

Report #13018-25C for Sullivan Environmental
Project ID: City of Jacksonville

Tanks Received: 3/5/13

Samples Analyzed: 3/14-21/13 (25-C on Analyzer B)
Client Chain-of-Custody forms: 1 pg

Abbreviations and Definitions:

DF: dilution factor(s)
CL: calibration limit = lowest concentration of initial calibration standard ×DF*
RL: report limit = (Method 3-C) minimum detection limit (MDL) × DF*
= (Method 25-C) calibration limit (CL)
J: flag for reported concentrations between RL and CL (applicable for 3-C results only)

* and any applicable water vapor and air correction

All Samples: Laboratory preshipment and receipt pressure and temperature readings were used for the tank pre- and post-test tank data, respectively. Laboratory post-test barometric pressure and temperature data were used to determine the water vapor fraction.

The tank contents were diluted so as to bring the measured CH_4 and CO_2 concentrations for each of these samples within the Method 25 calibration range. The reported final tank pressure is the original final tank pressure multiplied by the dilution factor.

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 25-C TABLE OF RESULTS

Name: Sullivan Environmental ID#13018-25C Analyzed: 3/14-21/13

Project ID: City of Jacksonville

	Sample Description	Concentrations (ppm) CH4	CO2	As Carbon NMOC (ppm)	As Carbon Mass Conc. (mg/cu.m)
1	Run 1	544500	413030	< 139	< 64
2	Run 2	551063	383378	< 131	< 65

< # = Concentration Below Report Limit
Correction of concentrations for the presence of air was made
(2 sample(s) corrected using oxygen)

* Please refer to the "Comments on the Analyses" page of the report for additional information.

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 3-C TABLE OF RESULTS

Name: Sullivan Environmental ID#13018-25C Analyzed: 3/14/18

Project ID: City of Jacksonville

	Sample Description	Concentrations (ppm) O2	N2	CH4	CO2
1	Run 1	5410	26544	585167	386272
2	Run 2	9544	56467	575602	351491

Triangle Environmental Services, Inc.
CALIBRATION DATA FOR THE ANALYSES

Client: Sullivan Environmental ID#13018-25C

Project ID: City of Jacksonville

Method 3-C
14-MAR-13: Analyzer f
Preanalysis Calibration

Compound	Conc.	Area(1)	Area(2)	Area(3)	Average	%RSD	RF	IRF	%Diff.
O2	24600.0	701619	702333	701866	701939	0.1%	28.53	30.01	-4.92%
N2	99500.0	3099150	3103095	3101976	3101407	0.1%	31.17	31.27	-0.32%
CH4	20500.0	523429	524635	523281	523782	0.1%	25.55	25.50	0.20%
CO2	243000.0	8897858	8904449	8901898	8901402	0.0%	36.63	36.61	0.06%

Postanalysis Calibration

Compound	Conc.	Area(1)	Area(2)	Area(3)	Average	RF(post)	RF(pre)	%Diff
O2	24600	693558	693106	692301	692988	28.17	28.53	-1.3%
N2	99500	3069343	3066827	3063786	3066652	30.82	31.17	-1.1%
CH4	20500	515719	516593	515445	515919	25.17	25.55	-1.5%
CO2	243000	8816874	8794251	8791531	8800885	36.22	36.63	-1.1%

Sample # 1 N435
2 N81

Method 25-C
21-MAR-1: Analyzer b
Preanalysis Calibration

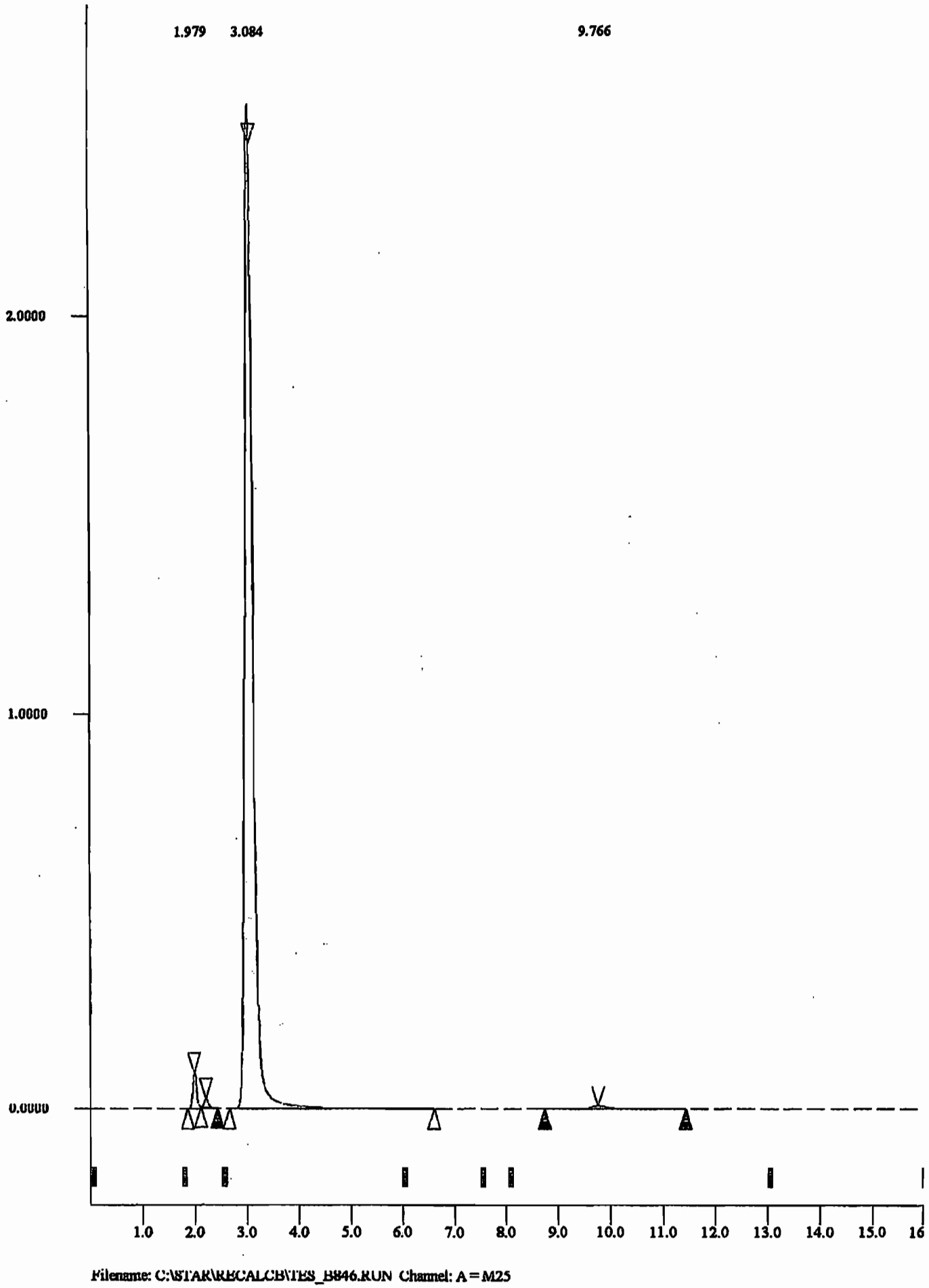
Compound	Conc.	Area(1)	Area(2)	Area(3)	Average	%RSD	RF	IRF	%Diff.
CO	200.5	47558	47716	47651	47642	0.2%	237.6	258.6	-8.1%
CH4	49.1	14630	14820	14655	14702	0.7%	299.2	284.1	5.3%
CO2	9950.0	2719625	2714687	2716512	2716941	0.1%	273.1	269.7	1.3%
C2+	61.7	15848	15440	15808	15699	1.4%	254.6	272.0	-6.4%

Postanalysis Calibration

Compound	Conc.	Area(1)	Area(2)	Area(3)	Average	RF(post)	RF(pre)	%Diff
CO	200.5	48389	48325	48312	48342	241.1	237.6	1.5%
CH4	49.1	14815	14870	14797	14827	301.8	299.2	0.9%
CO2	9950.0	2739734	2739630	2730901	2736755	275.1	273.1	0.7%
C2+	61.7	15320	15648	15816	15595	253.0	254.6	-0.7%

Sample # 1 N435
2 N81

Conc. = concentration in ppmC, %RSD = % relative standard deviation,
RF = response factor = Average Area/Conc., IRF = response factor from initial calibration,
%Diff. = %(RF-IRF)/IRF for preanalysis/= %(RF(post)-RF(pre)/RF(pre), C2+ = propane


1.979
3.084
9.766
2.0000
1.0000
0.0000
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
16
Filename: C:\STAR\RECALCB\TES_B846.RUN Channel: A = M25

Title :
Run File : C:\STAR\RECALCB\TES_B846.RUN
Method File : C:\STAR\RECALCB.MTH
Sample ID : 1- P mix CC61467

Injection Date: 21-MAR-13 5:40 PM Calculation Date: 22-MAR-13 10:53 AM

Operator : Donna Nolen-Weathi
Workstation: MS-DOS_6
Instrument : Varian Star #1
Channel : A = M25

Detector Type: ADCB (10 Volts)
Bus Address : 16
Sample Rate : 10.00 Hz
Run Time : 16.002 min

********** Star Chromatography Workstation ******* Version 4.5 **********

Run Mode : Analysis - Subtract Blank Baseline
Peak Measurement: Peak Area
Calculation Type: Percent

Peak No.	Peak Name	Result ()	Ret. Time (min)	Time Offset (min)	Area (counts)	Sep. Code	Width 1/2 (sec)	Status Codes
1	CO	1.6999	1.979	-0.021	47558	BV	4.7	U
2	CH4	0.5229	2.201	0.001	14630	VB	5.3	U
3	CO2	97.2107	3.084	0.084	2719625	BB	10.1	
4	C2+	0.5665	11.000	0.000	15848	GR	0.0	U
	Totals:	100.0000		0.064	2797661			

Status Codes:
U - User-defined peak endpoint(s)

Total Unidentified Counts : 0 counts

Detected Peaks: 4 Rejected Peaks: 0 **Identified Peaks: 4**

Multiplier: 1 Divisor: 1

Baseline **Offset: 8 microVolts**

Noise (used): 50 microVolts - fixed value
Noise (monitored before this run): 140 microVolts

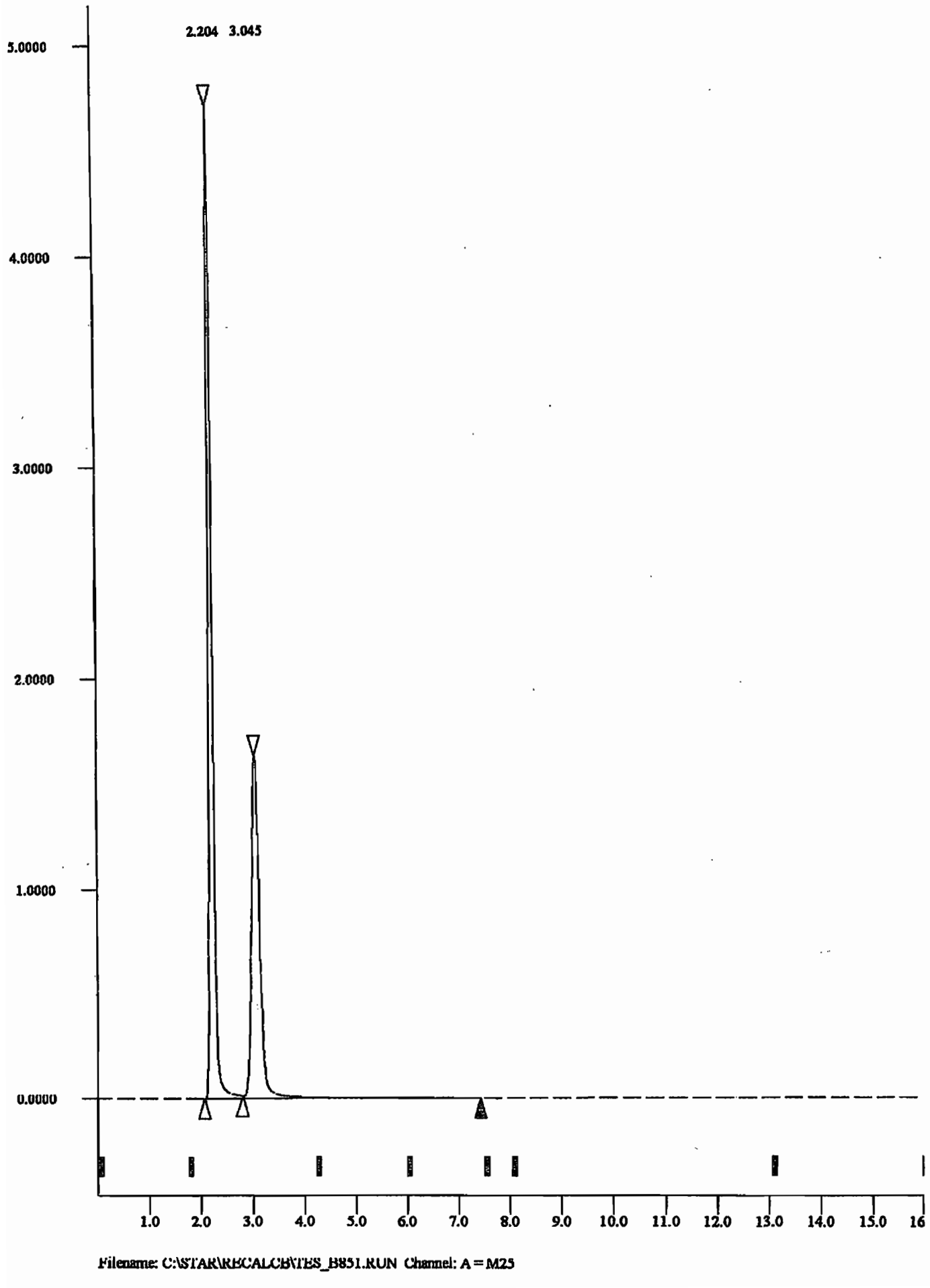
Could not format the injection information for this run.
Install the driver for the module at address 17 (type 8) to format this data.

Error Log:

Could not format the error log for the module at address 17 (type 8).
Install the appropriate module driver to format this data.

ADC Board:

****


2.204 3.045
5.0000
4.0000
3.0000
2.0000
1.0000
0.0000
1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0 16
Filename: C:\STAR\RECALCB\TES_B851.RUN Channel: A = M25

Title :
Run File : C:\STAR\RECALCB\TES_B851.RUN
Method File : C:\STAR\RECALCB.MTH
Sample ID : 13- tank N435

Injection Date: 21-MAR-13 7:20 PM Calculation Date: 22-MAR-13 10:57 AM

Operator : Donna Nolen-Weathi
Workstation: MS-DOS_6
Instrument : Varian Star #1
Channel : A = M25

Detector Type: ADCB (10 Volts)
Bus Address : 16
Sample Rate : 10.00 Hz
Run Time : 16.002 min

********** Star Chromatography Workstation ******* Version 4.5 **********

Run Mode : Analysis - Subtract Blank Baseline
Peak Measurement: Peak Area
Calculation Type: Percent

Peak No.	Peak Name	Result ()	Ret. Time (min)	Time Offset (min)	Area (counts)	Sep. Code	Width 1/2 (sec)	Status Codes
1	CH4	58.9666	2.204	0.004	2556525	BV	4.8	U
2	CO2	41.0334	3.045	0.045	1779020	VB	9.5	U
	Totals:	100.0000		0.049	4335545			

Status Codes:
U - User-defined peak endpoint(s)

Total Unidentified Counts : 0 counts

Detected Peaks: 2 Rejected Peaks: 0 Identified Peaks: 2

Multiplier: 1 Divisor: 1

Baseline Offset: 14 microVolts

Noise (used): 50 microVolts - fixed value
Noise (monitored before this run): 150 microVolts

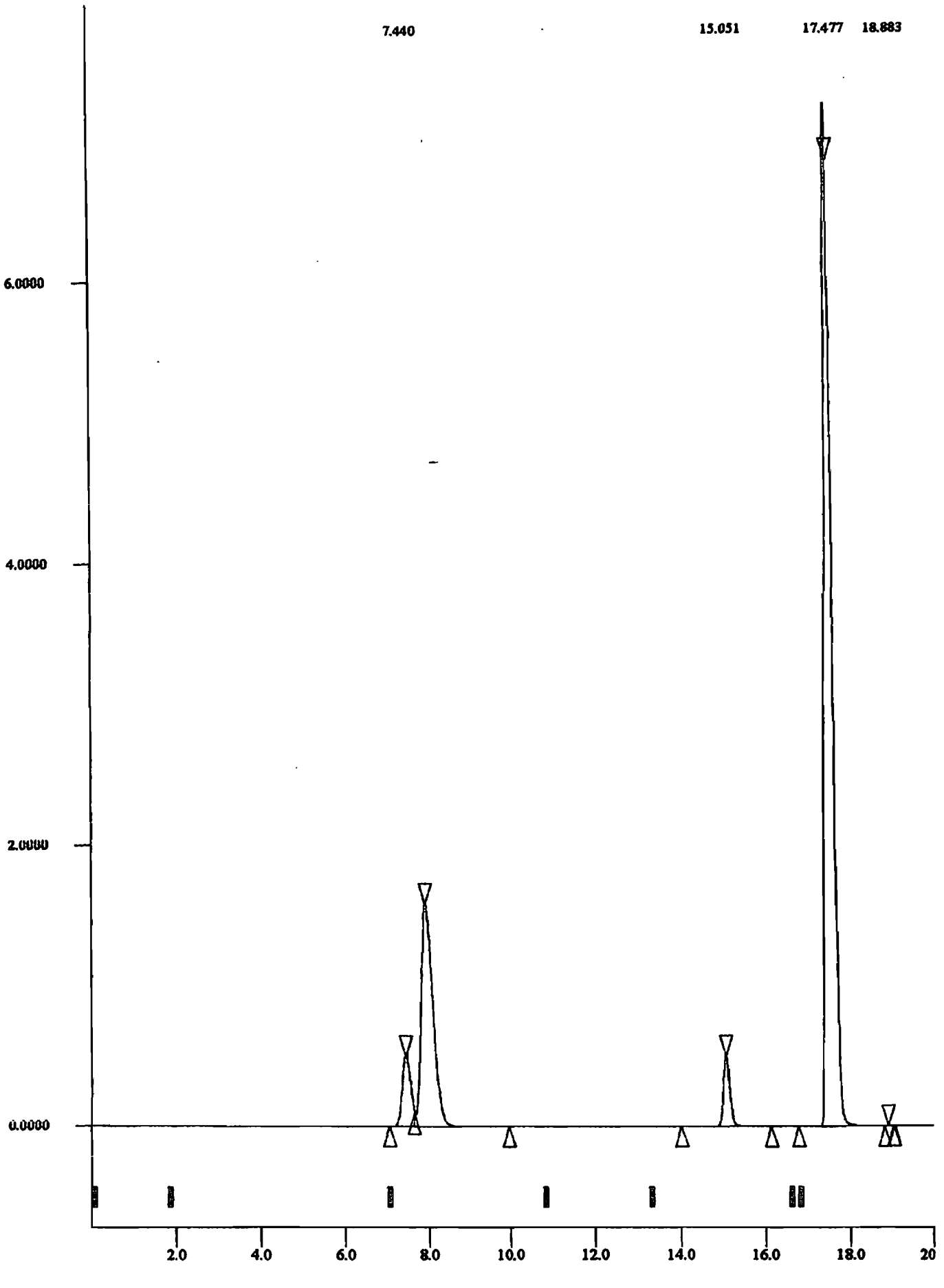
Could not format the injection information for this run.
Install the driver for the module at address 17 (type 8) to format this data.

Error Log:

Could not format the error log for the module at address 17 (type 8).
Install the appropriate module driver to format this data.

ADC Board:

****



Filename: C:\STAR\RECALC\TIES_F003.RUN Channel: A = A

Title :
Run File : C:\STAR\RECALCF\TES_F003.RUN
Method File : C:\STAR\CAL3C.MTH
Sample ID : 1- 3C MIX CC93314

Injection Date: 14-MAR-13 2:40 PM Calculation Date: 14-MAR-13 3:00 PM

Operator : Donna Nolen-Weathi **Detector Type: ADCB (10 Volts)**
Workstation: MS-DOS_6 **Bus Address : 16**
Instrument : Varian Star #1 **Sample Rate : 10.00 Hz**
Channel : A = A Run Time : 20.002 min

********** Star Chromatography Workstation ******* Version 4.5 **********

Run Mode : Analysis
Peak Measurement: Peak Area
Calculation Type: Percent

Peak No.	Peak Name	Result ()	Ret. Time (min)	Time Offset (min)	Area (counts)	Sep. Code	Width 1/2 (sec)	Status Codes
1	**O2**	**5.3064**	**7.440**	**0.140**	**701619**	**BV**	**13.4**	
2	N2	23.4392	7.906	0.106	3099150	VB	18.1	
3	**CH4**	**3.9588**	**15.051**	**-0.149**	**523429**	**BB**	**9.7**	
4	CO2	67.2956	17.477	-0.223	8897858	BB	12.2	
	Totals:	100.0000		-0.126	13222056			

Total Unidentified Counts : 0 counts

Detected Peaks: 5 Rejected Peaks: 1 **Identified Peaks: 4**

Multiplier: 1 Divisor: 1

Baseline **Offset: -7 microVolts**

Noise (used): 30 microVolts - fixed value
Noise (monitored before this run): 50 **microVolts**

Could not format the injection information for this run.
Install the driver for the module at address 17 (type 8) **to format this data.**

Revision Log:

14-MAR-13 3:00 PM: Calculated results from channel A using method:
'C:\STAR\CAL3C.MTH'

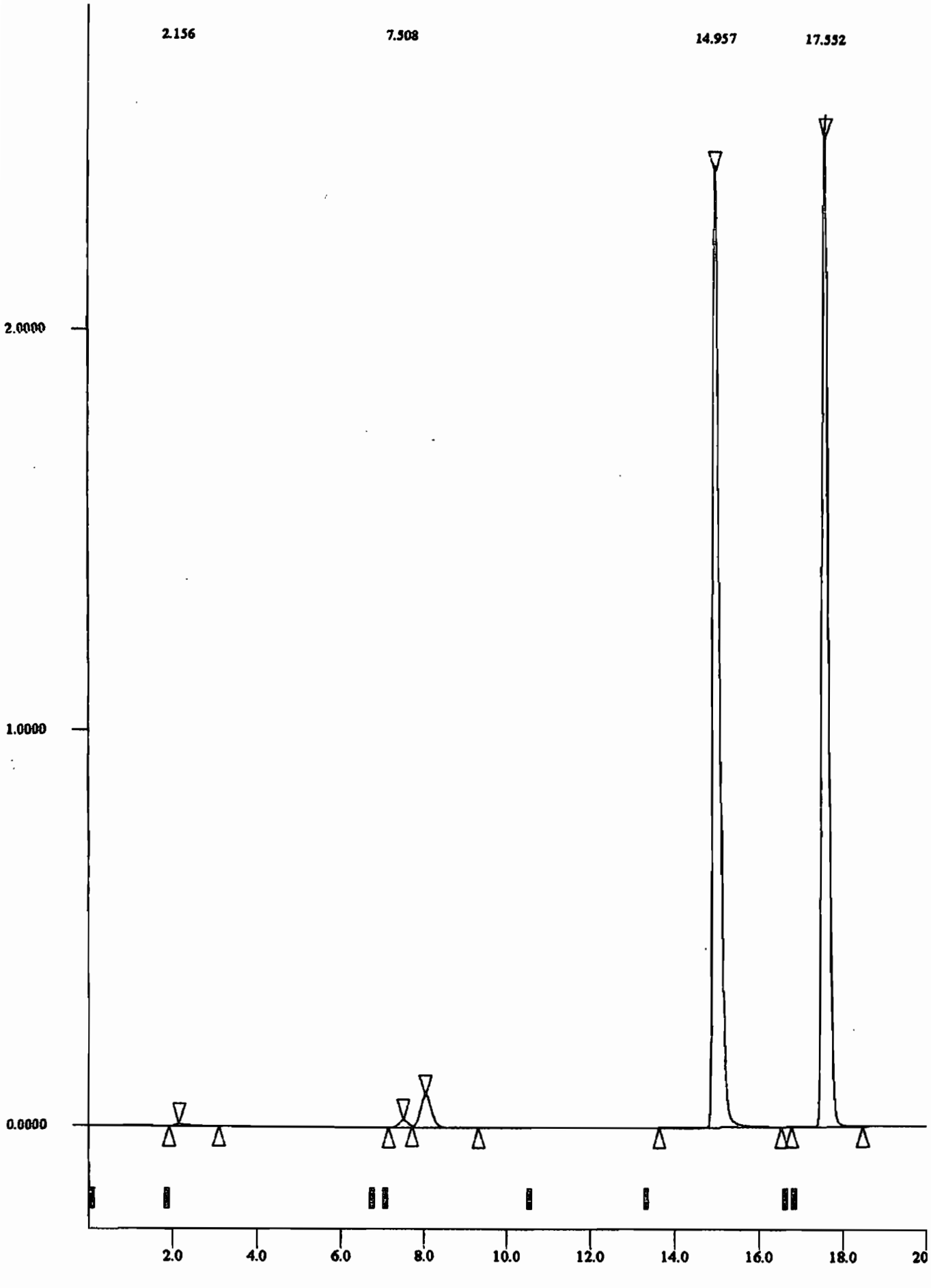
Error Log:

Could not format the error log for the module at address 17 (type 8).
Install the appropriate module driver to format this data.

ADC Board:

Original Notes:

****


2.156
7.508
14.957
17.552
2.0000
1.0000
0.0000
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20
Filename: C:\STAR\RECALC\TES_F006.RUN Channel: A = A

Title :
Run File : C:\STAR\RECALCF\TES_F006.RUN
Method File : C:\STAR\3C.MTH
Sample ID : 2- tank N435

Injection Date: 14-MAR-13 3:58 PM Calculation Date: 14-MAR-13 4:18 PM

Operator : Donna Nolen-Weathi
Workstation: MS-DOS_6
Instrument : Varian Star #1
Channel : A = A

Detector Type: **ADCB (10 Volts)**
Bus Address : 16
Sample Rate : 10.00 Hz
Run Time : 20.002 min

********** Star Chromatography Workstation ******* Version 4.5 **********

Run Mode : Analysis
Peak Measurement: Peak Area
Calculation Type: Percent

Peak No.	Peak Name	Result ()	Ret. Time (min)	Time Offset (min)	Area (counts)	Sep. Code	Width 1/2 (sec)	Status Codes
1	**O2**	**0.5115**	**7.508**	**0.108**	**27998**	**BV**	**14.5**	
2	N2	2.7414	8.038	0.138	150067	VB	16.8	
3	**CH4**	**49.6357**	**14.957**	**-0.243**	**2717091**	**BB**	**10.5**	
4	CO2	46.8707	17.552	-0.148	2565737	BB	9.6	
	Totals:	99.7593		-0.145	5460893			

Total Unidentified Counts : 13177 counts

Detected Peaks: 5 Rejected Peaks: 0 **Identified Peaks: 4**

Multiplier: 1 Divisor: 1

Baseline Offset: -12 microVolts

Noise (used): 50 microVolts - monitored before this run

Could not format the injection information for this run.
Install the driver for the module at address 17 (type 8) to format this data.

Error Log:

Could not format the error log for the module at address 17 (type 8).
Install the appropriate module driver to format this data.

ADC Board:

****

Triangle Environmental Services, Inc.
METHOD 25-C PROCEDURES

Report #13018-25C

CALIBRATION

The calibrations satisfy the requirements for Methods 25, 25-C, and 10-B.

Triplicate injections of a calibration gas mixture consisting of carbon monoxide (≈200 ppm), methane (≈50 ppm), carbon dioxide (≈10,000 ppm), and propane (≈20 ppm) are made immediately before and after each batch of samples. Daily response factors are calculated from the pre-batch integrated responses (average area count / concentration in ppmC) and must agree within 10% of the response factors of the initial calibrations. Further, the post-batch response factors must agree within 2% of the pre-batch response factors. Both criteria must be met before the analyses are considered valid.

ANALYSIS

All samples, which include the daily calibration gas mixture and sample tanks, are analyzed in triplicate using a computer-interfaced gas chromatograph equipped with an automated gas sampling system and a flame ionization detector (FID). CO, CH_4, and CO_2 are eluted from the Unibead 1S-Carbosieve G column and pass through the analytical oxidation and reduction catalyst to the FID. The column is then backflushed to elute the nonmethane organic (NMO) fraction, which passes through the analytical oxidation and reduction catalysts to the FID.

CALCULATIONS

Calculations are done in accord with USEPA Method 25-C procedures. A sample calculation for one of the samples is provided in the report.

EQUIPMENT

Tanks are at a minimum twice evacuated and filled with ambient air filtered through charcoal and are then evacuated to below 10 mm Hg and monitored for at least an hour to check that the tanks do not leak more than 1 mm Hg/hour. They are then pressurized to greater than ambient pressure with helium, analyzed to ensure < 2 ppmC NMO, and stored for later use. Prior to shipping, tanks are evacuated to ≈325 mm Hg absolute. The tank absolute pressure and temperature and the barometric pressure are recorded on a data sheet enclosed with the shipment. The absolute pressure can be verified by measurement in the field.

Sampling units are reconditioned by checking that all sections operate properly. The unit is flushed with zero air for at least thirty minutes before an aliquot of this flow is injected into the analyzer. If the total carbon concentration is below 10 ppm, the unit is made ready for use and stored for shipment.

Certifications:

South Coast Air Quality Management District: ID# 94 LA 0401
New Jersey NELAP ID: NC004
Pennsylvania DEP: Registration #68-3321

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 25-C SAMPLE CALCULATION

Note: All pressure values have been converted when necessary to mm Hg and all temperature values to Kelvin.

Name: Sullivan Environmental ID#13018-25C Analyzed: 3/14-21/13

Project ID: City of Jacksonville

Sample # 1 Run 1

D A T A

Tank N435:
Volume = 0.004486 cu.m

	Pressure (mm Hg)	Temp.(K)
Presampling	327.0	288.2
Postsampling	695.0	296.2
Final	21587.3	296.2
Barometric	772.0	
Water Vapor	21.1	

Water fraction = 0.0273
O2 fraction = 0.005410 (dry basis)

Calibration Data:

	CH4	CO2	NMOC
Response Factor (area units/ppmC)	299.2	273.1	254.6

Areas:

CH4	2,556,525	2,573,751	2,572,122
CO2	1,779,020	1,771,565	1,769,474
NMOC	0	0	0

C A L C U L A T I O N S

Measured Concentrations (ppmC):

Cm(CH4) = Area(CH4)/RF(CH4)
= 2556525 /299.2 = 8544.5
= 2573751 /299.2 = 8602.1
= 2572122 /299.2 = 8596.7

Cm(CO2) = Area(CO2)/RF(CO2)
= 1779020 /273.1 = 6514.2
= 1771565 /273.1 = 6486.9
= 1769474 /273.1 = 6479.2

Cm(NMOC) = Area(NMOC)/RF(NMOC)
= 0 /254.6 = 0.0
= 0 /254.6 = 0.0
= 0 /254.6 = 0.0

TRIANGLE ENVIRONMENTAL SERVICES, INC. METHOD 25-C SAMPLE CALCULATION
ID#13018-25C

Pressure-Temperature Ratio, Q(i) = P(i)/T(i):

postsampling tank: Q(1) = 695 / 296.15 = 2.346784
presampling tank: Q(2) = 327 / 288.15 = 1.134826
final tank: Q(3) = 21587.34 / 296.15 = 72.89328

Volume Sampled (dscm) = 0.3857 x Tank Volume x [Q(1)-Q(2)]
= 0.3857 x .004486 x [2.3468 - 1.1348]
= 0.002097

Averages and % Relative Standard Deviations (%RSD) of Cm's are calculated.
(%RSD of C = %RSD of Cm)

Moisture and Air (Oxygen dry basis) Correction Factor, CF:

CF = 1 - Water fraction - (99/21)xOxygen fraction (wet basis)
= (1 - Water fraction)x(1 - (99/21)xOxygen fraction (dry basis))
= (1 - 0.0273) x (1 - (99/21)x0.005410) = 0.9479

Calculated Concentrations (ppm):

C(CH4) = Q(3)/[Q(1)-Q(2)] x Cm(CH4)/CF
= 72.8933/(2.3468 - 1.1348) x 8581.1/0.9479 = 544500.3

C(CO2) = Q(3)/[Q(1)-Q(2)] x Cm(CO2)/CF
= 72.8933/(2.3468 - 1.1348) x 6493.4/0.9479 = 412029.7

C(NMOC as Carbon) = Q(3)/[Q(1)-Q(2)] x Cm(NMOC)/(CF x Carbon Number)
= 72.8933/(2.3468 - 1.1348) x 0.0/(0.9479 x 1)
= 0.0 (<RL of 128)

Carbon Mass Concentration (mg/cu.m)
= (12.011 /24.056) x C(NMOC)
= 0.4993 x 0.0 = 0.0 (<RL of 64).

<RL of ### = Concentration Below Report Limit

Triangle Environmental Services, Inc.
METHOD 25-C SAMPLE QA/QC DATA

Report #13018-25C

DAILY ANALYZER CHECKS

10.2* **Daily Calibration**

Response Factor (RF) Checks

Requirement: Daily RF = Initial RF ± 10%

Triplicate injections of a mixture of CO, CH_4, CO_2, and C_3H_8 are made before and after each batch of samples.

See the individual sample data sheet for the daily response factor

10.1.2.3* **Initial Calibration/Linearity**

Triplicate injections of a calibration gas is made for each compound at four levels:

	Nominal Concentrations (ppm)				Initial RF for Analyzer A 10/22/10	Initial RF for Analyzer B 02/04/13
CO	5	200	1000	5000	175.65	258.55
CH_4	3	50	500	10,000	181.49	284.14
CO_2	3	50	500	10,000	173.94	269.67
propane	2	20	3000	10,000	178.80	272.02

INITIAL NMO ANALYZER PERFORMANCE CHECKS

10.1.2.1* **Oxidation Catalyst Efficiency Check** Analyzer A, 4/8/98; Analyzer B, 4/21/98

FID response with reduction catalyst in bypass mode = 0, 0

Requirement: ≤1%

10.1.2.2* **Reduction Catalyst Efficiency Check** Analyzer A, 4/8/98; Analyzer B, 4/21/98

Response of CH_4 with oxidation and reduction catalysts in series mode and response with both catalysts in bypass mode to be within 5% of the average:

1.05 x Average Response > Response > 0.95 x Average Response

or Higher Response/Lower Response < 1.105263

100.0%, 100.0% Requirement: <110.5%

* USEPA Method 25 Protocol (2000) Reference Number

10.1.2.3* **Analyzer Linearity Check+NMO Calibration** Analyzer A, 10/22/10;Analyzer B, 02/04/13

	100×(1-RF/$RF_{average}$)		Requirement:
max. dev. CO:	+1.876%,	+2.259%	± 2.5%
max. dev. CH_4:	-1.775%,	-2.500%	± 2.5%
max. dev. CO_2:	+1.738%,	-1.233%	± 2.5%
max. dev. NMO:	+2.427%,	+1.150%	± 2.5%
max. %RSD:	1.67%,	1.50%	≤ 2%
$\frac{RF\ (NMO)}{RF\ (CO_2)}$ =	0.97,	0.99	1.0 ± 0.1

10.1.2.4* **System Performance Check** Analyzer A, 4/8/98; Analyzer B, 4/21/98, 5/1/98

	Measured Value, Expected Value		Requirement
	Analyzer A	Analyzer B	
Propane in Mix	19.6, 20.0	20.22, 20.0	± 5%
Hexane	50.6, 51.6	51.6, 51.6	± 5%
Toluene	20.3, 20.0	19.34, 20.0	± 5%
Methanol	104.5, 109.1	109.55, 109.0	± 5%

EQUIPMENT CHECKS

8.1.1* **Clean Sampling Equipment Check** (Method 25)

Sample Unit	<10	ppmC total C	@ 100%
Tank	< 2	ppmC NMO	@ 100%

8.1.2* **Sample Tank Evacuation and Leak Check** (Method 25)

Tank evacuated to ≤ 10 mm Hg absolute pressure, monitored for ≥ 1 hour, and passed for use if no pressure change (< 1 mm Hg/hr) is noted. (Method 25C: ± 2 mm Hg after 30 minutes)

10.3* **Sample Tank Volumes**

Tank weighed empty, filled with deionized distilled water (temperature recorded), and weighed to the nearest 2 g. Volume calculated based on density of water at that temperature and results recorded in permanent file.

* USEPA Method 25 Protocol (2000) Reference Number

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 25-C DATA REPORT

Name: Sullivan Environmental ID#13018-25C Analyzed: 3/14-21/13

Project ID: City of Jacksonville

Sample # 1 Run 1

TANK N435:
Volume = 0.004486 cu.m

	Pressure (mm Hg)	Temperature (K)	P/T
Presampling	327.0	288.15	1.135
Postsampling	695.0	296.15	2.347
Lab receipt	695.0	296.15	2.347
Final	21587.3	296.15	72.893
Barometric	772.0		
Water Vapor	21.1		

Field and laboratory postsampling pressure-temperature comparison:

Laboratory receipt P/T / Field postsampling P/T = 1.000

Volume Sampled = 0.002097 dscm
Water fraction = 0.0273
Oxygen fraction = 0.005410 (dry basis)

Calibration Data:

	CH4	CO2	NMOC	
Response Factor (area units/ppmC)	299.2	273.1	254.6	
Report Limit (ppm)	191	191	128	(as Carbon)

Areas:

CH4	2,556,525	2,573,751	2,572,122
CO2	1,779,020	1,771,565	1,769,474
NMOC	0	0	0

Concentrations:

	ppm	
	Amount ± SD	%RSD
CH4	544500 ±2017	0.4
CO2	412030 ±1166	0.3
NMOC as Carbon	<128	
	(= < 64 mg Carbon/cu.m)	

< # = Concentration Below Report Limit

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 25-C DATA REPORT

Name: Sullivan Environmental ID#13018-25C Analyzed: 3/14-21/13

Project ID: City of Jacksonville

Sample # 2 Run 2

TANK N81:
Volume = 0.004544 cu.m

	Pressure (mm Hg)	Temperature (K)	P/T
Presampling	327.0	288.15	1.135
Postsampling	695.0	296.15	2.347
Lab receipt	695.0	296.15	2.347
Final	21604.8	296.15	72.952
Barometric	772.0		
Water Vapor	21.1		

Field and laboratory postsampling pressure-temperature comparison:

Laboratory receipt P/T / Field postsampling P/T = 1.000

Volume Sampled = 0.002124 dscm
Water fraction = 0.0273
Oxygen fraction = 0.009544 (dry basis)

Calibration Data:

	CH4	CO2	NMOC	
Response Factor (area units/ppmC)	299.2	273.1	254.6	
Report Limit (ppm)	195	195	131	(as Carbon)

Areas:

CH4	2,542,633	2,545,703	2,544,841
CO2	1,616,330	1,615,928	1,614,945
NMOC	0	0	0

Concentrations:

	ppm	
	Amount ± SD	%RSD
CH4	551063 ± 343	0.1
CO2	383378 ± 169	0.0
NMOC as Carbon	<131	
	(= < 65 mg Carbon/cu.m)	

< # = Concentration Below Report Limit

Triangle Environmental Services, Inc.
METHOD 3-C PROCEDURES

Report #13018-25C

CALIBRATION

Triplicate injections of a calibration gas mixture consisting of oxygen (≈2.5%), nitrogen (≈ 10%), carbon dioxide (≈25%), and methane (≈2%) are made immediately before and after each batch of samples. Daily response factors are calculated from the pre-batch integrated responses (average area count / concentration in ppm) and must agree within 20% of the response factors of the initial calibrations. Further, the post-batch response factors must agree within 5% of the pre-batch response factors. Both criteria must be met before the analyses are considered valid.

ANALYSIS

All samples, which include the daily calibration gas mixture and sample tanks, are analyzed in triplicate using a computer-interfaced gas chromatograph equipped with an automated gas sampling system and a thermal conductivity detector (TCD). O_2, N_2, CO, CH_4, and CO_2 are eluted from the column and pass to the TCD.

CALCULATIONS

Calculations are done in accord with USEPA Method 3-C procedures. A sample calculation for one of the samples is provided in the report.

EQUIPMENT

Tanks are at a minimum twice evacuated and filled with ambient air filtered through charcoal and are then evacuated to below 10 mm Hg and monitored for at least an hour to check that the tanks do not leak more than 1 mm Hg/hour. They are then pressurized to greater than ambient pressure with helium, analyzed to ensure < 2 ppm CH_4 and < 20 ppm CO_2, and stored for later use.

Certifications:

South Coast Air Quality Management District: ID# 94 LA 0401
New Jersey NELAP ID: NC004
Pennsylvania DEP: Registration #68-3321

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 3-C SAMPLE CALCULATION

Note: All pressure values have been converted when necessary to mm Hg and all temperature values to Kelvin.

Name: Sullivan Environmental ID#13018-25C Analyzed: 3/14/18
Project ID: City of Jacksonville

Sample # 1 Run 1

D A T A

Tank N435:
Volume (cu.m) = 0.004486

	Pressure (mm Hg)	Temp.(K)
Presampling	327.0	288.15
Postsampling	695.0	296.15
Final	1922.0	296.15
Barometric	772.0	
Water Vapor	21.1	

Calibration Data:

	O2	N2	CH4	CO2
Response Factor (area units/ppmC)	28.53	31.17	25.55	36.63

Areas:

O2	27,998	28,083	28,033
N2	150,067	150,592	150,196
CH4	2,717,091	2,716,895	2,713,106
CO2	2,565,737	2,570,655	2,573,742

C A L C U L A T I O N S

Measured Concentrations (ppmC):

Cm(O2) = Area(O2) / RF(O2)
= 27998 / 28.5 = 981.4
= 28083 / 28.5 = 984.3
= 28033 / 28.5 = 982.6

Cm(N2) = Area(N2)/RF(N2)
= 150067 / 31.2 = 4814.5
= 150592 / 31.2 = 4831.3
= 150196 / 31.2 = 4818.6

Cm(CH4) = Area(CH4)/RF(CH4)
= 2717091 / 25.6 = 106344.1
= 2716895 / 25.6 = 106336.4
= 2713106 / 25.6 = 106188.1

Cm(CO2) = Area(CO2)/RF(CO2)
= 2565737 / 36.6 = 70044.7
= 2570655 / 36.6 = 70179.0
= 2573742 / 36.6 = 70263.2

TRIANGLE ENVIRONMENTAL SERVICES, INC. ID#13018-25C

METHOD 3-C SAMPLE CALCULATION

Pressure-Temperature Ratio, Q(i) = P(i)/T(i):

postsampling tank: Q(1) = 695 / 296.15 = 2.346784
presampling tank: Q(2) = 327 / 288.15 = 1.134826
final tank: Q(3) = 1922 / 296.15 = 6.489955

Volume Sampled (dscm) = 0.3857 x Tank Volume x [Q(1)-Q(2)]
= 0.3857 x .004486 x [2.3468 - 1.1348]
= 0.002097

Averages and % Relative Standard Deviations (%RSD) of Cm's are calculated. (%RSD of C = %RSD of Cm)

Moisture Correction Factor, MCF:

MCF = 1 - Water Vapor Pressure/Barometric Pressure
= 1 - 21.1/ 772.0 = 0.9727

Calculated Concentrations (ppm):

C(O2) = Q(3)/[Q(1)-Q(2)] x Cm(O2)/MCF
= 6.4900/(2.3468 - 1.1348) x 982.8/0.9727 = 5410.5

C(N2) = Q(3)/[Q(1)-Q(2)] x Cm(N2)/MCF
= 6.4900/(2.3468 - 1.1348) x 4821.5/0.9727 = 26544.1

C(CH4) = Q(3)/[Q(1)-Q(2)] x Cm(CH4)/MCF
= 6.4900/(2.3468 - 1.1348) x 106289.5/0.9727 = 585166.8

C(CO2) = Q(3)/[Q(1)-Q(2)] x Cm(CO2)/MCF
= 6.4900/(2.3468 - 1.1348) x 70162.3/0.9727 = 386271.7

Triangle Environmental Services, Inc.
METHOD 3-C SAMPLE QA/QC DATA

Report #13018-25C

DAILY ANALYZER CHECKS

Daily Calibration

Response Factor (RF) Checks

Requirement: Daily RF = Initial RF ± 20%

Triplicate injections of a mixture of O_2, N_2, CH_4, and CO_2 are made before and after each batch of samples.

Initial Calibration/Linearity

Triplicate injections of a calibration gas is made for each compound at three levels:

	Nominal Concentrations (ppm)			Initial RF 10/10/08
O_2	500	10,000	200,000	30.01
N_2	500	50,000	700,000	31.27
CH_4	500	50,000	500,000	25.50
CO_2	500	50,000	250,000	36.61

Analyzer Linearity Check 10/10/08

	100x(1-RF/$RF_{average}$)	Requirement:
max. dev. O_2:	- 5.0%	± 10%
max. dev. N_2:	- 4.0%	± 10%
max. dev. CH_4:	- 0.8%	± 10%
max. dev. CO_2:	+ 2.5%	± 10%

EQUIPMENT CHECKS

Clean Sampling Equipment Check

Tank	< 2	ppm CH_4 @ 100%
	< 20	ppm CO_2 @ 100%

Sample Tank Evacuation and Leak Check

Tank evacuated to ≤ 10 mm Hg absolute pressure, monitored for ≥ 1 hour, and passed for use if no pressure change (< 1 mm Hg/hr) is noted.

Sample Tank Volumes

Tank weighed empty, filled with deionized distilled water (temperature recorded), and weighed to the nearest 2 g. Volume calculated based on density of water at that temperature and results recorded in permanent file.

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 3-C DATA REPORT

Name: Sullivan Environmental ID#13018-25C Analyzed: 3/14/18

Project ID: City of Jacksonville

Sample # 1 Run 1

TANK N435:
Volume (cu.m) = 0.004486

	Pressure (mm Hg)	Temperature (K)	P/T
Presampling	327.0	288.15	1.135
Postsampling	695.0	296.15	2.347
Lab receipt	695.0	296.15	2.347
Final	1922.0	296.15	6.490
Barometric	772.0		
Water Vapor	21.1		

Field and laboratory postsampling pressure-temperature comparison:

Laboratory receipt P/T / Field postsampling P/T = 1.000

Volume Sampled (dscm) = 0.002097

Calibration Data:

	O2	N2	CH4	CO2
Response Factor (area units/ppmC)	28.53	31.17	25.55	36.63
Report Limit [RL] (ppm)	194	414	84	138
Calibration Limit [CL] (ppm)	2765	2765	2704	2770

Areas:

O2	27,998	28,083	28,033
N2	150,067	150,592	150,196
CH4	2,717,091	2,716,895	2,713,106
CO2	2,565,737	2,570,655	2,573,742

Concentrations:

	ppm			
	Amount	±	SD	%RSD
O2	5410	±	8	0.2
N2	26544	±	48	0.2
CH4	585167	±	484	0.1
CO2	386272	±	607	0.2

TRIANGLE ENVIRONMENTAL SERVICES, INC.

METHOD 3-C DATA REPORT

Name: Sullivan Environmental ID#13018-25C Analyzed: 3/14/18

Project ID: City of Jacksonville

Sample # 2 Run 2

TANK N81:
Volume (cu.m) = 0.004544

	Pressure (mm Hg)	Temperature (K)	P/T
Presampling	327.0	288.15	1.135
Postsampling	695.0	296.15	2.347
Lab receipt	695.0	296.15	2.347
Final	1907.0	296.15	6.439
Barometric	772.0		
Water Vapor	21.1		

Field and laboratory postsampling pressure-temperature comparison:

Laboratory receipt P/T / Field postsampling P/T = 1.000

Volume Sampled (dscm) = 0.002124

Calibration Data:

	O2	N2	CH4	CO2
Response Factor (area units/ppmC)	28.53	31.17	25.55	36.63
Report Limit [RL] (ppm)	192	411	83	137
Calibration Limit [CL] (ppm)	2743	2743	2683	2749

Areas:

O2	50,003	49,730	49,807
N2	322,819	322,017	321,808
CH4	2,694,860	2,695,642	2,686,452
CO2	2,360,263	2,357,483	2,353,329

Concentrations:

	ppm			
	Amount	±	SD	%RSD
O2	9544	±	27	0.3
N2	56467	±	94	0.2
CH4	575602	±	1089	0.2
CO2	351491	±	520	0.1

Chain of Custody

Triangle Environmental Services, Inc.
LABORATORY SAMPLE INFORMATION AND CHAIN-OF-CUSTODY FORM

Company Name: Sullivan Environmental	Project/Client ID: City of Jacksonville	Date: 3/1/13	
Contact Person: John Sullivan	Phone #:	Process Type:	
Email: john@sullivanenv.com	Note: Normal Turnaround is 15 working days after receipt of complete set of samples	Results Due Date: standard	Extra charge will apply for rush results
☒ Electronic Report ☐ Hard copy Report ☐ Fax Results		Report Package Due Date:	

Send Report to: (Street address required for Fed Ex shipment of report)	*Person* John Sullivan	Send Invoice to: (if different from report address)	*Person* John Sullivan
	Company Sullivan Environmental		*Company* Sullivan Environmental
	Address		*Address* 4448 13th Cove NE
			St. Petersburg, FL 33703
Phone #	*FAX #*		*PO#*

✓ all applicable boxes

Analysis

US EPA: ☐ Method 25 ☒ Method 3-C ☒ Method 25-C (NMOC as C [default]) ☐ Method 10-B ☐ Mod. M 3-C GHG/CO ☐ Mod. M25 Methane/Ethane

# of Tank & Trap Samples:	# of Tank-Only Samples: 2	# of Trap-Only Samples:	# of Bag Samples:
☐ Audit with Delay (*extra charge*)	☐ Rush Turnaround (*extra charge*)	☐ High Concentrations Possible ☐ Call if Concentrations High	☐ Dilute High Concentrations (*extra charge*)

Special Instructions:

Tanks for Analysis (Bags) (List IDs): N435, N81	**Traps** for Analysis (List IDs):

☐ TES Equipment	☐ Client Equipment	☐ Client Equipment to be Reconditioned
Tanks, Unused for Reconditioning (List IDs):		Traps, Unused for Reconditioning (List IDs):

Relinquished by:		Date: 3/1/13	Time: 1400	To: (Carrier)			
Tanks received at TES by:	Condition: good	Date: 3-5-13	Time: 3:30	Traps received at TES by:	Condition:	Date:	Time:

(919) 361-2890 6453 NC Highway 55 Durham, NC 27713 FAX (919) 361-3474

ATTACHMENT H

DETAILED DESCRIPTION OF CONTROL EQUIPMENT

DETAILED DESCRIPTION OF CONTROL EQUIPMENT

The enclosed flare is a John Zink Model ZTOF enclosed flare with maximum rated capacity of 3,150 scfm. Additional information from the September 1993 *Application to Construct a Landfill Gas Flare North Landfill, City of Jacksonville, Florida* prepared by Hayden-Wegman, Inc. is attached.

EQUIPMENT DESCRIPTION

ITEM I - ENCLOSED FLARE SYSTEM

A. Enclosed Flare Stack

One John Zink Landfill Gas Flare System with:

- 2" layer of A.P. Green (or equal) ceramic fiber refractory on Inconel pins and keepers. (2400°F hot face refractory). **The 1" layer of 8# hot face refractory will be overlapped both horizontally and vertically for additional protection.**
- A-36 carbon steel shell.
- Stainless steel gas burner(s) with flame stabilizers for high temperature corrosion resistance.
- Flanged flare gas inlet to match the flame arrestor flange.
- One (1) pilot assembly designed for 60,000 Btu/hr propane with electric spark ignitor. The pilot only operates during start-up.
- Bolted blade combustion air dampers. Opposed blade design provides a 6:1 air turndown control. Galvanized finish and stainless steel press-fit bearings ensure smooth, long term operation.
- Four 3" NPT sample ports at 90° located 1/2 diameter from the top for accurate emission testing.
- Inorganic zinc primer coat for superior corrosion protection and 600°F temperature resistance.
- Continuous base plate for high wind stability.
- Lift lugs to assist in erection.
- Mounting brackets welded to stack for thermocouple conduit.
- The high temperature shutdown will be located in the lower half of the stack, and there will be thermocouple connections at three (3) locations for the temperature monitoring thermocouple. (Multiple thermocouple locations allows accurate monitoring of the operating temperature at low and high rates. At low rates, the upper thermocouple may not read accurate temperatures but is often required at high rates to prove the temperature is met at the end of the "residence" time).

- Stainless steel rain cover to protect the top of the refractory.

- Heat shield for personnel protection up to six feet above grade.

B. Control System Operation

The following is a brief outline of the control system start-up and operating sequence:

System start-up would begin with a timed air purge cycle to evacuate any fugitive hydrocarbons from the flare enclosure. After purge is completed, the pilot will be lit. Upon proving the pilot flame by the flame scanner, the landfill gas valve will be opened and the landfill gas blower (by others) will be started allowing landfill gas to flow to the flare enclosure. This allows use of the landfill gas for system warm-up.

Upon proving the flame on the pilot, the system will continue its warm-up sequence. The landfill gas valve will be opened allowing normal operation of the unit.

After the landfill gas valve has been opened, the pilot gas will then shut off after a timed delay to limit propane gas usage. If a flame is still sensed on the main burner the system will continue operation, if not, it will shutdown on flame failure.

The unit temperature is set by adjusting the air dampers (manually or optional automatic). Opening the dampers will reduce the flue gas temperature by adding quench air. In the manual system, the operating temperature is set at 1800-2000°F at the maximum design flow and will fluctuate between 600-2100°F at variable gas flows.

Due to the presence of an open flame, the ground flare should be located in a "non-hazardous" electrical area.

C. Base Case Control Features - Manual Operation

- Manually operated combustion air dampers to control the operating temperature.

- High temperature shutdown switch with panel mounted temperature indicator.

- Pilot gas control system including pressure regulator, fail-closed shutdown valves, manual block valve and pressure indicator.

- Ignition system including ignition transformer, pilot spark electrode and ignition timer.

- Flame safeguard controls including self-checking flame scanner and panel mounted flame relay.

- Purge air blower with pressure proved switch and motor starter.

PROPRIETARY - TO BE MAINTAINED IN CONFIDENCE

- All high voltage (440/220V) items are enclosed in a separate panel for electrical safety including:

  Main power supply disconnect

  Power Transformer. Client will supply 220-460V/3 Ph/60 Hz electricity. John Zink will stepdown to 110V/1 Ph for use as required.

  One 25 horsepower motor starter for client's landfill gas blower motor. Client to verify size. Sizes larger than 25 HP will affect the price.

  One amp meter for waste gas blower motor (200% scale).

- "Manual-Off-Auto" blower selector switch.

- The following indicating lights:

  a. Panel Power ON
  b. Purging
  c. Purge Complete
  d. Pilot Gas ON
  e. Flame Proved
  f. High Stack Temperature (SD)
  g. Flame Failure (SD)

- Contacts for control room monitoring of the system.

- 15A convenience outlet (duplex) with weatherproof cover.

- 100W high pressure sodium security light with manual switch and photocell (shipped loose).

- Additional relays, timers, controllers, etc. required for system operation. NOTE: A Programmable Logic Controller will be supplied for the PLC option.

- The appropriate items will be enclosed in a weatherproof (NEMA 4) panel.

- Controls and valving are prepiped and wired onto a support rack.

- One blower hour meter.

The control system will be given a functional test simulating actual operation in our shop to ensure that it is properly wired and will perform as designed.

Units can be operated in the manual mode which requires an operator at the flare to start and restart the system using a pushbutton sequence. If the units shutdown for any reason, operator assisted restart is required.

The flare operating temperature is set by manually adjusting the air dampers.

The base case is recommended for sites with stable gas flow and constant electrical supply.

PROPRIETARY - TO BE MAINTAINED IN CONFIDENCE

AUTOMATIC START/RESTART

In the automatic mode, the unit will automatically start when power is applied. If the unit shuts down for any reason except high stack temperature, the auto mode will allow the unit to attempt to purge and restart for a specified time period. A remote signal is sent if the unit fails to restart.

AUTOMATIC TEMPERATURE CONTROL (AIR)

Flue gas temperature would be automatically controlled by adjusting the air flow into the unit. Lower waste gas flows or lower methane concentrations would automatically close the inlet air louvers. The control loop consists of a thermocouple and temperature indicator/controller and two electric operated actuators on the air louvers.

HONEYWELL CIRCULAR CHART RECORDER

One Honeywell Model DR4500T Digital Circular Chart Recorder. The circular chart recorder is a microprocessor based recorder which draws its own chart as it records data. Users can design the chart to match their specific application. **The temperature recorder will have four (4) inputs. All inputs will be 4-20MA. (When recorder option is purchased the Honeywell controller will be purchased with an optional output that will allow a 4-20MA signal to the recorder so the controller and recorder will read the same temperature from the same thermocouple.**

KENT TEMPERATURE RECORDER

One Kent model P100S-17-H1-011 analog temperature recorder, mounted in the control panel.

INLET FLAME ARRESTOR

One Varec Flame Arrestor (or equal). Aluminum housing and aluminum internals. Internal elements can be cleaned without removing the flame arrestor body from the pipe.

INLET BLOCK VALVE WITH PNEUMATIC ACTUATOR

One Pliaxseal high performance butterfly valve, ANSI 150# with carbon steel body, 316 stainless steel disk, PTFE seal with pneumatic, fail-closed actuator, 3-way solenoid valve, speed control valve and auxiliary switches. (Nitrogen bottles supplied by others).

Although nitrogen cylinders are required to be installed, the advantage of this option is that the actuator is a highly reliable standard industrial actuator that will have less maintenance than an electric fail-closed actuator.

OPTIONS

FLOW METER

One Thermal Instrument Model 62 Mass Flow Meter 1/2" O.D., 316 stainless steel, 3/4"NPT, 75 foot +A, probe style with 1/2" O.D. 316 stainless steel probe and 3/4" NPT mounting. The flow meter includes 75 feet of connecting cable between probe and electronics, remote mounted electronics in surface mount NEMA 4 enclosure.

UL CAPABILITIES

John Zink is dedicated to insuring the highest level of quality and safety standards in our products.

This performance level is reflected in all of our products and has given us the capability to apply the UL listing symbol for Industrial Control Panels on our motor starters and a UL classification symbol on our Flame Control Panels. These options are provided for our customers who need to meet the guidelines required by Underwriters Laboratories.

AUXILIARY MOTOR STARTER

One 10 horsepower motor starter mounted in a NEMA 4 weatherproof enclosure. The enclosure is mounted on the control rack, fully prewired in our shop ready for customer connections. A selector switch (choice of either on/off or on/off/auto) is provided on the main control panel with an indication running light for the compressor.

OTHER ENCLOSED FLARE OPTIONS

John Zink will design the Enclosed Flare System to meet most requirements or restrictions that our client's may have. A number of additional optional features are available upon request.

ATTACHMENT I

PROCEDURES FOR STARTUP AND SHUTDOWN

Municipal Solid Waste Landfill Gas Collection and Control System

Startup, Shutdown, and Malfunction Plan

Prepared in accordance with the:

National Emission Standards for Hazardous Air Pollutants
40 C.F.R. §63.6(e)(3)

Prepared for:

Facility: City of Jacksonville North Municipal Landfill

Address: 11405 Island Drive

Jacksonville, FL 32226

This document identifies the procedures for conducting startups, shutdowns or addressing malfunctions of the municipal solid waste landfill gas collection and control system in a timely and safe manner.

Revision: 0
Revision Date: _____

Revised by: _____

START-UP, SHUTDOWN AND MALFUNCTION PLAN

TABLE OF CONTENTS

APPENDICES

Introduction

Introduction

The purpose of this plan is to fulfill the obligations set forth in the NESHAP for Municipal Solid Waste Landfills (40 CFR 63 Subpart AAAA) and to provide site personnel with a flexible plan to minimize emissions of hazardous air pollutants during startup, shutdown or malfunction. This document identifies the procedures for conducting startups, shutdowns or addressing malfunctions of the gas collection and control equipment or processes subject to this plan in a timely and safe manner. In addition, specific record-keeping and reporting procedures are described.

In order to properly document that the site personnel have followed the plan as required, a single form to document all start-up, shutdown and malfunction (SSM) events has been prepared in a checklist format.

Except as specifically excluded below, all components of the gas collection and control system as well as the continuous monitoring system for the control device(s) are to follow the SSM Plan:

The following items are excluded from this SSM Plan:

1. Exceedances at Individual Wells for Pressure, Oxygen or Nitrogen, Temperature
2. Surface Emissions Monitoring Exceedances (readings 500 ppm or greater)
3. Portable and/or Intermittent Field Monitoring Equipment (i.e., GEM500, FID)
4. Shutdowns of the flare which are followed by successful re-start sequences. This is done automatically, and is part of the control device's normal operating procedures.
5. Temporary (less than five days) closure of control valves within the landfill gas collection system, in order to isolate portions of the system for troubleshooting or maintenance.
6. Combustion devices utilizing "treated" landfill gas *(12/8/2003 US EPA guidance, Regional EPA Determinations)*

The completed forms must be kept in the site files, for use in the semi-annual SSM Plan Report.

This **Startup, Shutdown and Malfunction Plan** must be revised if the procedures described herein do not address or adequately address any startup, or shutdown procedure or malfunction that occurs. Revisions to the plan must be discussed in the semi-annual SSM Plan Report.

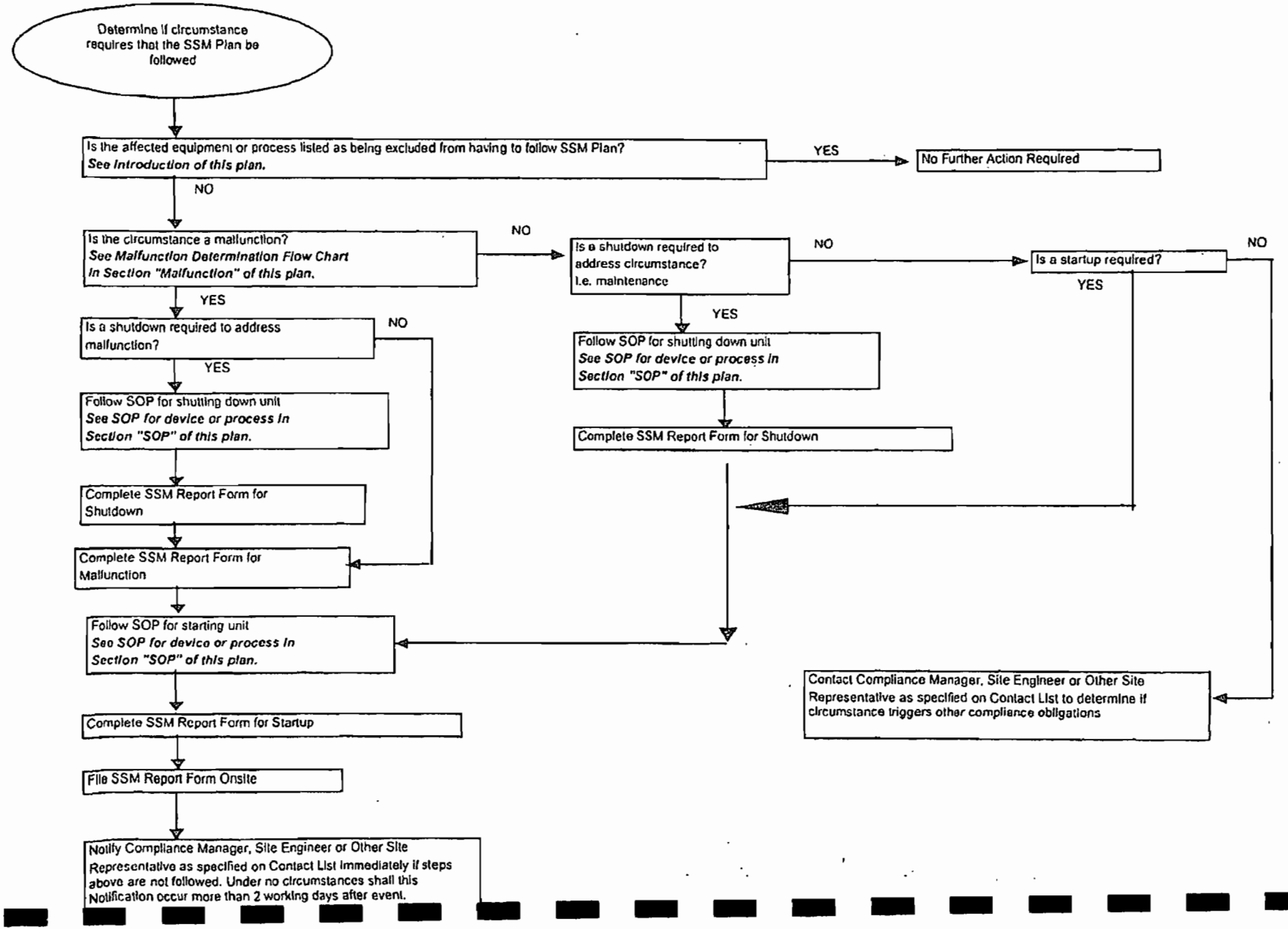
A copy of the original plan and all revisions must be kept at the facility for at least five (5) years.

Plan Responsibilities

S. . .up, Shutdown, Malfunction Plan –

Gas Collection and Control System Operator Responsibilities

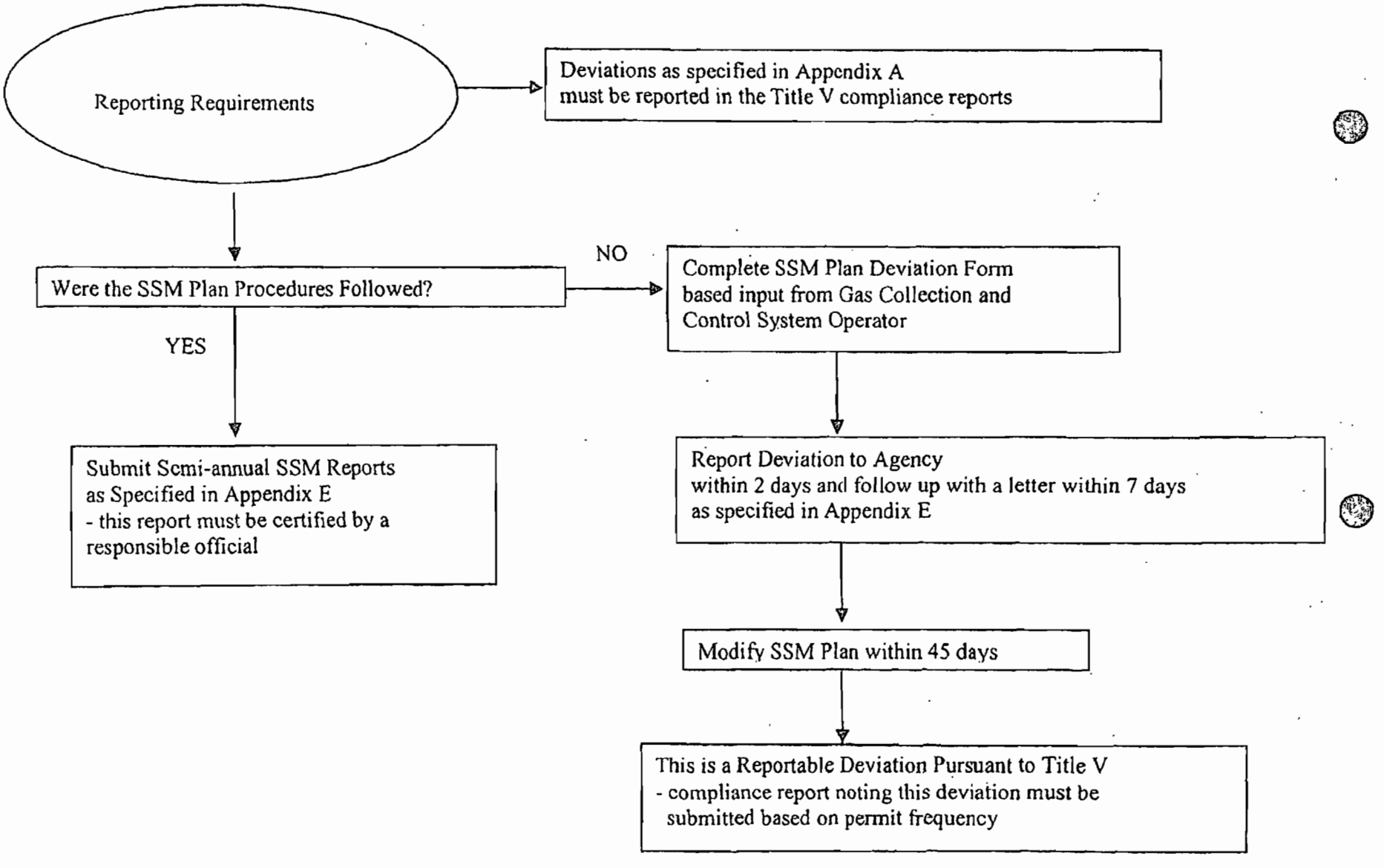
All persons or parties undertaking the operations or maintenance of the gas collection and control system must adhere to the following procedures.



Startup, Shutdown, Malfunction Plan –

Compliance Manager/ Site Engineer Responsibilities

All persons or parties undertaking the reporting of deviations must adhere to the following procedures.



Contacts

CONTACTS

The following person(s) should be contacted (in order of priority) for any events requiring the implementation of the SSM plan. If unable to reach a person, contact next person on list:

	Title/Position	Phone
1	Ron Moore (EarthTech)	904-472-4720
2		
3		
4		
5		

The following telephone numbers are provided in the event additional resources are necessary to address a malfunction:

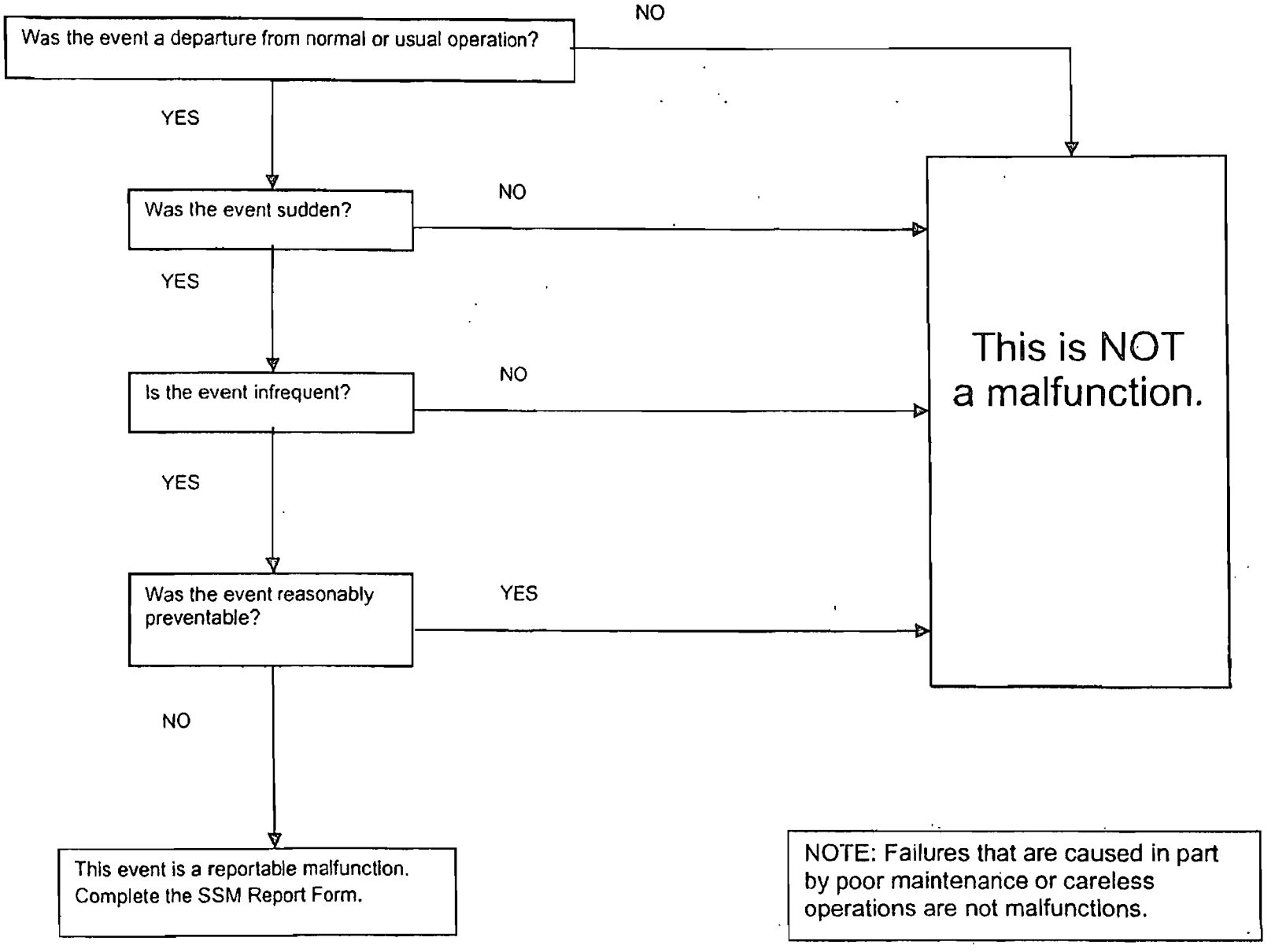
Resource	Name	Phone
Flare Manufacturer	John Zink Co.	918-234-2751
Blower Manufacturer	Lamson	
Electrician	Cosburn Bros. Elect.	904-358-7344

The following person(s) should be contacted (in order of priority) if the SSM plan was not followed, the event resulted in the continued release of landfill gas to the air, or the event was not a malfunction, startup or shutdown as specified in the plan. If unable to reach a person, contact next person on list:

	Title	Phone
1	Ron Moore (EarthTech)	904-472-4720
2	Chris Pearson (City of JAX Solid Waste)	904-873-0665
3		
4		
5		

Malfunction

Is this event a malfunction?



Report Form

SSM PLAN REPORT FORM

Startup/Shutdown/Malfunction Report Form

Section 1 - All Events

Type of Event	Military Time Date/Time Start	Date/Time End	Duration (hours)	Event Code (see back of form)	SOP* Followed? Yes	No**
☐ Startup						
☐ Shutdown						
☐ Malfunction					Complete Section 2 Below	

Date Form Filled Out: _____ Signature: _____

* Standard Operating Procedure (SOP) for Flare Startups (Manual & Automatic) and Shutdowns are provided in SSM Plan

**If SOP in SSM Plan was not followed, notify personnel on "Contact List".

Section 2 - Malfunction Events Only

Step	Corrective Action Procedures for All Malfunctions	☑ Check one of the following for each step: Procedure completed	Procedure Not Applicable
1.	Determine if landfill gas is being released to the air (can you smell landfill gas, or measure/detect gas flow?).	☐	
2.	If landfill gas is being released to the air, notify personnel on "Contact List".	☐	☐
3.	Determine if the malfunction is causing an unsafe operating condition (air entering landfill or piping, smoking, vibration, or other problem), which may harm people, the environment or the landfill gas control equipment.	☐	
4.	If unsafe operating condition exists, or landfill gas is being released to the air, stop (if possible) landfill gas flow.	☐	☐
5.	If Control device or other system component is shutdown, follow Shutdown SOP and Complete Section 1 - "Shutdown".	☐	☐
6.	Determine if other personnel/resource (qualified technician, electrician, consultant or other) are needed for malfunction diagnosis.	☐	
7.	If additional personnel needed, notify qualified personnel: a. Record contact name, date and time:_____ b. Contact site representative with information recorded in #7.a.	☐	☐
8.	Start malfunction diagnosis.	☐	
9.	Determine if other resources are needed to fix the malfunction (qualified technician, electrician, contractor, on-site resources, manufacturer's representative, or other).	☐	
10.	If additional resources needed, contact qualified resource: a. Record contact name, date and time:_____ b. Contact site representative with information recorded in #10.a.	☐	☐
11.	Fix the malfunction.	☐	
12.	Once the malfunction is fixed, re-start the system per SOP if it had been shut down, and record start-up times and dates in boxes in Section 1 of this form.	☐	☐
13.	Record date that malfunction occurred, date that malfunction was repaired, and total time that system was out of service in boxes in Section 1 of this form.	☐	
14.	Sign this form and place it in the Start-up, Shutdown, Malfunction file.	☐	
15.	If the procedures listed above were not followed, notify personnel on "Contact List".	☐	☐

SOP

Standard Operating Procedure

Startup

1 Ensure that there are no unsafe conditions present

2 Ensure that the system is ready to start by one or more of the following:

- a. Valves are in correct operating position
- b. Levels, pressures, temperatures are within normal starting range
- c. Alarms are cleared
- d. Power is on and available to control panel and energized equipment
- e. Emergency Stop is de-energized

3 Initiate start sequence (Note time and date on top section of form as Start) Refer to Manufacturer's Information (if applicable) as an additional resource.

4 Observe that system achieves normal operating ranges for levels, pressures, and temperatures (Note time and date on top section of form as End)

5 Complete top section of form. Duration is the time it takes to go from Step 3 to 4.

Shutdown

1 Ensure that there are no unsafe conditions present

- a. contact site manager immediately

2 Initiate shutdown sequence by one or more of the following (Note time and date on top section of form as Start) Refer to Manufacturer's Information (if applicable) as an additional resource.

- a. Press Emergency Stop if necessary
- b. Close On/ Off switch(es) or Push On/ Off button(s)
- c. Close adjacent valves if necessary

3 Observe that system achieves normal shutdown ranges for levels, pressures, and temperatures (Note time and date on top section of form as End)

4 Complete top section of form. Duration is the time it takes to go from Step 2 to 3.

Malfunction

1 Minimize/stop emissions of landfill gas (if present).

2 Determine cause of malfunction. Refer to Manufacturer's Information (if applicable) as an additional resource.

3 Fix malfunction.

4 Complete form. Duration is the time it takes to go from discovery of malfunction (unless continuous monitoring records indicate malfunction started earlier) to Step 3.

APPENDIX A

LANDFILL NESHAP REGULATIONS

PART 63--[AMENDED]

1. The authority citation for part 63 continues to read as follows:

Authority: 42 U.S.C. 7401, et seq.

2. Part 63 is amended by adding a new subpart AAAA to read as follows:

Subpart AAAA--National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills

Sec.

subpart WWW, the Federal plan, or EPA approved and effective State or tribal plan that applies to your landfill or by January 13, 2004, whichever occurs later.

(e) If your landfill is a new affected source and is an area source meeting the criteria in Sec. 63.1935(a)(3), you must comply with the requirements of Sec. Sec. 63.1955(b) and 63.1960 through 63.1980 by the date your landfill is required to install a collection and control system by 40 CFR 60.752(b)(2) of subpart WWW.

(f) If your landfill is an existing affected source and is an area source meeting the criteria in Sec. 63.1935(a)(3), you must comply with the requirements in Sec. Sec. 63.1955(b) and 63.1960 through 63.1980 by the date your landfill is required to install a collection and control system by 40 CFR 60.752(b)(2) of subpart WWW, the Federal plan, or EPA approved and effective State or tribal plan that applies to your landfill or by January 16, 2004, whichever occurs later.

Sec. 63.1947 When do I have to comply with this subpart if I own or operate a bioreactor?

You must comply with this subpart by the dates specified in Sec. 63.1945(a) or (b) of this subpart. If you own or operate a bioreactor located at a landfill that is not permanently closed as of January 16, 2003 and has a design capacity equal to or greater than 2.5 million Mg and 2.5 million m\3\, then you must install and operate a collection and control system that meets the criteria in 40 CFR 60.752(b)(2)(v) of part 60, subpart WWW, the Federal plan, or EPA approved and effective State plan according to the schedule specified in paragraph (a), (b), or (c) of this section.

(a) If your bioreactor is at a new affected source, then you must meet the requirements in paragraphs (a)(1) and (2) of this section:

(1) Install the gas collection and control system for the bioreactor before initiating liquids addition.

(2) Begin operating the gas collection and control system within 180 days after initiating liquids addition or within 180 days after achieving a moisture content of 40 percent by weight, whichever is later. If you choose to begin gas collection and control system operation 180 days after achieving a 40 percent moisture content instead of 180 days after liquids addition, use the procedures in Sec. 63.1980(g) and (h) to determine when the bioreactor moisture content reaches 40 percent.

(b) If your bioreactor is at an existing affected source, then you must install and begin operating the gas collection and control system for the bioreactor by January 17, 2006 or by the date your bioreactor is required to install a gas collection and control system under 40 CFR part 60, subpart WWW, the Federal plan, or EPA approved and effective State plan or tribal plan that applies to your landfill, whichever is earlier.

(c) If your bioreactor is at an existing affected source and you do not initiate liquids addition to your bioreactor until later than January 17, 2006, then you must meet the requirements in paragraphs (c)(1) and (2) of this section:

(1) Install the gas collection and control system for the bioreactor before initiating liquids addition.

(2) Begin operating the gas collection and control system within 180 days after initiating liquids addition or within 180 days after achieving a moisture content of 40 percent by weight, whichever is later. If you choose to begin gas collection and control system operation 180 days after achieving a 40 percent moisture content instead of 180 days after liquids addition, use the procedures in Sec. 63.1980(g) and (h) to determine when the bioreactor moisture content reaches 40 percent.

Sec. 63.1950 When am I no longer required to comply with this subpart?

You are no longer required to comply with the requirements of this subpart when you are no longer required to apply controls as specified in 40 CFR 60.752(b)(2)(v) of subpart WWW, or the Federal plan or EPA approved and effective State plan or tribal plan that implements 40 CFR part 60, subpart Cc, whichever applies to your landfill.

60.756(b)(1), (c)(1), and (d) of subpart WWW, are used to demonstrate compliance with the operating conditions for control systems. If a deviation occurs, you have failed to meet the control device operating conditions described in this subpart and have deviated from the requirements of this subpart. Finally, you must develop and implement a written SSM plan according to the provisions in 40 CFR 63.6(e)(3). A copy of the SSM plan must be maintained on site. Failure to write, implement, or maintain a copy of the SSM plan is a deviation from the requirements of this subpart.

Sec. 63.1965 What is a deviation?

A deviation is defined in Sec. 63.1990. For the purposes of the landfill monitoring and SSM plan requirements, deviations include the items in paragraphs (a) through (c) of this section.

(a) A deviation occurs when the control device operating parameter boundaries described in 40 CFR 60.758(c)(1) of subpart WWW are exceeded.

(b) A deviation occurs when 1 hour or more of the hours during the 3-hour block averaging period does not constitute a valid hour of data. A valid hour of data must have measured values for at least three 15-minute monitoring periods within the hour.

(c) A deviation occurs when a SSM plan is not developed, implemented, or maintained on site.

Sec. 63.1975 How do I calculate the 3-hour block average used to demonstrate compliance?

Averages are calculated in the same way as they are calculated in 40 CFR part 60, subpart WWW, except that the data collected during the events listed in paragraphs (a), (b), (c), and (d) of this section are not to be included in any average computed under this subpart:

(a) Monitoring system breakdowns; repairs, calibration checks, and zero (low-level) and high-level adjustments.

(b) Startups.

(c) Shutdowns.

(d) Malfunctions.

Notifications, Records, and Reports

Sec. 63.1980 What records and reports must I keep and submit?

(a) Keep records and reports as specified in 40 CFR part 60, subpart WWW, or in the Federal plan, EPA approved State plan or tribal plan that implements 40 CFR part 60, subpart Cc, whichever applies to your landfill, with one exception: You must submit the annual report described in 40 CFR 60.757(f) every 6 months.

(b) You must also keep records and reports as specified in the general provisions of 40 CFR part 60 and this part as shown in Table 1 of this subpart. Applicable records in the general provisions include items such as SSM plans and the SSM plan reports.

(c) For bioreactors at new affected sources you must submit the initial semiannual compliance report and performance test results described in 40 CFR 60.757(f) within 180 days after the date you are required to begin operating the gas collection and control system by Sec. 63.1947(a)(2) of this subpart.

(d) For bioreactors at existing affected sources, you must submit the initial semiannual compliance report and performance test results described in 40 CFR 60.757(f) within 180 days after the compliance date specified in Sec. 63.1947(b) of this subpart, unless you have previously submitted a compliance report for the bioreactor required by 40 CFR part 60, subpart WWW, the Federal plan, or an EPA approved and effective State plan or tribal plan.

(e) For bioreactors that are located at existing affected sources, but do not initiate liquids addition until later than the compliance date in Sec. 63.1947(b) of this subpart, you must submit the initial semiannual compliance report and performance tests results described in 40 CFR 60.757(f) within 180 days after the date you are required to begin operating the gas collection and control system by Sec. 63.1947(c) of this subpart.

(f) If you must submit a semiannual compliance report for a bioreactor as well as a semiannual compliance report for a conventional portion of the same landfill, you may delay submittal of a subsequent

Deviation means any instance in which an affected source subject to this subpart, or an owner or operator of such a source:

(1) Fails to meet any requirement or obligation established by this subpart, including, but not limited to, any emissions limitation (including any operating limit) or work practice standard;

(2) Fails to meet any term or condition that is adopted to implement an applicable requirement in this subpart and that is included in the operating permit for any affected source required to obtain such a permit; or

(3) Fails to meet any emission limitation, (including any operating limit), or work practice standard in this subpart during SSM, regardless of whether or not such failure is permitted by this subpart. Emissions limitation means any emission limit, opacity limit, operating limit, or visible emissions limit.

EPA approved State plan means a State plan that EPA has approved based on the requirements in 40 CFR part 60, subpart B to implement and enforce 40 CFR part 60, subpart Cc. An approved State plan becomes effective on the date specified in the notice published in the Federal Register announcing EPA's approval.

Federal plan means the EPA plan to implement 40 CFR part 60, subpart Cc for existing MSW landfills located in States and Indian country where State plans or tribal plans are not currently in effect. On the effective date of an EPA approved State or tribal plan, the Federal plan no longer applies. The Federal plan is found at 40 CFR part 62, subpart GGG.

Municipal solid waste landfill or MSW landfill means an entire disposal facility in a contiguous geographical space where household waste is placed in or on land. A municipal solid waste landfill may also receive other types of RCRA Subtitle D wastes (see Sec. 257.2 of this chapter) such as commercial solid waste, nonhazardous sludge, conditionally exempt small quantity generator waste, and industrial solid waste. Portions of a municipal solid waste landfill may be separated by access roads. A municipal solid waste landfill may be publicly or privately owned. A municipal solid waste landfill may be a new municipal solid waste landfill, an existing municipal solid waste landfill, or a lateral expansion.

Tribal plan means a plan submitted by a tribal authority pursuant to 40 CFR parts 9, 35, 49, 50, and 81 to implement and enforce 40 CFR part 60, subpart Cc.

Work practice standard means any design, equipment, work practice, or operational standard, or combination thereof, that is promulgated pursuant to section 112(h) of the Clean Air Act.

APPENDIX B

SSM Plan Revision History

This SSM Plan will be amended if equipment or processes are added that are not covered under the plan or will be revised within 45 days of non-conforming events if the procedures described herein do not adequately address any malfunction or start-up/shutdown events that occur at the facility. A copy of the original plan and all revisions/addendums will be kept on file at the facility for at least five (5) years.

Date of Revision	Reason For Revision

APPENDIX C

State Specific Malfunction Reporting Requirements

62-4.130 Plant Operation - Problems.

If the permittee is temporarily unable to comply with any of the conditions of the permit due to breakdown of equipment or destruction by hazard of fire, wind or by other cause, the permittee shall immediately notify the Department. Notification shall include pertinent information as to the cause of the problem, and what steps are being taken to correct the problem and to prevent its recurrence, and where applicable, the owner's intent toward reconstruction of destroyed facilities. Such notification does not release the permittee from any liability for failure to comply with Department rules.
(This is also Title V Condition 9 in Appendix TV-4)

Title V Condition 10 in Appendix TV-4

For Purposes of Notification to the Department pursuant to Condition No. 9., Condition No. 12.(8), and Rule 62-4.130, F.A.C., Plant Operations-Problems, "immediately" shall mean the same day, if during a workday (i.e., 8:00 a.m. – 5:00 p.m.), or the first business day after the incident, excluding weekends and holidays; and for the purposes of 40 CFR 70.6(a)(3)(iii)(B), "prompt" shall have the same meaning as "immediately".

(106) "Excess Emissions" – Emissions of pollutants in excess of those allowed by any applicable air pollution rule of the Department, or by a permit issued pursuant to any such rule or Chapter 62-4, F.A.C. The term applies only to conditions which occur during startup, shutdown, sootblowing, load changing or malfunction.

(160) "Malfunction" – Any unavoidable mechanical and/or electrical failure of air pollution control equipment or process equipment or of a process resulting in operation in an abnormal or unusual manner.

62-210.700 Excess Emissions.

(1) Excess emissions resulting from startup, shutdown or malfunction of any emissions unit shall be permitted providing (1)best operational practices to minimize emissions are adhered to and (2) the duration of excess emissions shall be minimized but in no case exceed two hours in any 24 hour period unless specifically authorized by the Department for longer duration.

(4) Excess emissions which are caused entirely or in part by poor maintenance, poor operation, or any other equipment or process failure which may reasonably be prevented during startup, shutdown, or malfunction shall be prohibited.

(6) In case of excess emissions resulting from malfunctions, each owner or operator shall notify the Department or the appropriate Local Program in accordance with Rule 62-4.130, F.A.C. A full written report on the malfunctions shall be submitted in a quarterly report, if requested by the Department.

APPENDIX D

General NESHAP Recordkeeping Requirements

Recordkeeping Requirements of the Landfill NESHAP

1. Keep current SSM plan on site
2. Keep previous versions of revised SSM plans for five years
3. Maintain records of the following for each SSM event:
    a. Occurrence and duration of start-up, shutdown or malfunction of operation (i.e. process equipment)
    b. Occurrence and duration of each malfunction of the required air pollution control and monitoring equipment
    c. All required maintenance performed on the air pollution control and monitoring equipment
4. Actions taken during SSM events, when such actions are different from those specified in the SSM plan
5. Demonstration of conformance of SSM events with site's SSM plan (information needed to demonstrate conformance with the SSM plan may take form of a checklist)
6. Each period during which a CMS is malfunctioning or inoperative
7. All required measurements needed to demonstrate compliance with a relevant standard (i.e. temperature and flow measurements)
8. All results of performance tests, CMS performance evaluations, and opacity and visible emissions observations
9. All CMS calibration checks
10. All adjustments and maintenance performed on CMS
11. Any information demonstrating whether a source is meeting the requirements for a waiver of recordkeeping or reporting requirements

APPENDIX E

General NESHAP Reporting Requirements

Semiannual SSM Plan Reports

(Must be submitted within 30 days of the end of the calendar quarter - i.e. by July 30 and January 30)

1. Letter report containing the name, title, and signature of the owner or operator or other responsible official who is certifying its accuracy.
2. If actions taken during an SSM event are consistent with procedures specified in the SSM plan, the owner/operator shall state this in the report.
3. If actions taken during an SSM event are not consistent with procedures specified in the SSM plan, but source did not exceed any applicable emissions limitation in the relevant emissions standard, then the semiannual report must include the following:
    a. Number of malfunctions
    b. Duration of malfunctions
    c. Description of malfunctions
4. If the SSM plan was revised during the reporting period, to reflect changes in equipment or procedures at the affected source, this must be reported in the semiannual report.

Immediate Notification Reports

(Triggered if actions taken during an SSM event were not consistent with procedures specified in the SSM plan, AND the source exceeds the relevant emissions standard)

1. Record the actions taken for the event.
2. Report such actions to the Department within 2 working days after commencing actions inconsistent with the plan.
3. Follow up verbal report by a letter within 7 working days after the end of the event, in accordance with 40 CFR 63.10(d)(5).
4. Revise the SSM plan within 45 days of the non-conforming event.

APPENDIX F

Sample NESHAP Report Letters and Notification Forms

Startup, Shutdown, and Malfunction Plan Deviation Report

Facility: _____ Date Form Completed: _____

Unit ID: _____

Event: ☑ *appropriate box.*

☐ Startup ☐ Shutdown ☐ Malfunction

Date: _____ Time: _____

Duration: _____

Provide detailed explanation of the circumstance of the startup, shutdown, malfunction:

_____

_____

Provide description of corrective action:

_____

_____

Describe the reasons the Startup, Shutdown, Malfunction Plan was not adequate:

_____

_____

Describe proposed revisions to the Startup, Shutdown, Malfunction Plan:

_____

_____

Were any excess emissions and/ or parameter monitoring exceedances believed to have occurred during the event:

☐ Yes ☐ No

Name: _____

Title: _____

Signature: _____

Sample Semiannual Report Letter
(All SSM Events in Compliance with the SSM Plan)

Date

Air Agency Address

RE: Semiannual Startup, Shutdown, Malfunction (SSM) Plan Report
XXXXX Landfill
Facility Title V Operating Permit No.
Reporting Period: _____ to _____

Dear _____:

The XXXXX Landfill is subject to the National Emissions Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills (Landfill NESHAP – 40 CFR 63 Subpart AAAA). The NESHAP requires that a report be submitted on a semiannual basis, a report be submitted to the Administrator discussing the facility's compliance with the procedures in their SSM Plan, during SSM events (40 CFR 63.10(d)(5)).

The actions taken at the facility during all SSM events, for the reporting period listed above, were consistent with the procedures listed in the SSM Plan at the facility.

During the reporting period listed above, there (were/were not any) revisions made to the SSM Plan at the facility. (If changes were made, state why – revised to reflect new equipment, new contact numbers, etc.).

If you have any questions regarding this Semiannual SSM Plan Report, please contact me at (List Phone Number).

Sincerely,

XXXXXXXXXXXXX
Republic Services

SIGNATURE BLOCK FOR RESPONSIBLE OFFICIAL

I, the undersigned, hereby certify under penalty of law that I am a responsible official and that I have personally examined, and am familiar with, the information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the information is on knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false or incomplete information, including the possibility of fine or imprisonment.

BY: _____ Date _____
Authorized Signature

Typed or Printed Name of Signatory

Title of Signatory

Sample Semiannual Report Letter
(One or more SSM Events NOT in Compliance with the SSM Plan)

Date

Air Agency Address

RE: Semiannual Startup, Shutdown, Malfunction (SSM) Plan Report
XXXXXXXXX Landfill
Facility Title V Operating Permit No.
Reporting Period: _____ to _____

Dear _____:

The Facility Name Landfill is subject to the National Emissions Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills (Landfill NESHAP – 40 CFR 63 Subpart AAAA). The NESHAP requires that a report be submitted on a semiannual basis, a report be submitted to the Administrator discussing the facility's compliance with the procedures in their SSM Plan, during SSM events (40 CFR 63.10(d)(5)).

The actions taken at the facility during one or more SSM events, for the reporting period listed above, were not consistent with the procedures listed in the SSM Plan at the facility. However, the source did not exceed any of the emissions limitations in the Landfill NESHAP during these events. The attached table lists the information that must be submitted in the Semiannual SSM Plan Report in this instance.

During the reporting period listed above, there were ____ revisions made to the SSM Plan at the facility. (If changes were made, state why – revised to reflect new procedures to address non conforming event (mandatory), new equipment, new contact numbers, etc.).

If you have any questions regarding this Semiannual SSM Plan Report, please contact met at (List Phone Number).

Sincerely,

XXXXXXXXX
Republic Services

SIGNATURE BLOCK FOR RESPONSIBLE OFFICIAL

I, the undersigned, hereby certify under penalty of law that I am a responsible official and that I have personally examined, and am familiar with, the information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the information is on knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false or incomplete information, including the possibility of fine or imprisonment.

BY: _____ Authorized Signature Date _____

Typed or Printed Name of Signatory Title of Signatory

Attachment 1: Description of all Malfunction Events
For the Reporting Period _____ to _____

Total Number of Malfunctions: _____

Date of Malfunction	Total Duration (hours)	Equipment Affected*	Description of Malfunction	Were SSM Plan Procedures Followed (Y/N)	Date of SSM Plan Revision to Address Event**

* Control Device, Continuous Monitoring System, or Collection System
**Not Applicable if SSM Plan Procedures were followed during the Malfunction Event

Sample Immediate Notification Letter
(SSM Events NOT in Compliance with the SSM Plan, and Facility Experienced Excess Emissions)

Date

Air Agency Address

RE: XXXXXXXX Landfill
Facility Title V Operating Permit No.
40 CFR 63 Subpart AAAA – Landfill NESHAP
Immediate Notification Report: Non-conforming SSM Event

Dear _____:

The XXXXXX Landfill is subject to the National Emissions Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills (Landfill NESHAP – 40 CFR 63 Subpart AAAA). 40 CFR 63.10(d)(5) of the NESHAP requires that if actions taken at the facility during a startup, shutdown or malfunction (SSM) event are not consistent with the facility's SSM Plan, and the event results in excess emissions, the Agency must be notified verbally within 2 working days after the actions are taken. A letter must be written within 7 days of the event.

Please consider this letter as the required written report for the SSM event that occurred at the facility on (list date). As required by the NESHAP, a verbal notification was made to (give name of agency, person talked to) on (list date).

In accordance with the NESHAP, the following information is required in the letter report for this event:

Record the actions taken for the event:

Describe what occurred, what was done, and how it differed from the SSM plan actions.

Describe excess emissions:

Discuss the type of emission, and where it came from

Revise the SSM plan within 45 days of the non-conforming event:

Give a date by which the SSM plan will be revised.

If you have any questions regarding this Immediate Notification Report, please contact met at (List Phone Number).

Sincerely,

XXXXXXX
Republic Services

SIGNATURE BLOCK FOR RESPONSIBLE OFFICIAL

I, the undersigned, hereby certify under penalty of law that I am a responsible official and that I have personally examined, and am familiar with, the information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the information is on knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false or incomplete information, including the possibility of fine or imprisonment.

BY: _____

Authorized Signature

Date _____

Typed or Printed Name of Signatory

Title of Signatory

ATTACHMENT J

OPERATIONS AND MAINTENANCE PLAN

OPERATIONS AND MAINTENANCE PLAN

The Operations and Maintenance information for the enclosed flare was provided as Attachment 10 to the August 8, 2008 *North LF Title V Permit Renewal Application* prepared by Earth Tech, AECOM. The Attachment is provided here for your reference.

Landfill Gas Collection/Flare System

Operation and maintenance of the landfill gas collection and flare systems includes care of primarily the landfill gas extraction wells, the gas collection blower and the flare. The following describes the general operation and maintenance details involved with each system.

Landfill Gas Extraction Wells

In order to ensure that the proper vacuum is being applied to each extraction well, the landfill gas quality is checked periodically for indicator parameters such as methane and oxygen. Adjustments to the applied vacuum are made as needed at each wellhead in order to minimize the occurrence of air intrusion. The wells are inspected periodically for deterioration of equipment such as the flex hose, sampling ports, gaskets, thermometers, etc. These are replaced as necessary.

Landfill Gas Blower

The gas collection system in place at the closed North Sanitary Landfill has Lamson Landfill gas blowers Model 602 GD. The unit is driven by a 20 HP, 3 phase, 460 VAC, 60 Hertz, TEXP electric motor with a fixed V-belt drive on a unitary base. The motor on the blower is equipped with sealed bearings and requires no maintenance. However, the manufacturer recommends that the belt tension on the V-belt drive be periodically inspected to ensure that the belts are adjusted or replaced when necessary. The blower motor's line current should be measured periodically to ensure that the motor is operating at the correct nameplate motor current. Incorrect motor current could be an indication that the motor is not operating properly, thereby reducing the life of the blower if not corrected.

Flare System

The flare control panel is equipped with a number of indicating lights that assist the operator with startup of the flare and with operating conditions. On an annual basis, the flame arrestor leading to the flare should be inspected and cleaned if a high differential pressure exists. Thermocouples may need to be replaced occasionally. Pilot gas cylinders should be inspected periodically to insure that sufficient gas is present to re-light the flare if it goes down.

ATTACHMENT K

IDENTIFICATION OF APPLICABLE REQUIREMENTS

IDENTIFICATION OF APPLICABLE REQUIREMENTS

Federal Rule:

40 CFR 60, Subpart A: Standards of Performance for New Stationary Sources (NSPS)
40 CFR 60, Subpart WWW: Standards of Performance for Municipal Solid Waste Landfills
40 CFR 61, Subpart A: General Provisions
40 CFR 61, Subpart M: NESHAP for Asbestos.
40 CFR 82: Protection of Stratospheric Ozone.

State Rule:

CHAPTER 62-4, F.A.C.: PERMITS, effective 12-01-11

62-4.030, F.A.C.: General Prohibition.
62-4.040, F.A.C.: Exemptions.
62-4.050, F.A.C.: Procedure to Obtain Permits; Application. 10-31-07
62-4.055, F.A.C.: Permit Processing. 8-16-98
62-4.060, F.A.C.: Consultation.
62-4.070, F.A.C.: Standards for Issuing or Denying Permits; Issuance; Denial.
62-4.080, F.A.C.: Modification of Permit Conditions.
62-4.090, F.A.C.: Renewals. 3-16-08
62-4.100, F.A.C.: Suspension and Revocation.
62-4.110, F.A.C.: Financial Responsibility.
62-4.120, F.A.C.: Transfer of Permits.
62-4.130, F.A.C.: Plant Operation - Problems.
62-4.150, F.A.C.: Review.
62-4.160, F.A.C.: Permit Conditions.
62-4.210, F.A.C.: Construction Permits.
62-4.220, F.A.C.: Operation Permit for New Sources.

CHAPTER 62-210, F.A.C.: STATIONARY SOURCES - GENERAL REQUIREMENTS, effective 6-29-11.

62-210.300, F.A.C.: Permits Required.
62-210.300(1), F.A.C.: Air Construction Permits.
62-210.300(2), F.A.C.: Air Operation Permits.
62-210.300(3), F.A.C.: Exemptions from Permitting.
62-210.300(5), F.A.C.: Notification of Startup.
62-210.300(6), F.A.C.: Emissions Unit Reclassification.
62-210.300(7), F.A.C.: Transfer of Air Permits.
62-210.350, F.A.C.: Public Notice and Comment. 10-12-08.
62-210.350(1), F.A.C.: Public Notice of Proposed Agency Action.
62-210.350(2), F.A.C.: Additional Public Notice Requirements for Emissions Units Subject to Prevention of Significant Deterioration or Nonattainment-Area Preconstruction Review.
62-210.350(3), F.A.C.: Additional Public Notice Requirements for Sources Subject to Operation Permits for Title V Sources.
62-210.360, F.A.C.: Administrative Permit Corrections and Amendments. 3-16-08

62-210.370(3), F.A.C.: Annual Operating Report for Air Pollutant Emitting Facility. 7-3-08
62-210.650, F.A.C.: Circumvention.
62-210.700, F.A.C.: Excess Emissions.
62-210.900, F.A.C.: Forms and Instructions.
62-210.900(1), F.A.C.: Application for Air Permit – Long Form, Form and Instructions. 3-11-10
62-210.900(5), F.A.C.: Annual Operating Report for Air Pollutant Emitting Facility, Form and Instructions. 7-3-08
62-210.900(7), F.A.C.: Application for Transfer of Air Permit – Title V and Non-Title V Source. 7-3-08

CHAPTER 62-213, F.A.C.: OPERATION PERMITS FOR MAJOR SOURCES OF AIR POLLUTION, effective 6/29/11

62-213.205, F.A.C.: Annual Emissions Fee.
62-213.400, F.A.C.: Permits and Permit Revisions Required.
62-213.410, F.A.C.: Changes Without Permit Revision.
62-213.412, F.A.C.: Immediate Implementation Pending Revision Process.
62-213.415, F.A.C.: Trading of Emissions Within a Source.
62-213.420, F.A.C.: Permit Applications.
62-213.430, F.A.C.: Permit Issuance, Renewal, and Revision.
62-213.440, F.A.C.: Permit Content.
62-213.450, F.A.C.: Permit Review by EPA and Affected States
62-213.460, F.A.C.: Permit Shield.
62-213.900, F.A.C.: Forms and Instructions.
62-213.900(1), F.A.C.: Major Air Pollution Source Annual Emissions Fee Form.
62-213.900(2), F.A.C.: Statement of Compliance Form.
62-213.900(3), F.A.C.: Responsible Official Notification Form.

CHAPTER 62-296, F.A.C.: STATIONARY SOURCES - EMISSION STANDARDS, effective 03-11-10

62-296.320(4)(c), F.A.C.: Unconfined Emissions of Particulate Matter.
62-296.320(2), F.A.C.: Objectionable Odor Prohibited.

CHAPTER 62-297, F.A.C.: STATIONARY SOURCES - EMISSIONS MONITORING, effective 02-12-04

62-297.310, F.A.C.: General Compliance Test Requirements.
62-297.620, F.A.C.: Exceptions and Approval of Alternate Procedures and Requirements.

Miscellaneous:

CHAPTER 28-106, F.A.C.: Decisions Determining Substantial Interests
CHAPTER 62-110, F.A.C.: Exception to the Uniform Rules of Procedure, effective 07-01-98
Chapter 62-256, F.A.C.: OPEN BURNING AND FROST PROTECTION FIRES, EFFECTIVE 10-6-08
Chapter 62-257, F.A.C.: ASBESTOS PROGRAM, EFFECTIVE 10-12-08
CHAPTER 62-281, F.A.C.: Motor Vehicle Air Conditioning Refrigerant Recovery and Recycling, effective 09-10-96