Energy Developments

608 South Washington Avenue
PO Box 15217
Lansing, Michigan 48901

April 16, 2018

MDEQ – Lansing District Office
Julie Brunner
525 W. Allegan (Constitution Hall 1st Floor)
Lansing, MI 48909-7742

Re: Response to Violation Notice Dated March 28, 2018
Energy Developments Grand Blanc, LLC
MI-ROP-N5991-2016 Section 2

Energy Developments Grand Blanc, LLC (EDGB) is submitting this notification in response to the Michigan Department of Environmental Quality (MDEQ) Violation Notice dated March 28, 2018. Based on a revised 2017 MAERS submittal, dated March 16, 2018, MDEQ noted EDGB was in violation of Special Condition I.1, which limits each engine (EUENGINE6 and EUENGINE7) to 1.7 lb/hr of Sulfur Dioxide (SO_x). Below are details of EDGB's response to the violation and additional requested information.

The updated 2017 MAERS emission calculations submitted March 16, 2018, were based on site-specific Total Reduced Sulfur (TRS) testing performed on May 31, 2016. Based on additional site-specific testing performed on March 26, 2018, EDGB has revised the 2017 MAERS emission calculations, attached as Attachment A. At this time, EDGB believes the testing performed during March 2018 is the most accurate representation of the 2017 gas conditions at EDGB. As a result of the revised emissions basis for SOx, EDGB was not in compliance with the hourly emission rate during 2017; the issue of non-compliance is currently ongoing. In addition to the revised MAERS emission calculations, EDGB is also submitting a revised 2017 Annual Compliance Certification, to reflect the non-compliance status for the SO_x emission rate for EUENGINE6 and EUENGINE7 as Attachment B.

As requested in the violation notice, the facility-wide Potential-to-Emit (PTE) demonstration for all pollutants is included with this notification as Attachment C. Below is a summary of the PTE for the EDGB facility:

Equipment	LFG Flow (scfm)	NOx (tpy)	CO (tpy)	SO2 (tpy)	PM10 (tpy)	VOC (tpy)	HAP-T (tpy)	HAP-S (tpy)
Five (5) 3516 ICE	1,625	110.75	171.67	136.92	10.15	22.70	19.83	16.43
Two (2) 3520 ICE	1,100	43,26	129.78	92.69	6.38	43.26	20.70	18.40

As part of the corrective action to address the violation notice, EDGB will submit a Permit-to-Install (PTI) application to revise the SO_x emission for the two Caterpillar Engines by April 27, 2018. The TRS concentrations in landfill gas can be hard to predict and are dependent on

the type of waste the landfill is accepts. Therefore, as a preventative measure to maintain compliance with SO_x emission limit EDGB will test the gas quality on an annual basis.

Per the violation notice, the above information was provided to MDEQ by April 18, 2018. If you have any questions, please contact me at (517) 896-4417.

Sincerely,

Energy Developments, LLC

Dan Zimmerman
Director of N.A. OHS & Compliance

Enclosure: Attachment A: Revised 2017 MAERS Emission Calculations
Attachment B: Revised 2017 Annual Compliance Certification
Attachment C: PTE Emission Calculations
Attachment D: Violation Letter Dated March 28, 2018

Cc: Courtney Truett – EDGB (Electronically)
Cornerstone Environmental Group (Electronically)
Ms. Mary Ann Dolehanty – MDEQ (Electronically)
Mr. Craig Fitzner – MDEQ (Electronically)
Mr. Thomas Hess – MDEQ (Electronically)
Mr. Christopher Ethridge – MDEQ (Electronically)
Mr. Brad Myott – MDEQ (Electronically)
Mr. Dennis Bollinger – EDGB (Electronically)

Attachment A

Revised 2017 MAERS Emission Calculations

Energy Developments Grand Blanc, LLC
MI-ROP-N5991-2016
2017 MAERS Emission Calculations

Energy Developments Grand Blanc, LLC

	Plant 1	Engine 6		Engine 7		Flare	
Month/Year	Total Flow	Hours of Operation	Total Flow	Hours of Operation	Total Flow	Hours of Operation	Total Flow
	mscf	Hr/month	SCF	Hr/month	SCF	Hr/month	SCF
Jan-17	59.0	596	18,711,562	645	20,660,144	631	12,155
Feb-17	60.6	640	20,751,143	589	18,751,526	360	5,691
Mar-17	54.3	679	21,793,418	702	22,502,990	534	8,560
Apr-17	62.5	695	22,209,467	704	22,411,137	362	3,521
May-17	62.2	723	23,721,041	723	23,614,781	236	7,200
Jun-17	64.9	705	24,193,474	686	23,535,328	344	4,049
Jul-17	65.2	695	21,904,997	542	17,679,981	307	5,870
Aug-17	63.8	693	21,002,726	538	18,074,629	319	6,805
Sep-17	58.7	657	17,828,863	676	21,634,555	341	5,367
Oct-17	59.7	711	21,758,284	688	21,927,340	341	5,690
Nov-17	50.9	649	20,091,253	636	19,547,353	530	9,270
Dec-17	64.4	732	24,627,143	686	22,995,456	725	11,128

Energy Developments Grand Blanc
Emission Basis
January - November 2017

Emission Source	Regulated Pollutants	Emission Factors				Emission Factors Basis
LFG-Fired Engine 6 - CAT G3520C	VOCs	0.11	g/bhp-hr	0.54	lbs/hr[(1)]	Stack Test Performed December 6, 2016
	NO_x	0.8	g/bhp-hr	4.00	lbs/hr	Stack Test Performed December 6, 2016
	SO_x	1102	ppmv	5.88	lbs/hr	Site specific values
	CO	2.52	g/bhp-hr	12.60	lbs/hr	Stack Test Performed December 6, 2016
	PM_{10}	48	lb/MM dscf CH_4	0.55	lbs/hr	EPA, AP-42, Table 2.4-5 (November 1998)
	Formaldehyde	-	-	2.10	lbs/hr	Typical Engine Testing
	Total HAPs (Including Formaldehyde)	-	-	4.46	lbs/hr	EPA, AP-42, Table 2.4-1, 2, 3 (November 1998)
LFG-Fired Engine 7 - CAT G3520C	VOCs	0.15	g/bhp-hr	0.74	lbs/hr[(1)]	Stack Test Performed December 6, 2016
	NO_x	0.56	g/bhp-hr	2.76	lbs/hr	Stack Test Performed December 6, 2016
	SO_x	1102	ppmv	5.88	lbs/hr	Site specific values
	CO	2.77	g/bhp-hr	13.80	lbs/hr	Stack Test Performed December 6, 2016
	PM_{10}	48	lb/MM dscf CH_4	0.55	lbs/hr	EPA, AP-42, Table 2.4-5 (November 1998)
	Formaldehyde	-	-	2.10	lbs/hr	Typical Engine Testing
	Total HAPs (Including Formaldehyde)	-	-	4.46	lbs/hr	EPA, AP-42, Table 2.4-1, 2, 3 (November 1998)
Plant 1 (5 CAT G3516 ICEs)	VOCs	0.41	g/bhp-hr	1.04	lbs/hr[(1)]	Manufacturer's Technical Specs
	NO_x	2.00	g/bhp-hr	5.06	lbs/hr	Manufacturer's Technical Specs
	SO_x	1102	ppmv	4.10	lbs/hr	Site specific values
	CO	3.10	g/bhp-hr	7.84	lbs/hr	Manufacturer's Technical Specs
	PM_{10}	48.00	lb/MM dscf CH_4	0.55	lbs/hr	EPA, AP-42, Table 2.4-5 (November 1998)
	Formaldehyde	-	-	0.75	lbs/hr	Typical Engine Testing
	Total HAPs (Including Formaldehyde)	-	-	3.11	lbs/hr	EPA, AP-42, Table 2.4-1, 2, 3 (November 1998)

[(1)] For the purposes of calculating actual emissions in lb/hr, the following equations were used:

CO and NO_x Emissions

(lb/MMbtu)*(MMbtu/hr)= lb/hr

SO_x Emissions

[(scfm) x (60 min/hr) x (individual ppmv $_{sulfur}$ * 1E-06) x (MW SO_2)] ÷ [(R x T)] = lb/hr

PM_{10} Emissions

(dscfm) x (CH_4 component) x (1E-6 MMscf/scf) x (lb PM/MMscf CH_4) x (60 min/hr) = lb/hr

VOC Emissions

[(scfm x 60 min/hr x (ppmv $_{compound}$ x 1E-06 x MW $_{compound}$)] ÷ (R x T) x (1-control efficiency) = lb/hr

Energy Developments Grand Blanc
Emission Basis
Dec-17

Emission Source	Regulated Pollutants	Emission Factors				Emission Factors Basis
LFG-Fired Engine 6 - CAT G3520C	VOCs	0.14	g/bhp-hr	0.69	lbs/hr[(1)]	Stack Test Performed November 28, 2017
	NO_x	0.6	g/bhp-hr	2.94	lbs/hr	Stack Test Performed November 28, 2017
	SO_x	1102	ppmv	5.88	lbs/hr	Site specific values
	CO	2.66	g/bhp-hr	13.11	lbs/hr	Stack Test Performed November 28, 2017
	PM_{10}	48	lb/MM dscf CH_4	0.55	lbs/hr	EPA, AP-42, Table 2.4-5 (November 1998)
	Formaldehyde	-	-	2.10	lbs/hr	Typical Engine Testing
	Total HAPs (Including Formaldehyde)	-	-	4.46	lbs/hr	EPA, AP-42, Table 2.4-1, 2, 3 (November 1998)
LFG-Fired Engine 7 - CAT G3520C	VOCs	0.14	g/bhp-hr	0.69	lbs/hr[(1)]	Stack Test Performed November 28, 2017
	NO_x	0.55	g/bhp-hr	2.75	lbs/hr	Stack Test Performed November 28, 2017
	SO_x	1102	ppmv	5.88	lbs/hr	Site specific values
	CO	2.65	g/bhp-hr	13.10	lbs/hr	Stack Test Performed November 28, 2017
	PM_{10}	48	lb/MM dscf CH_4	0.55	lbs/hr	EPA, AP-42, Table 2.4-5 (November 1998)
	Formaldehyde	-	-	2.10	lbs/hr	Typical Engine Testing
	Total HAPs (Including Formaldehyde)	-	-	4.46	lbs/hr	EPA, AP-42, Table 2.4-1, 2, 3 (November 1998)
Plant 1 (5 CAT G3516 ICEs)	VOCs	0.41	g/bhp-hr	1.04	lbs/hr[(1)]	Manufacturer's Technical Specs
	NO_x	2.00	g/bhp-hr	5.06	lbs/hr	Manufacturer's Technical Specs
	SO_x	1102	ppmv	4.10	lbs/hr	Site specific values
	CO	3.10	g/bhp-hr	7.84	lbs/hr	Manufacturer's Technical Specs
	PM_{10}	48.00	lb/MM dscf CH_4	0.55	lbs/hr	EPA, AP-42, Table 2.4-5 (November 1998)
	Formaldehyde	-	-	0.75	lbs/hr	Typical Engine Testing
	Total HAPs (Including Formaldehyde)	-	-	3.11	lbs/hr	EPA, AP-42, Table 2.4-1, 2, 3 (November 1998)

[(1)] For the purposes of calculating actual emissions in lb/hr, the following equations were used:

CO and NO_x Emissions

(lb/MMbtu)*(MMbtu/hr)= lb/hr

SO_x Emissions

[(scfm) x (60 min/hr) x (individual ppmv $_{sulfur}$ * 1E-06) x (MW SO_2)] ÷ [(R x T)] = lb/hr

PM_{10} Emissions

(dscfm) x (CH_4 component) x (1E-6 MMscf/scf) x (lb PM/MMscf CH_4) x (60 min/hr) = lb/hr

VOC Emissions

[(scfm x 60 min/hr x (ppmv $_{compound}$ x 1E-06 x MW $_{compound}$)] ÷ (R x T) x (1-control efficiency) = lb/hr

Energy Developments Grand Blanc

Annual Emissions

2017

Plant 1 (Engine 1-5)										
	Annual LFG (mmSCF)	Hours of Operation (Hr/yr)	Units	NOx	CO	SO2	PM10	VOC	Formaldehyde	Total HAPs (Including Formaldehyde)
TOTAL	**726.3**	**32,958**	LBS	**166,677.46**	**258,350.07**	**135,127.80**	**18,126.90**	**34,168.88**	**24,718.50**	**102,499.38**
			Tons	**83.34**	**129.18**	**67.56**	**9.06**	**17.08**	**12.36**	**51.25**
Emission Factor Input in MAERS			LBS/mmSCF	**229.47**	**355.68**	**186.04**	**24.96**	**47.04**	**34.03**	**141.12**

LFG-Fired Engine 6 - CAT G3520C										
	Annual LFG (mmSCF)	Hours of Operation (Hr/yr)	Units	NOx	CO	SO2	PM10	VOC	Formaldehyde	Total HAPs (Including Formaldehyde)
TOTAL	**258.6**	**8,175**	LBS	**32,700.43**	**103,006.37**	**48,069.64**	**4,496.31**	**4,445.60**	**17,167.73**	**36,460.98**
			Tons	**16.35**	**51.50**	**24.03**	**2.25**	**2.22**	**8.58**	**18.23**
Emission Factor Input in MAERS			LBS/mmSCF	**126.46**	**398.33**	**185.89**	**17.39**	**17.19**	**66.39**	**141.00**

LFG-Fired Engine 7 - CAT G3520C										
	Annual LFG (mmSCF)	Hours of Operation (Hr/yr)	Units	NOx	CO	SO2	PM10	VOC	Formaldehyde	Total HAPs (Including Formaldehyde)
TOTAL	**253.3**	**7,814**	LBS	**21,559.58**	**107,352.06**	**45,945.90**	**4,297.66**	**5,760.44**	**16,409.25**	**34,850.12**
			Tons	**10.78**	**53.68**	**22.97**	**2.15**	**2.88**	**8.20**	**17.43**
Emission Factor Input in MAERS			LBS/mmSCF	**85.10**	**423.75**	**181.36**	**16.96**	**22.74**	**64.77**	**137.57**

Attachment B

Revised 2017 Annual Compliance Certification

DEQ

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

RENEWABLE OPERATING PERMIT
REPORT CERTIFICATION

Authorized by 1994 P.A. 451, as amended. Failure to provide this information may result in civil and/or criminal penalties.

Reports submitted pursuant to R 336.1213 (Rule 213), subrules (3)(c) and/or (4)(c), of Michigan's Renewable Operating (RO) Permit program must be certified by a responsible official. Additional information regarding the reports and documentation listed below must be kept on file for at least 5 years, as described in General Condition No. 22 in the RO Permit and be made available to the Department of Environmental Quality, Air Quality Division upon request.

Source Name	Energy Developments Grand Blanc, LLC	County	Genesee

Source Address	2361 W. Grand Blanc Road	City	Grand Blanc

AQD Source ID (SRN)	N5991	RO Permit No.	MI-ROP-5991-2016	RO Permit Section No.	2

Please check the appropriate box(es):

Annual Compliance Certification (General Condition No. 28 and No. 29 of the RO Permit)

Reporting period (provide inclusive dates): From Jan. 1, 2017 To Dec. 31, 2017

1. During the entire reporting period, this source was in compliance with **ALL** terms and conditions contained in the RO Permit, each term and condition of which is identified and included by this reference. The method(s) used to determine compliance is/are the method(s) specified in the RO Permit.

2. During the entire reporting period this source was in compliance with all terms and conditions contained in the RO Permit, each term and condition of which is identified and included by this reference, **EXCEPT** for the deviations identified on the enclosed deviation report(s). The method used to determine compliance for each term and condition is the method specified in the RO Permit, unless otherwise indicated and described on the enclosed deviation report(s).

Semi-Annual (or More Frequent) Report Certification (General Condition No. 23 of the RO Permit)

Reporting period (provide inclusive dates): From _____ To _____

1. During the entire reporting period, **ALL** monitoring and associated recordkeeping requirements in the RO Permit were met and no deviations from these requirements or any other terms or conditions occurred.

2. During the entire reporting period, all monitoring and associated recordkeeping requirements in the RO Permit were met and no deviations from these requirements or any other terms or conditions occurred, **EXCEPT** for the deviations identified on the enclosed deviation report(s).

Other Report Certification

Reporting period (provide inclusive dates): From Jan. 1, 2017 To Dec. 31, 2017

Additional monitoring reports or other applicable documents required by the RO Permit are attached as described:

2017 Revised MAERS

I certify that, based on information and belief formed after reasonable inquiry, the statements and information in this report and the supporting enclosures are true, accurate and complete, and that any observed, documented or known instances of noncompliance have been reported as deviations, including situations where a different or no monitoring method is specified by the RO Permit.

Dennis Bollinger	VP Assets & Reg. Affairs	615-636-3386
Name of Responsible Official (print or type)	Title	Phone Number

Dennis Bollinger 4/17/2018

Signature of Responsible Official Date

* Photocopy this form as needed.

EQP 5736 (8/99)

Revised 2017 Annual Compliance Certification Report
Energy Developmetns Grand Blanc

SECTION	CONDITION NUMBER AND BRIEF DESCRIPTION		COMPLIANCE STATUS	CONTINUOUS OR INTERMITTENT COMPLIANCE?	CONTINUOUS OR INTERMITTENT DATA?	METHOD USED TO DETERMINE COMPLIANCE
A	*GENERAL CONDITIONS*					
	PERMIT ENFORCEABILITY					
	*	Nothing shall affect enforceability of ROP	N/A	N/A	N/A	Not Applicable-General Permit Conditions
	*	State only Enforceable designated with footnote 1	N/A	N/A	N/A	Not Applicable-General Permit Conditions
	*	Federal only Enforceable designated with footnote 2	N/A	N/A	N/A	Not Applicable-General Permit Conditions
	GENERAL PROVISIONS					
	1	Compliance with All Conditions of ROP	In Compliance	Continuous	Intermittent	Monitoring / Testing / Recordkeeping as described in this ROP.
	2	Enforcement Action	N/A	N/A	N/A	Not Applicable-General Permit Conditions
	3	Modification, Revision, Termination of ROP	N/A	N/A	N/A	Not Applicable-General Permit Conditions
	4	Allowance of Authorized Representative to Enter and Inspect Facility	In Compliance	Continuous	Intermittent	Stationary Source has Not Denied Access to DEQ-AQD
	5	Furnish information upon Request	In Compliance	Continuous	Intermittent	Stationary Source has Complied with All DEQ-AQD Information Requests
	6	Challenge by any person	In Compliance	Continuous	N/A	ROP Not Challenged in 2017
	7	Consistent Payment of Fees	In Compliance	Continuous	Continuous	Fees Paid in 2017
	8	ROP does not convey Property Rights or Privileges	In Compliance	N/A	N/A	Not Applicable-General Permit Conditions
	EQUIPMENT & DESIGN					

Revised 2017 Annual Compliance Certification Report
Energy Developmetns Grand Blanc

SECTION	CONDITION NUMBER AND BRIEF DESCRIPTION		COMPLIANCE STATUS	CONTINUOUS OR INTERMITTENT COMPLIANCE?	CONTINUOUS OR INTERMITTENT DATA?	METHOD USED TO DETERMINE COMPLIANCE
	9	Removal of Collected Air Contaminants	In Compliance	N/A	N/A	No such devices at stationary source
	10	Air Cleaning Device Shall Be Installed, Maintained, Operated According to Rules	In Compliance	N/A	N/A	No such devices at stationary source
	EMISSION LIMITS					
	11	Visible Emissions	In Compliance	Continuous	Intermittent	Visual Inspection
	12	Disallowance of Air Contaminants that Affect Quality of Life	In Compliance	Continuous	N/A	Not cited by DEQ-AQD for Rule 901 violation
	TESTING/SAMPLING					
	13	Conduct Performance Test	In Compliance	Continuous	N/A	DEQ-AQD did not request performance test in 2017
	14	Required Performance Testing	In Compliance	Continuous	Intermittent	Performance test was conducted on November 28, 2017
	15	Test Results must be submitted to AQD within 60 days	In Compliance	Continuous	Intermittent	Performance test results submitted within 60-days
	MONITORING/RECORDKEEPING					
	16	Requirements for Records of Emissions and Monitoring	In Compliance	Continuous	Intermittent	Recordkeeping
	17	Maintain Records on -site for a period of 5 Years	In Compliance	Continuous	Continuous	Recordkeeping
	CERTIFICATION & REPORTING					
	18	Requirements for Responsible Official Certification	In Compliance	Continuous	Intermittent	Responsible Official Certifications Submitted

Revised 2017 Annual Compliance Certification Report
Energy Developmetns Grand Blanc

SECTION	CONDITION NUMBER AND BRIEF DESCRIPTION		COMPLIANCE STATUS	CONTINUOUS OR INTERMITTENT COMPLIANCE?	CONTINUOUS OR INTERMITTENT DATA?	METHOD USED TO DETERMINE COMPLIANCE
	19	Responsible Official Form	In Compliance	Continuous	Intermittent	Responsible Official Certifications Submitted
	20	Annual Submittal of Compliance Certification	In Compliance	Continuous	Intermittent	Annual Report was submitted March 15, 2017
	21	Prompt Reporting Deviations	In Compliance	Continuous	Intermittent	No Deviation reports submitted in 2017
	22	Prompt Certification of Deviation Report	In Compliance	Continuous	Intermittent	No Deviation reports submitted in 2017
	23	Semi-Annual Reporting	In Compliance	Continuous	Intermittent	Semi-annual Report was submitted by March 15, 2017 and September 15, 2017
	24	Reporting Actual Emissions	In Compliance	Continuous	Intermittent	MAERS submitted by March 15, 2017
	25	Notice of Abnormal Start-up, Shutdown or Malfunction	In Compliance	Continuous	Intermittent	No incidences in 2017
	PERMIT SHIELD					
	26	Identification and Determination of Applicable Requirements	N/A	N/A	N/A	Not Applicable-General Permit Conditions
	27	Provisions, Liability, and Information Requests	N/A	N/A	N/A	Not Applicable-General Permit Conditions
	28	Provisions of Permit Shield	N/A	N/A	N/A	Not Applicable-General Permit Conditions
	29	Renewal of Permit Shield with ROP	N/A	N/A	N/A	Not Applicable-General Permit Conditions
	REVISIONS					
	30	ROP Changes	In Compliance	Continuous	N/A	Procedures Followed where Applicable
	31	Change of Ownership	In Compliance	Continuous	N/A	Ownership changed during 2017

Revised 2017 Annual Compliance Certification Report
Energy Developmetns Grand Blanc

SECTION	CONDITION NUMBER AND BRIEF DESCRIPTION		COMPLIANCE STATUS	CONTINUOUS OR INTERMITTENT COMPLIANCE?	CONTINUOUS OR INTERMITTENT DATA?	METHOD USED TO DETERMINE COMPLIANCE
	32	Administratively Complete Application	In Compliance	Continuous	N/A	No ROP Modification Requested in 2017
	33	ROP Modifications	In Compliance	Continuous	N/A	No ROP Modification Requested in 2017
	RE-OPENINGS					
	34	Re-opening and ROP	In Compliance	Continuous	N/A	DEQ-AQD did not re-open in 2017
	RENEWALS					
	35	ROP Renewal	In Compliance	Continuous	N/A	ROP Renewal Submitted during May 2015, Revised ROP issued November 16, 2016
	STRATOSPHERIC OZONE PROTECTION					
	36	Applicable Standards for Recycling Units Containing Refrigerant	In Compliance	Continuous	Intermittent	Stationary Source does not accept CFC-containing appliances for disposal
	37	Fleet Motor Vehicle Servicing	In Compliance	Continuous	N/A	Not Applicable
	RISK MANAGEMENT PLAN					
	38	Reduction of Probability of Accidental Release of Regulated Substance	In Compliance	Continuous	N/A	Not Required to submit a Risk Management Plan
	39	Compliance Requirements Pertaining to Regulated Substances	In Compliance	Continuous	N/A	Not Required to submit a Risk Management Plan
	40	Submittal of Requested Information Pertaining to Regulated Substances	In Compliance	Continuous	N/A	Not Required to submit a Risk Management Plan
	41	Compliance Certification Pertaining to Regulated Substances	In Compliance	Continuous	N/A	Not Required to submit a Risk Management Plan

Revised 2017 Annual Compliance Certification Report
Energy Developmetns Grand Blanc

SECTION	CONDITION NUMBER AND BRIEF DESCRIPTION		COMPLIANCE STATUS	CONTINUOUS OR INTERMITTENT COMPLIANCE?	CONTINUOUS OR INTERMITTENT DATA?	METHOD USED TO DETERMINE COMPLIANCE
	EMISSION TRADING					
	42	Emission Trading	In Compliance	Continuous	Intermittent	No Emission Trading Occurred During 2017
	PERMIT TO INSTALL (PTI)					
	43	PTI Requirements	In Compliance	Continuous	N/A	No PTI issued during 2017
	44	Department may Revoke PTI	In Compliance	Continuous	N/A	No PTI issued during 2017
	45	PTI Applicability	In Compliance	Continuous	N/A	No PTI issued during 2017
	46	PTI Conditions Void after 18 Months	In Compliance	Continuous	N/A	No PTI issued during 2017
B	***SOURCE WIDE CONDITIONS - INFORMATIONAL SECTION***					
C	***EMISSION UNIT CONDITIONS - INFORMATIONAL SECTION***					
	EUTREATMENTS					
I.	**EMISSION LIMIT(S)**					
	I.	N/A	N/A	N/A	N/A	N/A
II.	**MATERIAL LIMIT(S)**					
	II.1	Material	N/A	N/A	N/A	N/A
III.	**PROCESS/OPERATIONAL RESTRICTION(S)**					
	III.1	Operating treatment system at all times when the collected gas is routed to the system	In Compliance	Continuous	Continuous	The treatment system operating at all times when the collected gas is routed to the system
	III.2	Operate so that any emissions from atmosphereic vents or stacks are subject to 60.752	N/A	N/A	N/A	NA- No atmospheric vents or stacks.
	III.3	Maintain and implement a MA/PMP	In Compliance	Continuous	Continuous	Records of MA/PMP maintained on-site
IV.	**DESIGN/EQUIPMENT PARAMETER(S)**					
	IV.1	Treatment system shall be designed as approved by AQD	In Compliance	Continuous	Intermittent	Treatment system meets AQD criteria.

Revised 2017 Annual Compliance Certification Report
Energy Developmetns Grand Blanc

SECTION	CONDITION NUMBER AND BRIEF DESCRIPTION		COMPLIANCE STATUS	CONTINUOUS OR INTERMITTENT COMPLIANCE?	CONTINUOUS OR INTERMITTENT DATA?	METHOD USED TO DETERMINE COMPLIANCE
V.	**TESTING/SAMPLING**					
		Records shall be maintained on file for a period of 5 years	In Compliance	Continuous	Intermittent	No tests were conducted during this reporting period
VI.	**MONITORING/RECORDKEEPING**					
	VI.1	Keep up-to-date readily accessible records of all treatment system exceedances	In Compliance	Continuous	Intermittent	No exceedance occurred during this reporting period
	VI.2	Maintain log of all maintenance activities	In Compliance	Continuous	Intermittent	Maintenance activities log kept
VII.	**REPORTING**					
	IV.1	Prompt Reporting of Deviations	In Compliance	Continuous	Intermittent	No Deviation reports submitted in 2017
	IV.2	Semi-Annual Reporting	In Compliance	Continuous	Intermittent	Semi-annual Report was submitted by March 15, 2017 and September 15, 2017
	IV.3	Annual Certification of Compliance	In Compliance	Continuous	Intermittent	Annual Report was submitted by March 15, 2017
	IV.4	Semi-Annual Landfill Gas Treatment System Report	In Compliance	Continuous	Intermittent	Semi-annual Report was submitted by March 15, 2017 and September 15, 2017
	IV.5	Semi-Annual SSM Report	In Compliance	Continuous	Intermittent	No SSM Report required during reporting period. SSM Report to be submitted by March 15, 2017.
VIII.	**STACK/VENT RESTRICTIONS**					
	N/A	N/A	N/A	N/A	N/A	N/A
IX.	**OTHER REQUIREMENTS**					
	VI.1	Comply with 40 CFR 60.755 during SSM events greater then 1 hour	In Compliance	Continuous	Continuous	In compliance with 40 CFR 60.755
	VI.2	Develop a SSM Plan	In Compliance	Continuous	Continuous	SSM Plan developed

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SECTION	CONDITION NUMBER AND BRIEF DESCRIPTION		COMPLIANCE STATUS	CONTINUOUS OR INTERMITTENT COMPLIANCE?	CONTINUOUS OR INTERMITTENT DATA?	METHOD USED TO DETERMINE COMPLIANCE
D	*FLEXIBLE GROUPINGS CONDITIONS*					
	FG3516ENGINES					
I.	**EMISSION LIMIT(S)**					
	N/A	N/A	N/A	N/A	N/A	N/A
II.	**MATERIAL LIMIT(S)**					
	N/A	N/A	N/A	N/A	N/A	N/A
III.	**PROCESS/OPERATIONAL RESTRICTION(S)**					
	III.1	Only landfill gas shall be burned in the engines	In Compliance	Continuous	Intermittent	Only landfill gas routed to the engines.
	III.2	Develop and submit a malfunction abatement/preventative maintenance plan	In Compliance	Continuous	Intermittent	Malfunction and abatement/preventative maintenance plan developed.
IV.	**DESIGN/EQUIPMENT PARAMETER(S)**					
	N/A	N/A	N/A	N/A	N/A	N/A
V.	**TESTING/SAMPLING**					
	N/A	N/A	N/A	N/A	N/A	N/A
VI.	**MONITORING/RECORDKEEPING**					
	VI.1	Keep complete records in AQD format and make them available by the last day of the calendar month for the previous month	In Compliance	Continuous	Intermittent	Records maintained
	VI.2	Maintain for each engine the following: manufacturer, date of manufacture, model number, model year…..	In Compliance	Continuous	Continuous	Records maintained
VII.	**REPORTING**					

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	VII.1	Prompt Reporting of Deviations	In Compliance	Continuous	Intermittent	No Deviation reports submitted in 2017
	VII.2	Semi-Annual Reporting	In Compliance	Continuous	Intermittent	Semi-annual Report was submitted by March 15, 2017 and September 15, 2017
	VII.3	Annual Certification of Compliance	In Compliance	Continuous	Intermittent	Annual Report was submitted by March 15, 2017
VIII.	**STACK/VENT RESTRICTIONS**					
	N/A	N/A	N/A	N/A	N/A	N/A
IX.	**OTHER REQUIREMENTS**					
	IX.1	Comply with NESHAP, Subpart A and ZZZZ	In Compliance	Continuous	Intermittent	Records maintained
	FGENGINES					
I.	**EMISSION LIMIT(S)**					
	I.1	NOx emissions from each engine not to exceed 1.0 g/hp-hr	In Compliance	Continuous	Intermittent	Performance test conducted November 28, 2017
	I.2	SOx emissions from each engine not to exceed 1.7 Ib/hr	Non-compliance	Intermittent	Intermittent	Landfill gas testing for TRS indicated higher than permitted level of SO2 emission.
	I.3	CO emissions from each engine not to exceed 3.0 g/hp-hr	In Compliance	Continuous	Intermittent	Performance test conducted January 6, 2015
	I.4	VOC emissions from each engine not to exceed 1.0 g/hp-hr	In Compliance	Continuous	Intermittent	Performance test conducted January 6, 2015
II.	**MATERIAL LIMIT(S)**					

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SECTION	CONDITION NUMBER AND BRIEF DESCRIPTION		COMPLIANCE STATUS	CONTINUOUS OR INTERMITTENT COMPLIANCE?	CONTINUOUS OR INTERMITTENT DATA?	METHOD USED TO DETERMINE COMPLIANCE
	II.1	Kilowatt-hour output for each engine not to exceed 14 MMKW-hr	In Compliance	Continuous	Intermittent	Kilowatt-hour output of each engine monitored and recorded.
III.	**PROCESS/OPERATIONAL RESTRICTION(S)**					
	III.1	Only landfill gas shall be burned in the engines	In Compliance	Continuous	Intermittent	Only landfill gas routed to the engines.
	III.2	Develop and submit a malfunction abatement/preventative maintenance plan	In Compliance	Continuous	Intermittent	Malfunction and abatement/preventative maintenance plan developed.
	III.3	Engines to operate at their maximum design output	In Compliance	Continuous	Intermittent	Engines operating at their maximum design output.
IV.	**DESIGN/EQUIPMENT PARAMETER(S)**					
	IV.1	Engines to operate with air/fuel ratio controller at all time	In Compliance	Continuous	Intermittent	Comply with applicable requirements
	IV.2	Equip all engines with non-resettable hours meter to track operating hours.	In Compliance	Continuous	Intermittent	Non-resettable hours meter is installed
V.	**TESTING/SAMPLING**					
	V.1	AQD can require verification of emission rates at one or more engines. An approved test plan must be approved by AQD…	In Compliance	Continuous	Intermittent	No performance test requested during reporting period
	V.2	Conduct Initial Performance Test	In Compliance	Continuous	Intermittent	Initial performance test conducted
VI.	**MONITORING/RECORDKEEPING**					

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SECTION	CONDITION NUMBER AND BRIEF DESCRIPTION		COMPLIANCE STATUS	CONTINUOUS OR INTERMITTENT COMPLIANCE?	CONTINUOUS OR INTERMITTENT DATA?	METHOD USED TO DETERMINE COMPLIANCE
	VI.1	Complete all required records and make available by the last day of the calendar month for the previous calendar month	In Compliance	Continuous	Intermittent	Records maintained
	VI.2	Continuous monitoring and recording of the landfill gas usages	In Compliance	Continuous	Intermittent	Landfill gas usages continuously monitored and recorded
	VI.3	Continuous monitoring the kilowatt output from each engine	In Compliance	Continuous	Intermittent	Kilowatt output for each engine continuously monitored and recorded
	VI.4	Maintain log of all maintenance activities	In Compliance	Continuous	Intermittent	Maintenance activities log kept
	VI.5	Keeping records of landfill gas usages	In Compliance	Continuous	Intermittent	Landfill gas usages records kept
	VI.6	Records kilowatt output for each engine at least once per day	In Compliance	Continuous	Intermittent	Kilowatt output records for each engine kept
	VI.7	Monitor emissions and operating in accordance with 40 CFR Part 60 Subpart JJJJ	In Compliance	Continuous	Intermittent	Initial performance test conducted
VII.	**REPORTING**					
	VII.1	Prompt Reporting of Deviations	In Compliance	Continuous	Intermittent	No Deviation reports submitted in 2017
	VII.2	Semi-Annual Reporting	In Compliance	Continuous	Intermittent	Semi-annual Report was submitted by March 15, 2017 and September 15, 2017

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SECTION	CONDITION NUMBER AND BRIEF DESCRIPTION		COMPLIANCE STATUS	CONTINUOUS OR INTERMITTENT COMPLIANCE?	CONTINUOUS OR INTERMITTENT DATA?	METHOD USED TO DETERMINE COMPLIANCE
	VII.3	Annual Certification of Compliance	In Compliance	Continuous	Intermittent	Annual Report was submitted by March 15, 2017
VIII.	**OPERATIONAL PARAMETERS**					
	VIII.	The exhaust gases shall be discharged unobstructed vertically upwards to the ambient air	In Compliance	Continuous	Intermittent	In compliance with applicable requirements
IX.	**OTHER REQUIREMENTS**					
	IX.1	Comply with 40 CFR Part 60 Subpart JJJJ	In Compliance	Continuous	Intermittent	In compliance with applicable requirements
	IX.2	Comply with 40 CFR Part 63 Subpart A and ZZZZ	In Compliance	Continuous	Intermittent	In compliance with applicable requirements
E	***NON-APPLICABLE REQUIREMENTS***					
		Additional Non-Applicable Requirements	N/A	N/A	N/A	N/A

Note: The permit conditions listed above corresponds to the Part 70 Operating Permit Renewal (MI-ROP-N5991-2016Section 2) issued November 16, 2016

Attachment C

PTE Emission Calculations

Description	Emissions														
	LFG Flow	NO_x		CO		SO_2		PM_{10}		VOC		HAP (Total)		HAP (Single)	
	(scfm)	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
Caterpillar Model G3516	325	5.06	22.15	7.84	34.33	6.25	27.38	0.43	1.89	1.04	4.54	0.91	3.97	0.75	3.29
Total Five LFG Engines (Five G3516 Engines)	1,625	25.29	110.75	39.19	171.67	31.26	136.92	2.15	9.43	5.18	22.70	4.53	19.83	3.75	16.43

Table. Standard Conditions, Constants, and Typical Values

Category	Value		Equivalent
Standard Temperature[a]	60	°F	520 °R
Universal Gas Constant	0.7302	atm-ft^3/lb-mol°R	
Pressure[a]	1	atm	
Methane Heating Value[a]	1,000	Btu/ft^3	
LFG Methane Component[c]	50%		
LFG Typical Heating Value	500	Btu/ft^3	
LFG Temperature[c]	100	°F	560 °R
LFG Moisture[c]	8%		
NG Combustion Constant, dry (F_d)[d]	8,710	ft^3 flue gas/MMBtu	
LFG Combustion Constant, dry (F_d)[d]	9,220	ft^3 flue gas/MMBtu	
NG Combustion Constant, wet (F_w)[d]	10,610	ft^3 flue gas/MMBtu	
LFG Combustion Constant, wet (F_w)[d,e]	11,231	ft^3 flue gas/MMBtu	

[a]Industrial STP (60°F, 30.00 in. Hg, 1 atm)

[b]Typical

[c]Assumed

[d]U.S. E.P.A. 40 CFR 60 Appendix A, *Method 19 - Determination of Sulfur Dioxide Removal Efficiency and Particulate Matter, Sulfur Dioxide, and Nitrogen Dioxide Emission Rates*

[e]Derived from the natural gas dry and wet combustion constants

Table. Fuel & Equipment - LFG Engine

The data below represents one engine (generator set) only.

LFG Engine Information	Value		Equivalent
Operation Period[a]	8,760	hr	
Mechanical Output[b]	1,148	bhp	
Electrical Output[b]	820	kW	
Fuel Consumption[b]	7,897	Btu/bhp-hr, nominal	
LFG inlet flow, standard[c]	325	scfm	171 MMscf/yr
LFG Inlet Flow, dry standard	299	dscfm	

[a]Typical

[b]Manufactuer's technical specifications

[c]Derived from engine manufactuer's technical specifications

[d]Assumed

Table. Criteria Pollutant Emissions - LFG Engine

Operation Period	8,760	hr	
LFG inlet flow, standard	325	scfm	
Heat Input	9.1	MMBtu/hr	
Mechanical Output	1,148	bhp	
SO_2 Emission Rate			
SO_2 concentration in exhaust gas	1900.3	ppmv	
SO_2 emission rate	6.25	lb/hr	27.38 ton/yr
PM_{10} Emission Rate			
PM emission factor[a]	48	lb/MM dscf CH_4	
PM emission rate	0.43	lb/hr	1.89 ton/yr
NO_2 Emission Rate			
NO_2 emission factor[c]	2.0	g/bhp-hr	
NO_2 emission rate	5.06	lb/hr	22.2 ton/yr
CO Emission Rate			
CO emission factor[c]	3.1	g/bhp-hr	
CO emission rate	7.8	lb/hr	34.3 ton/yr
VOC Emission Rate			
VOC emission factor[c]	0.41	g/bhp-hr	
VOC emission rate	1.0	lb/hr	4.5 ton/yr

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.,* November 1998. Tables 2.4-1, 2.4-2, 2.4-3, 2.4-5.

[b]AP-42 gives ranges for control efficiencies. The "typical" control efficiencies for halogenated and non-halogenated species are 93.0 and 86.1 percent respectively. The 86.1 percent control efficiency is assumed for all species (conservative estimates).

[c]Manufacturer's technical specifications

Air Toxics Emissions - LFG Engine

LFG inlet flow 325 scfm

LFG Compound	HAP	VOC	CAS	MW (lb/lb-mol)	Compound Conc & Mass in Inlet Gas (ppmv)[a]	(lb/hr)	Control Eff[a,b]	Engine Exhaust lb/hr	ton/yr
1,1,1 - Trichloroethane (methyl chloroform)	x	--	71-55-6	133.41	0.48	3.29E-03	86.1%	4.57E-04	2.00E-03
1,1,2,2 - Tetrachloroethane	x	x	79-34-5	167.85	1.11	9.57E-03	86.1%	1.33E-03	5.83E-03
1,1,2 - Trichloroethane (1,1,2 TCA)	x	x	79-00-5	133.41	0.10	6.85E-04	86.1%	9.52E-05	4.17E-04
1,1 - Dichloroethane (ethylidene dichloride)	x	x	75-34-3	98.96	2.35	1.19E-02	86.1%	1.66E-03	7.27E-03
1,1 - Dichloroethene (vinylidene chloride)	x	x	75-35-4	96.94	0.20	1.00E-03	86.1%	1.39E-04	6.09E-04
1,2 - Dichloroethane (ethylene dichloride)	x	x	107-06-2	98.96	0.41	2.07E-03	86.1%	2.88E-04	1.26E-03
1,2 - Dichloropropane (propylene dichloride)	x	x	78-87-5	112.99	0.18	1.04E-03	86.1%	1.45E-04	6.36E-04
2-Propanol (isopropyl alcohol)	--	y	67-63-0	60.11	50.1	1.55E-01	86.1%	2.15E-02	9.42E-02
Acetone (2-propanone)	--	--	67-64-1	58.08	7.01	2.09E-02	86.1%	2.91E-03	1.27E-02
Acrylonitrile (Propenenitrile)	x	x	107-13-1	53.06	6.33	1.72E-02	86.1%	2.40E-03	1.05E-02
Benzene	x	x	71-43-2	78.12	1.91	7.66E-03	86.1%	1.07E-03	4.67E-03
Bromodichloromethane	--	y	75-27-4	163.83	3.13	2.63E-02	86.1%	3.66E-03	1.60E-02
Butane	--	y	106-97-8	58.12	5.03	1.50E-02	86.1%	2.09E-03	9.14E-03
Carbon Disulfide	x	x	75-15-0	76.14	0.21	8.21E-04	86.1%	1.14E-04	5.00E-04
Carbon Tetrachloride	x	x	56-23-5	153.84	0.00	3.16E-05	86.1%	4.39E-06	1.92E-05
Carbonyl Sulfide	x	x	463-58-1	60.07	2.19	6.76E-03	86.1%	9.39E-04	4.11E-03
Chlorobenzene (monochlorobenzene)	x	x	108-90-7	112.56	0.25	1.47E-03	86.1%	2.04E-04	8.94E-04
Chlorodifluoromethane (CFC-22, freon-22)	--	--	75-45-6	86.47	1.30	5.77E-03	86.1%	8.02E-04	3.51E-03
Chloroethane (ethyl chloride)	x	x	75-00-3	64.52	1.25	4.14E-03	86.1%	5.76E-04	2.52E-03
Chloroform (trichloromethane)	x	x	67-66-3	119.38	0.03	1.84E-04	86.1%	2.56E-05	1.12E-04
Chloromethane (methyl chloride)	x	x	74-87-3	50.49	1.21	3.14E-03	86.1%	4.36E-04	1.91E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	x	x	106-46-7	147	0.21	1.61E-03	86.1%	2.24E-04	9.79E-04
Dichlorodifluoromethane (CFC-12, freon-12)	--	--	75-71-8	120.91	15.7	9.75E-02	86.1%	1.36E-02	5.94E-02
Dichlorofluoromethane (freon-21)	--	--	75-43-4	102.92	2.62	1.38E-02	86.1%	1.92E-03	8.43E-03
Dichloromethane (methylene chloride)	x	--	75-09-2	84.93	14.3	6.24E-02	86.1%	8.67E-03	3.80E-02
Dimethyl Sulfide (methyl sulfide)	--	y	75-18-3	62.13	1.06	3.38E-03	86.1%	4.70E-04	2.06E-03
Ethane	--	--	74-84-0	30.07	889	1.37E+00	86.1%	1.91E-01	8.36E-01
Ethanol (ethyl alcohol)	--	y	64-17-5	46.08	27.2	6.44E-02	86.1%	8.95E-03	3.92E-02
Ethylbenzene[g]	x	x	100-41-4	106.17	4.61	2.51E-02	86.1%	3.49E-03	1.53E-02
Ethyl Mercaptan (ethanethiol)	--	y	75-08-1	62.13	1.25	3.99E-03	86.1%	5.54E-04	2.43E-03
Ethylene dibromide (1,2 dibromoethane)	x	x	106-93-4	187.88	0.001	9.65E-06	86.1%	1.34E-06	5.87E-06
Fluorotrichloromethane (CFC-11, freon-11)	--	--	75-69-4	137.37	0.76	5.36E-03	86.1%	7.45E-04	3.26E-03
Formaldehyde	x	x	50000			7.50E-01	0.0%	7.50E-01	3.29E+00
Hexane	x	x	110-54-3	86.18	6.57	2.91E-02	86.1%	4.04E-03	1.77E-02
Hydrogen Sulfide	--	--	7783-06-4	34.08	1886.0	3.30E+00	0.0%	3.30E+00	1.45E+01
Mercury (total)	x	--	7439-97-6	200.61	2.92E-04	3.01E-06	0.0%	3.01E-06	1.32E-05
Methyl Ethyl Ketone (2-butanone)	x	x	78-93-3	72.11	7.09	2.63E-02	86.1%	3.65E-03	1.60E-02
Methyl Isobutyl Ketone (hexone)	x	x	108-10-1	100.16	1.87	9.62E-03	86.1%	1.34E-03	5.86E-03
Methyl Mercaptan	--	y	74-93-1	48.11	1.33	3.29E-03	86.1%	4.57E-04	2.00E-03
Pentane	--	y	109-66-0	72.15	3.29	1.22E-02	86.1%	1.69E-03	7.42E-03
Tetrachloroethylene (perchloroethylene, -ethene)	x	x	127-18-4	165.83	3.73	3.18E-02	86.1%	4.42E-03	1.93E-02
Propane	--	y	74-98-6	44.1	11.1	2.51E-02	86.1%	3.49E-03	1.53E-02
Toluene (methylbenzene)	x	x	108-88-3	92.14	39.3	1.86E-01	86.1%	2.58E-02	1.13E-01
Trichloroethylene (trichloroethene)	x	x	79-01-6	131.38	2.82	1.90E-02	86.1%	2.64E-03	1.16E-02
t - 1,2 - Dichloroethene (1,2 dichloroethylene)	--	--	156-60-5	96.94	2.84	1.41E-02	86.1%	1.97E-03	8.61E-03
Vinyl Chloride (chloroethylene, VCM)	x	x	75-01-4	62.50	7.34	2.36E-02	86.1%	3.27E-03	1.43E-02
Xylenes (m, o, p)	x	x	1330-20-7	106.17	12.1	6.60E-02	86.1%	9.17E-03	4.02E-02
Hydogen Chloride[c,d]	x	--	7647-01-0	36.50	42.0	7.87E-02	0.0%	7.87E-02	3.45E-01
Total HAP								0.91	3.97
Maximum Single HAP								0.75	3.29
VOC (Non-HAP)								0.04	0.19

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.,* November 1998.

Tables 2.4-1, 2.4-2, 2.4-3.

[b]AP-42 gives ranges for control efficiencies. The "typical" control efficiencies for halogenated and non-halogenated species are 93.0 and 86.1 percent respectively.

The 86.1 percent control efficiency is assumed for all species (conservative estimates).

[c]Product of combustion

[d]Because HCl is a production of combustion, a default outlet concentration is listed; AP-42, Section 2.4.4.

Note: "x" denotes a HAP only or a HAP and VOC; "y" denotes a VOC only

Letter Symbol----Definition

atm-ft^3/lb-mol^oR-----atmosphere cubic foot per pound mole degree Rankine
acfm-----actual cubic foot per minute
atm-----atmosphere
bhp-----brake horsepower
Btu-----british thermal unit
cal/s-----calorie per second
CO-----carbon monoxide
ft^3-----cubic foot
m^3-----cubic meter
d-----day
^oF-----degree Fahrenheit
^oR-----degree Rankine
dscfm-----dry standard cubic foot, feet per minute
dsl/min------dry standard litre per minute
ft-----foot
ft/min-----foot per minute
ft/s-----foot per second
g-----gram
hr-----hour
HAP-----hazardous air pollutant
HV----heating value
HHV----higher heating value
in.----inch
kW----kilowatt
kWh----kilowatt hour
l----litre
LHV----lower heating value
m----meter
m/s----meter per second
CH_4----methane
Hg----mercury
μg----microgram
μg/dsl----microgram per dry standard litre
mg----milligram
MM----million
MMBtu----million british thermal units
min----minute
mol----mole
NO_2----nitrogen dioxide
Nox----nitrogen oxides
NMOC----non-methane organic compounds
NMHC----non-methane hydro carbons
PM_{10}----particulate matter less than or equal to 10 microns
Pb----lead
ppmv----parts per million by volume
ppmw----parts per million by weight
lb/hr----pound per hour
s----second
scf-standard cubic foot
scfm-standard cubic foot per minute
STP----standard temperature and pressure
SO_2----sulfur dioxide
ton----ton
ton/yr----ton per y
R----universal gas constant
VOC----volatile organic compound

Sample Calculations

Standard Conditions and Constants

$^{o}R = {}^{o}F + 460$
standard temperature = 60 ^{o}F
standard pressure = 1 atm
Universal gas constant (R) = 0.7302 atm-ft^3/lb-mol^{o}R

Flow
dscfm= scfm*(1-%moisture)
acfm = scfm*(actual temp[^{o}R])/(standard temp[^{o}R])*{(standard press[atm])/(actual press [atm])}

CO and NO_x Emissions
(lb/MMbtu)*(MMbtu/hr)= lb/hr

SO_2 Emissions
typically, 86% to 99.7% of sulfur compounds convert to SO_2 during combustion
{(scfm)*(60 min/hr)*(total sulfur concentration [ppmv])*(1-control efficiency)*(MW SO_2)}/{(R)*(T)} = lb/hr

PM_{10} Emissions
(dscfm)*(CH_4 component)*(1E-6 MMscf/scf)* (lb PM/MMscf CH_4)*(60 min/hr) = lb/hr

VOC Emissions
{(scfm*60 min/hr*concentration$_{compound}$[ppmv]*MW$_{compound}$)/(R)*(T)}*(1-control efficiency) = lb/hr
OR
VOCs are 39 percent of NMOC, as prescribed in AP-42
VOC concentration[ppmv] = NMOC concentration[as hexane]*39%
flare and/or engines typically combust 98% of VOCs
{(scfm*60 min/hr*concentration$_{hexane}$[ppmv]*MW$_{hexane}$)/(R)*(T)}*(0.39) = lb/hr

LFG Compound Emissions
{(scfm*60 min/hr*concentration$_{compound}$[ppmv]*MW$_{compound}$)/(R)*(T)}*(1-control efficiency)

HCl Emissions
typically, 86% to 99.7% of chlorine compounds convert to HCl during combustion
(concentration$_{compound}$ [ppm])*(control efficiency)*(no. of chlorine atoms) = HCl concentration [ppm] in outlet gas from each compound
{HCl conconcentration$_{each\ compound}$ [ppm]*scfm*MW$_{HCl}$}/{(R)*(T)}*(60 min/hr) = lb/hr
OR
{(scfm)*(60 min/hr)*(HCl outlet concentration per AP-42 [ppmv])*(1-control efficiency)*(MW}/{(R)*(T)} = lb/hr

Description	Emissions														
	LFG Flow	NO_x		CO		SO_2		PM_{10}		VOC		HAP (Total)		HAP (Single)	
	(scfm)	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
Caterpillar Model G3520C	550	4.94	21.63	14.81	64.89	10.58	46.34	0.73	3.19	4.94	21.63	2.36	10.35	2.10	9.20
Total Two LFG Engines (Two G3520C Engines)	1,100	9.88	43.26	29.63	129.78	21.16	92.69	1.46	6.38	9.88	43.26	4.73	20.70	4.20	18.40

Table. Standard Conditions, Constants, and Typical Values

Category	Value		Equivalent
Standard Temperature[a]	60	°F	520 °R
Universal Gas Constant	0.7302	atm-ft^3/lb-mol°R	
Pressure[a]	1	atm	
Methane Heating Value[a]	1,000	Btu/ft^3	
LFG Methane Component[c]	50%		
LFG Typical Heating Value	500	Btu/ft^3	
LFG Temperature[c]	100	°F	560 °R
LFG Moisture[c]	8%		
NG Combustion Constant, dry (F_d)[d]	8,710	ft^3 flue gas/MMBtu	
LFG Combustion Constant, dry (F_d)[d]	9,220	ft^3 flue gas/MMBtu	
NG Combustion Constant, wet (F_w)[d]	10,610	ft^3 flue gas/MMBtu	
LFG Combustion Constant, wet (F_w)[d,e]	11,231	ft^3 flue gas/MMBtu	

[a]Industrial STP (60°F, 30.00 in. Hg, 1 atm)

[b]Typical

[c]Assumed

[d]U.S. E.P.A. 40 CFR 60 Appendix A, *Method 19 - Determination of Sulfur Dioxide Removal Efficiency and Particulate Matter, Sulfur Dioxide, and Nitrogen Dioxide Emission Rates*

[e]Derived from the natural gas dry and wet combustion constants

Table. Fuel & Equipment - LFG Engine

The data below represents one engine (generator set) only.

LFG Engine Information	Value		Equivalent
Operation Period[a]	8,760	hr	
Mechanical Output[b]	2,242	bhp	
Electrical Output[b]	1,600	kW	
Fuel Consumption[b]	6,511	Btu/bhp-hr, nominal	
LFG inlet flow, standard[c]	550	scfm	289 MMscf/yr
LFG Inlet Flow, dry standard	506	dscfm	

[a]Typical

[b]Manufactuer's technical specifications

[c]Derived from engine manufactuer's technical specifications

[d]Assumed

Table. Criteria Pollutant Emissions - LFG Engine

Operation Period	8,760 hr	
LFG inlet flow, standard	550 scfm	
Heat Input	14.6 MMBtu/hr	
Mechanical Output	2,242 bhp	

SO_2 Emission Rate		
SO_2 concentration in exhaust gas	1900.3 ppmv	
SO_2 emission rate[a]	10.58 lb/hr	46.34 ton/yr
PM_{10} Emission Rate		
PM emission factor[a]	48 lb/MM dscf CH_4	
PM emission rate	0.73 lb/hr	3.19 ton/yr
NO_2 Emission Rate		
NO_2 emission factor[c]	1.0 g/bhp-hr	
NO_2 emission rate	4.94 lb/hr	21.6 ton/yr
CO Emission Rate		
CO emission factor[a]	3.0 g/bhp-hr	
CO emission rate	14.8 lb/hr	64.9 ton/yr
VOC Emission Rate		
VOC emission factor[c]	1.00 g/bhp-hr	
VOC emission rate	4.9 lb/hr	21.6 ton/yr

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.,* November 1998. Tables 2.4-1, 2.4-2, 2.4-3, 2.4-5.

[b]AP-42 gives ranges for control efficiencies. The "typical" control efficiencies for halogenated and non-halogenated species are 93.0 and 86.1 percent respectively. The 86.1 percent control efficiency is assumed for all species (conservative estimates).

[c]Manufacturer's technical specifications

[d]Site Specific

Air Toxics Emissions - LFG Engine

LFG inlet flow 550 scfm

LFG Compound	HAP	VOC	CAS	MW (lb/lb-mol)	Compound Conc & Mass in Inlet Gas (ppmv)[a]	(lb/hr)	Control Eff[a,b]	Engine Exhaust lb/hr	ton/yr
1,1,1 - Trichloroethane (methyl chloroform)	x	--	71-55-6	133.41	0.48	5.57E-03	86.1%	7.74E-04	3.39E-03
1,1,2,2 - Tetrachloroethane	x	x	79-34-5	167.85	1.11	1.62E-02	86.1%	2.25E-03	9.86E-03
1,1,2 - Trichloroethane (1,1,2 TCA)	x	x	79-00-5	133.41	0.10	1.16E-03	86.1%	1.61E-04	7.06E-04
1,1 - Dichloroethane (ethylidene dichloride)	x	x	75-34-3	98.96	2.35	2.02E-02	86.1%	2.81E-03	1.23E-02
1,1 - Dichloroethene (vinylidene chloride)	x	x	75-35-4	96.94	0.20	1.69E-03	86.1%	2.35E-04	1.03E-03
1,2 - Dichloroethane (ethylene dichloride)	x	x	107-06-2	98.96	0.41	3.50E-03	86.1%	4.87E-04	2.13E-03
1,2 - Dichloropropane (propylene dichloride)	x	x	78-87-5	112.99	0.18	1.77E-03	86.1%	2.46E-04	1.08E-03
2-Propanol (isopropyl alcohol)	--	y	67-63-0	60.11	50.1	2.62E-01	86.1%	3.64E-02	1.59E-01
Acetone (2-propanone)	--	--	67-64-1	58.08	7.01	3.54E-02	86.1%	4.92E-03	2.15E-02
Acrylonitrile (Propenenitrile)	x	x	107-13-1	53.06	6.33	2.92E-02	86.1%	4.06E-03	1.78E-02
Benzene	x	x	71-43-2	78.12	1.91	1.30E-02	86.1%	1.80E-03	7.90E-03
Bromodichloromethane	--	y	75-27-4	163.83	3.13	4.46E-02	86.1%	6.19E-03	2.71E-02
Butane	--	y	106-97-8	58.12	5.03	2.54E-02	86.1%	3.53E-03	1.55E-02
Carbon Disulfide	x	x	75-15-0	76.14	0.21	1.39E-03	86.1%	1.93E-04	8.46E-04
Carbon Tetrachloride	x	x	56-23-5	153.84	0.00	5.35E-05	86.1%	7.43E-06	3.26E-05
Carbonyl Sulfide	x	x	463-58-1	60.07	2.19	1.14E-02	86.1%	1.59E-03	6.96E-03
Chlorobenzene (monochlorobenzene)	x	x	108-90-7	112.56	0.25	2.48E-03	86.1%	3.45E-04	1.51E-03
Chlorodifluoromethane (CFC-22, freon-22)	--	--	75-45-6	86.47	1.30	9.77E-03	86.1%	1.36E-03	5.95E-03
Chloroethane (ethyl chloride)	x	x	75-00-3	64.52	1.25	7.01E-03	86.1%	9.74E-04	4.27E-03
Chloroform (trichloromethane)	x	x	67-66-3	119.38	0.03	3.11E-04	86.1%	4.33E-05	1.90E-04
Chloromethane (methyl chloride)	x	x	74-87-3	50.49	1.21	5.31E-03	86.1%	7.38E-04	3.23E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	x	x	106-46-7	147	0.21	2.72E-03	86.1%	3.78E-04	1.66E-03
Dichlorodifluoromethane (CFC-12, freon-12)	--	--	75-71-8	120.91	15.7	1.65E-01	86.1%	2.29E-02	1.00E-01
Dichlorofluoromethane (freon-21)	--	--	75-43-4	102.92	2.62	2.34E-02	86.1%	3.26E-03	1.43E-02
Dichloromethane (methylene chloride)	x	--	75-09-2	84.93	14.3	1.06E-01	86.1%	1.47E-02	6.43E-02
Dimethyl Sulfide (methyl sulfide)	--	y	75-18-3	62.13	1.06	5.72E-03	86.1%	7.96E-04	3.48E-03
Ethane	--	--	74-84-0	30.07	889	2.32E+00	86.1%	3.23E-01	1.41E+00
Ethanol (ethyl alcohol)	--	y	64-17-5	46.08	27.2	1.09E-01	86.1%	1.51E-02	6.63E-02
Ethylbenzene[g]	x	x	100-41-4	106.17	4.61	4.25E-02	86.1%	5.91E-03	2.59E-02
Ethyl Mercaptan (ethanethiol)	--	y	75-08-1	62.13	1.25	6.75E-03	86.1%	9.38E-04	4.11E-03
Ethylene dibromide (1,2 dibromoethane)	x	x	106-93-4	187.88	0.001	1.63E-05	86.1%	2.27E-06	9.94E-06
Fluorotrichloromethane (CFC-11, freon-11)	--	--	75-69-4	137.37	0.76	9.07E-03	86.1%	1.26E-03	5.52E-03
Formaldehyde	x	x	50000			2.10E+00	0.0%	2.10E+00	9.20E+00
Hexane	x	x	110-54-3	86.18	6.57	4.92E-02	86.1%	6.84E-03	3.00E-02
Hydrogen Sulfide	--	--	7783-06-4	34.08	1894.0	5.61E+00	0.0%	5.61E+00	2.46E+01
Mercury (total)	x	--	7439-97-6	200.61	2.92E-04	5.09E-06	0.0%	5.09E-06	2.23E-05
Methyl Ethyl Ketone (2-butanone)	x	x	78-93-3	72.11	7.09	4.44E-02	86.1%	6.18E-03	2.71E-02
Methyl Isobutyl Ketone (hexone)	x	x	108-10-1	100.16	1.87	1.63E-02	86.1%	2.26E-03	9.91E-03
Methyl Mercaptan	--	y	74-93-1	48.11	1.33	5.56E-03	86.1%	7.73E-04	3.39E-03
Pentane	--	y	109-66-0	72.15	3.29	2.06E-02	86.1%	2.87E-03	1.26E-02
Tetrachloroethylene (perchloroethylene, -ethene)	x	x	127-18-4	165.83	3.73	5.38E-02	86.1%	7.47E-03	3.27E-02
Propane	--	y	74-98-6	44.1	11.1	4.25E-02	86.1%	5.91E-03	2.59E-02
Toluene (methylbenzene)	x	x	108-88-3	92.14	39.3	3.15E-01	86.1%	4.37E-02	1.92E-01
Trichloroethylene (trichloroethene)	x	x	79-01-6	131.38	2.82	3.22E-02	86.1%	4.48E-03	1.96E-02
t - 1,2 - Dichloroethene (1,2 dichloroethylene)	--	--	156-60-5	96.94	2.84	2.39E-02	86.1%	3.33E-03	1.46E-02
Vinyl Chloride (chloroethylene, VCM)	x	x	75-01-4	62.50	7.34	3.99E-02	86.1%	5.54E-03	2.43E-02
Xylenes (m, o, p)	x	x	1330-20-7	106.17	12.1	1.12E-01	86.1%	1.55E-02	6.80E-02
Hydogen Chloride[c,d]	x	--	7647-01-0	36.50	42.0	1.33E-01	0.0%	1.33E-01	5.84E-01
Total HAP								2.36	10.35
Maximum Single HAP								2.10	9.20
VOC (Non-HAP)								0.07	0.32

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.,* November 1998.

Tables 2.4-1, 2.4-2, 2.4-3.

[b]AP-42 gives ranges for control efficiencies. The "typical" control efficiencies for halogenated and non-halogenated species are 93.0 and 86.1 percent respectively.

The 86.1 percent control efficiency is assumed for all species (conservative estimates).

[c]Product of combustion

[d]Because HCl is a production of combustion, a default outlet concentration is listed; AP-42, Section 2.4.4.

Note: "x" denotes a HAP only or a HAP and VOC; "y" denotes a VOC only

Letter Symbol----Definition

atm-ft^3/lb-mol^oR-----atmosphere cubic foot per pound mole degree Rankine
acfm-----actual cubic foot per minute
atm-----atmosphere
bhp-----brake horsepower
Btu-----british thermal unit
cal/s-----calorie per second
CO-----carbon monoxide
ft^3-----cubic foot
m^3-----cubic meter
d-----day
^oF-----degree Fahrenheit
^oR-----degree Rankine
dscfm-----dry standard cubic foot, feet per minute
dsl/min------dry standard litre per minute
ft-----foot
ft/min-----foot per minute
ft/s-----foot per second
g-----gram
hr-----hour
HAP-----hazardous air pollutant
HV----heating value
HHV----higher heating value
in.----inch
kW----kilowatt
kWh----kilowatt hour
l----litre
LHV----lower heating value
m----meter
m/s----meter per second
CH_4----methane
Hg----mercury
μg----microgram
μg/dsl----microgram per dry standard litre
mg----milligram
MM----million
MMBtu----million british thermal units
min----minute
mol----mole
NO_2----nitrogen dioxide
Nox----nitrogen oxides
NMOC----non-methane organic compounds
NMHC----non-methane hydro carbons
PM_{10}----particulate matter less than or equal to 10 microns
Pb----lead
ppmv----parts per million by volume
ppmw----parts per million by weight
lb/hr----pound per hour
s----second
scf-standard cubic foot
scfm-standard cubic foot per minute
STP----standard temperature and pressure
SO_2----sulfur dioxide
ton----ton
ton/yr----ton per y
R----universal gas constant
VOC----volatile organic compound

Sample Calculations

Standard Conditions and Constants

$^{o}R = {}^{o}F + 460$
standard temperature = 60 ^{o}F
standard pressure = 1 atm
Universal gas constant (R) = 0.7302 atm-ft^3/lb-mol^{o}R

Flow
dscfm= scfm*(1-%moisture)
acfm = scfm*(actual temp[^{o}R])/(standard temp[^{o}R])*{(standard press[atm])/(actual press [atm])}

CO and NO_x Emissions
(lb/MMbtu)*(MMbtu/hr)= lb/hr

SO_2 Emissions
typically, 86% to 99.7% of sulfur compounds convert to SO_2 during combustion
{(scfm)*(60 min/hr)*(total sulfur concentration [ppmv])*(1-control efficiency)*(MW SO_2)}/{(R)*(T)} = lb/hr

PM_{10} Emissions
(dscfm)*(CH_4 component)*(1E-6 MMscf/scf)* (lb PM/MMscf CH_4)*(60 min/hr) = lb/hr

VOC Emissions
{(scfm*60 min/hr*concentration$_{compound}$[ppmv]*MW$_{compound}$)/(R)*(T)}*(1-control efficiency) = lb/hr
OR
VOCs are 39 percent of NMOC, as prescribed in AP-42
VOC concentration[ppmv] = NMOC concentration[as hexane]*39%
flare and/or engines typically combust 98% of VOCs
{(scfm*60 min/hr*concentration$_{hexane}$[ppmv]*MW$_{hexane}$)/(R)*(T)}*(0.39) = lb/hr

LFG Compound Emissions
{(scfm*60 min/hr*concentration$_{compound}$[ppmv]*MW$_{compound}$)/(R)*(T)}*(1-control efficiency)

HCl Emissions
typically, 86% to 99.7% of chlorine compounds convert to HCl during combustion
(concentration$_{compound}$ [ppm])*(control efficiency)*(no. of chlorine atoms) = HCl concentration [ppm] in outlet gas from each compound
{HCl conconcentration$_{each\ compound}$ [ppm]*scfm*MW$_{HCl}$}/{(R)*(T)}*(60 min/hr) = lb/hr
OR
{(scfm)*(60 min/hr)*(HCl outlet concentration per AP-42 [ppmv])*(1-control efficiency)*(MW}/{(R)*(T)} = lb/hr

Attachment D

Violation Letter Dated March 28, 2018

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE

RICK SNYDER
GOVERNOR

C. HEIDI GRETHER
DIRECTOR

March 28, 2018

Mr. Dan Zimmerman
Director of OHS and Compliance
Energy Developments, LLC
608 South Washington Avenue
Lansing, Michigan 48833

SRN: N5991, Genesee County

Dear Mr. Zimmerman:

VIOLATION NOTICE

On March 16, 2018, the Department of Environmental Quality (DEQ), Air Quality Division (AQD) received updated 2017 MAERS emission calculations for Energy Developments Grand Blanc, LLC located at Citizens Disposal, Incorporated, 2361 West Grand Blanc Road, Grand Blanc. The information indicates an issue with the following conditions of Renewable Operating Permit (ROP) number MI-ROP-N5991-2016:

Process Description	Rule/Permit Condition Violated	Comments
Two Caterpillar G3520, 2,233 hp, landfill gas-fired, lean burn, spark ignition (SI), reciprocating internal combustion engines (RICE) identified as EUENGINE6 and EUENGINE7.	Special Condition (SC) I.1 which limits each engine to 1.7 lb/hr of SOx. **(R 336.2803, R 336.2804, 40 CFR 52.21 (c) and (d))**	The emissions information received shows emissions of 3.26 lb/hr of SOx from EUENGINE6 and 3.22 lb/hr of SOx from EUENGINE7 both in excess of the emissions limit.

The records provided demonstrate that actual emissions of sulfur oxides (SOx) from EUENGINE6 and EUENGINE7 are estimated at 28.4 tons per year (tpy). The emissions are based on gas samples that were collected May 31, 2016. Please be advised that potential emissions of SOx could be greater than 40 tpy which exceeds the significant threshold for sulfur dioxide (SO_2) which may trigger New Source Review (NSR) for a major modification.

AQD staff have advised you that, at a minimum, this is a violation of Rule 201 (R 336.1201) of the administrative rules promulgated under Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451).

A program for compliance will include a completed PTI application for the EUENGINE6 and EUENGINE7. An application form is available by request, or at the following website: www.michigan.gov/deqair.

Be advised that Rule 201 requires that a permit be obtained prior to installation, construction, operation, reconstruction, relocation, or alteration of any process or process equipment which may be a source of an air contaminant.

In addition, please provide a facility-wide Potential to Emit (PTE) demonstration for all pollutants at the source. Information on calculating PTE can be found at the following website:

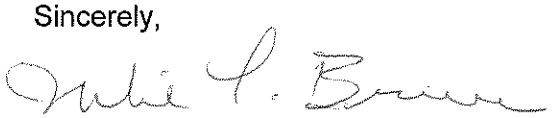
http://www.michigan.gov/deq/0,4561,7-135-3310_70487-112202--,00.html

Please initiate actions necessary to correct the cited violation and submit a written response to this Violation Notice by April 18, 2018. The written response should include: the dates the violation occurred; an explanation of the causes and duration of the violation; whether the violation is ongoing; a summary of the actions that have been taken and are proposed to be taken to correct the violation and the dates by which these actions will take place; and what steps are being taken to prevent a reoccurrence.

If it is believed that the above observations or statements are inaccurate or do not constitute violations of the applicable legal requirements cited, please provide appropriate information to explain your position.

Thank you for your attention to resolving the violation cited above and for the cooperation that was extended to me. If you have any questions regarding the violation or the actions necessary to bring this facility into compliance, please contact me at the telephone number listed below.

Sincerely,



Julie L. Brunner, P.E.
Senior Environmental Engineer
Air Quality Division
517-275-0415

JLB:TG

cc/via e-mail: Ms. Mary Ann Dolehanty, DEQ
Mr. Craig Fitzner, DEQ
Mr. Thomas Hess, DEQ
Mr. Christopher Ethridge, DEQ
Mr. Brad Myott, DEQ