

#AOP-08-015
DEC#BR95-0106

Operating Permit Expiration Date: September 15, 2013

State of Vermont
Agency of Natural Resources
Department of Environmental Conservation



Air Pollution Control Division
Waterbury, Vermont

TITLE V
AIR POLLUTION CONTROL PERMIT
TO CONSTRUCT AND OPERATE

Date Permit Issued: September 15, 2008

Owner/Operator: PPL Renewable Energy, LLC
Two North Ninth Street (GENPL8)
Allentown, Pennsylvania 18101

Source: Moretown Landfill Gas to Energy Facility
Palisades Park, US Route 2
Moretown, Vermont

FINDINGS OF FACT

(A) FACILITY DESCRIPTION

PPL Renewable Energy, LLC (also referred to herein as "Permittee") has proposed to construct and operate a landfill gas-to-energy (LFGTE) plant at the Moretown Landfill, Inc. municipal solid waste landfill located at Palisades Park off US Route 2 in Moretown, Vermont (also referred to herein as "Facility"). The Facility will consist of two Caterpillar G3520C LE landfill gas fired internal combustion engine generators rated at 2,233 hp and 1,600 kW each for a total of 3.2 megawatts of electric power generation. The Facility will also consist of a gas skid containing a moisture separator and blowers, step-up and station transformers mounted on concrete pads, all necessary electrical switchgear and an office trailer for the Facility operator.

The Facility does not include the landfill itself or its operations that continue to be the responsibility of Moretown Landfill, Inc. Any excess landfill gas collected and not combusted in the engines, as well as gas generated during periods the engines may be off-line, is to be routed to an on-site flare or flares, owned and operated by Moretown Landfill, Inc., to ensure continued complete combustion of the landfill gas. The currently approved capacity of the Moretown landfill is less than the federal NSPS and MACT threshold of 2.5 million megagrams (Mg) and thus does not currently require its own Title V Permit to Operate.

Below is a summary table of the Facility’s equipment specifications:

Landfill and Equipment Specifications			
Landfill Gas Combustion devices	Size ¹	Gas capacity (scfm) ²	stack height
(2) Caterpillar G3520C LE Engines	2,233 bhp (1,600 kW)	550 scfm each	20' min.

¹ bhp – brake horsepower rated output as specified by the manufacturer. kW - kilowatt electrical output.

² scfm - standard cubic feet per minute of landfill gas. Landfill gas is assumed to contain 40% - 60% methane with the balance predominately carbon dioxide but also includes nonmethane organic compounds (NMOCs). The maximum landfill gas recovery rate is predicted to be 1,095 scfm in 2013 based on the LandGEM model ver. 3.02 with values of L₀ of 3000 ft³/ton and k of 0.14 /yr for municipal solid waste which are based on average recoveries at other Northeast landfills rather than LFG generation which then must be factored by a collection efficiency.

(B) FACILITY CLASSIFICATION

The Facility is classified as a source of air contaminants pursuant to Title 10 of the *Vermont Statutes Annotated* ("10 VSA") §555 and §5-401(3) [Electrical power generation facilities] and (6)(c) [Stationary reciprocating internal combustion engines...having a rating of 450 brake horsepower output or greater] of the *Vermont Air Pollution Control Regulations* (hereinafter "*Regulations*"). In addition, §5-101 of the *Regulations* defines a *stationary source* as any structure(s), equipment, installation(s), or operation(s), or combination thereof, which emit or may emit any air contaminant, which is located on one or more contiguous or adjacent properties and which is owned or operated by the same person or persons under common control. Based on this definition, all of the equipment, operations, and structures at the Facility are grouped together by the Agency of Natural Resources, Department of Environmental Conservation, Air Pollution Control Division (hereinafter "Agency") as one stationary air contaminant source for purposes of review under the *Regulations*. The landfill itself and the activities associated with its operations are owned and operated by a separate entity and are not considered part of the proposed air contaminant source.

(C) PRIOR AGENCY ACTIONS/APPROVALS

The Facility does not currently operate under any prior "Permit to Construct" issued by the Agency pursuant to 10 VSA §556 and §§5-501 and/or 5-502 of the *Regulations* or any "Permit to Operate" issued by the Agency pursuant to 10 VSA §556a and Subchapter X of the *Regulations*.

(D) FACILITY PERMIT APPLICABILITY

As noted above, the Facility is classified as a source of air contaminants under §5-401 of the *Regulations*. Pursuant to 10 VSA §556 and §5-501 of the *Regulations* a Permit to Construct, or an amendment to any existing Permit to Construct, must be obtained before commencing the construction, installation, modification or operation of an air contaminant source. The installation of the LFGTE Facility consequently requires a Permit to Construct.

Pursuant to 10 VSA §556a and Subchapter X of the *Regulations* a Permit to Operate is required for any air contaminant source with allowable emissions of all air contaminants combined of ten (10) tons per year ("tpy") or more or that is subject to a standard, limitation or other requirement under §111 and/or §112 of the Clean Air Act. Allowable emissions from the Facility are estimated to be greater than ten (10) tpy combined and emissions of carbon monoxide (CO) are estimated to be in excess of the one-hundred (100) tpy threshold for applicability of Title V of the federal Clean Air Act. Therefore, pursuant to §§5-1002, 5-1003, and 5-1005 of the *Regulations* the Facility is classified as a "Title V Subject Source" and must obtain a Permit to Operate consistent with the requirements of Subchapter X of the *Regulations* and 40 CFR Part 70.

In accordance with 10 VSA §556(e) the Agency has combined the Permit to Construct and the Permit to Operate for this Facility into one combined Permit to Construct and Operate. The allowable emissions for the Facility are summarized below:

Future Allowable Air Contaminant Emissions (tons/year) ¹						
PM/PM ₁₀	SO ₂	NO _x	CO	VOCs	Total Criteria	HAPs ²
8.3	22.2	21.5	118.3	8.5	>10	<10/25

¹ PM/PM₁₀ - particulate matter and particulate matter of 10 micrometers in size or smaller; SO₂ - sulfur dioxide; NO_x - oxides of nitrogen measured as NO₂ equivalent; CO - carbon monoxide; VOCs - volatile organic compounds; HAPs - hazardous air pollutants as defined in §112 of the federal Clean Air Act. Emissions are based on: (1) the maximum flow rate per engine of 550 scfm, (2) 50% methane in the landfill gas, and (3) PM based on AP-42 2.4 with 1.2 safety factor, SO₂ based on 232 ppm H₂S measured in landfill gas and 2.0 safety factor, NO_x and CO based on manufacturer data, and VOC based on 100% of the 20 ppmvd NMOC as hexane at 3% oxygen in the exhaust being VOC.

² Emissions of individual HAPs each < 10 tpy and emissions of total HAPs combined <25 tpy.

(E) REVIEW FOR THE PERMIT TO CONSTRUCT

(a) New Source Review Designation

Any proposed facility with allowable emissions of fifty (50) tons per year or greater of any air contaminant, or five (5) tons per year or greater of lead, is designated as a major stationary source and is subject to review under §5-501 and §5-502 of the *Regulations*. The proposed project identified in Findings of Fact (A) above will result in a major increase in emissions. Consequently, the proposed project is designated as a major stationary source and is subject to the requirements of §5-502 of the *Regulations*.

(b) Most Stringent Emission Rate

Pursuant to §5-502 of the *Regulations*, the owner/operator of each new major stationary source or major modification must apply control technology adequate to achieve the Most Stringent Emission Rate ("MSER") with respect to those air contaminants for which there would be a major or significant actual emissions increase, respectively, but only for those currently proposed physical or operational changes which would contribute to the increased emissions.

The proposed project is designated as a major stationary source and therefore is subject to review under the MSER requirements in §5-502 of the *Regulations* for the pollutant carbon monoxide (CO).

The Agency has determined MSER to be:

Most Stringent Emission Rate Determination		
Date of Determination/ Permit #	Pollutant	Description/Emission limit
September 15, 2008 #AOP-08-015	CO	Cat G3520C Engines: 2.75 g/bhphr and 13.5 lbs/hour (each)

(c) Ambient Air Quality Impact Evaluation

An ambient air quality impact evaluation (AQIE) is performed to demonstrate whether or not a proposed project will cause or contribute to violations of the ambient air quality standards and/or significantly deteriorate existing air quality. The Agency's implementation procedures concerning the need for an AQIE under §5-406(1) of the *Regulations*, specifies that such analyses may be required when a project results in an allowable emissions increase of ten (10) tons per year or more of any air contaminant, excluding VOCs. Additionally, the Agency may require an AQIE where the short-term allowable emission rates will significantly increase as a result of a project.

Based on the proposed level of emissions from this Facility, the Agency required a AQIE for the pollutants CO, NO_x, and SO₂. The proposed level of emissions of all other criteria pollutants, excluding VOCs, are below the ten (10) tons per year threshold. Since CO emissions also exceed the significance threshold of fifty (50) tons per year, the Agency's implementation procedures require the AQIE to determine which other nearby sources, if any, must be included in the analysis. Any other nearby source that has a significant impact area for a respective pollutant that overlaps with the proposed Facility's significant impact area for that same pollutant must be included in the AQIE. No nearby sources were determined to be necessary to include in the modeling. Instead, all other nearby sources are assumed to be included in the ambient background value for the pollutant. The ambient background value is determined from the Agency's ambient monitoring network throughout the State.

The Facility emissions used in the AQIE are based on the maximum projected volumes of landfill gas generation and the highest level of emissions generated from the two engines combined.

The Facility was found to comply with all applicable ambient air quality standards and prevention of significant deterioration increments. A summary of the AQIE results is presented below:

Ambient Air Quality Impact Evaluation Performed for Permit #AOP-08-015					
Comparison of Facility's Impacts to National Ambient Air Quality Standards¹					
Pollutant	Averaging time of Std.	Ambient Standard (ug/m3)	Modeled Impact of Facility (ug/m3)	Background Value ² (ug/m3)	Total Impact w/ Background (ug/m3)
CO	1-hour	40,000	351	3,664	4,015
CO	8-hour	10,000	304	2,519	2,823
NO _x	annual	100	4.6	27	31.6
SO ₂	3-hour	1,300	61	39	100
SO ₂	24-hour	365	32	34	66
SO ₂	annual	80	4.7	6.5	11
Comparison of Facility Impacts to Prevention of Significant Deterioration Increments³					
Pollutant	Averaging time of PSD Increment	PSD Increment Available (ug/m3)	Modeled Impact of Facility (ug/m3)		
NO _x	annual	6.25	4.6		
SO ₂	3-hour	384	61		
SO ₂	24-hour	68	32		
SO ₂	annual	5	4.7		

¹ The National Ambient Air Quality Standards are presented in Subchapter III - Ambient Air Quality Standards - of the *Vermont Air Pollution Control Regulations*.

² Background values are provided by the Agency and are based on the maximum actual monitored values from the Agency's ambient monitoring network across the State over the past three (3) years.

³ Prevention of Significant Deterioration Increments are presented in Table 2 of the *Vermont Air Pollution Control Regulations*. All areas in Vermont with the exception of the Lye Brook Wilderness Area are classified as Class II. In addition, pursuant to §5-502(5) of the *Regulations* major modifications are only allowed a maximum of 25% of the total remaining annual increments and 75% of the total remaining short term increments. No nearby sources were assumed to have consumed increment therefore the full increment (factored by 25%-75%) is available.

(F) REVIEW FOR THE PERMIT TO OPERATE

(a) Applicable Requirements

The operations at the Facility are subject to the following state and federal laws and regulations, the requirements of which are embodied in the conditions of this Permit.

(i) *Vermont Air Pollution Control Regulations:*

Applicable Requirements from the Vermont Air Pollution Control Regulations
Section 5-201 – Prohibition of Open Burning
Section 5-211(2) - Prohibition of Visible Air Contaminants, Installations Constructed Subsequent to April 30, 1970.
Section 5-221(1) - Prohibition of Potentially Polluting Materials in Fuel, Sulfur Limitation in Fuel.
Section 5-231(4) - Prohibition of Particulate Matter; Fugitive Particulate Matter.
Section 5-241 – Prohibition of Nuisance and Odor.
Section 5-261(3) – Control of Hazardous Air Contaminants - Hazardous Most Stringent Emission Rate.
Section 5-402 – Written Reports When Requested.
Section 5-403 – Circumvention.
Subchapter VIII – Registration of Air Contaminant Sources.
Subchapter X – Operating Permits.

(ii) Reasonably Available Control Technology - §5-1010 of the *Regulations*

Pursuant to 10 VSA §556a(d) and §5-1010 of the *Regulations* the Agency may establish and include within any Permit to Operate emission control requirements based on Reasonably Available Control Technology ("RACT"). The Agency has not imposed any RACT requirements on this Facility under this authority at this time.

(iii) Existing Air Pollution Control Permit to Construct and/or Operate

The Facility does not currently operate under the confines of a Permit to Construct or Operate.

(iv) Federal Requirements:

Applicable Requirements from Federal Regulations and the Clean Air Act
<p>40 <i>CFR</i> Part 60, Subpart WWW - Standards of Performance for Municipal Solid Waste Landfills. §60.752 Standards - Requires landfill gas collection and control system. §60.753 Operational Standards - Operational requirements of the gas collection and control system. Applicable to all MSW landfills with a design capacity of 2.5 million megagrams (Mg) or greater, however the requirement to install the landfill gas collection and control system is only required once uncontrolled emissions of nonmethane organic compounds (NMOCs) from the landfill equal or exceed 50 Mg/year. The Moretown landfill and its operations are considered a separate source and are not covered by this Permit therefore this regulation does not apply to this Facility.</p>
<p>40 <i>CFR</i> Part 63, Subpart AAAA - National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills. §63.1955 Standards - Requires gas collection and control system meeting same standards as 40 <i>CFR</i> Part 60, Subpart WWW by referencing such. Applicable to all MSW landfills that are (1) a major source of Hazardous Air Pollutants (HAPs), or (2) are collocated with a major source of HAPs, or (3) are an area source with a design capacity of 2.5 million megagrams (Mg) or greater and have estimated uncontrolled emissions of NMOCs equal to or greater than 50 Mg/year. The Moretown landfill and its operations are considered a separate source and are not covered by this Permit therefore this regulation does not apply to this Facility.</p>
<p>40 <i>CFR</i> Part 60, Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines. Requires engines manufactured after certain dates to meet specific emission standards. For engines manufactured after July 1, 2007 that burn landfill/digester gas and are over 500 bhp the units must comply with the following limits: NOx 3.0 g/bhphr, CO 5.0 g/bhphr, and NMOC 1.0 g/bhphr. The Facility intends to comply with this requirement by purchasing certified engines.</p>
<p>40 <i>CFR</i> Part 63, Subpart ZZZZ - National Emission Standards for Hazardous Air Pollutants: Reciprocating Internal Combustion Engines (RICE). Requires RICEs over 500 bhp and located at a major source of HAPs to meet certain emission reduction requirements. RICE burning landfill gas at greater than 10% are exempt from these requirements therefore this regulation does not apply to the Facility.</p>
<p>Clean Air Act §§114(a)(3), 502(b), and 504(a)-(c); 40 <i>CFR</i> Part 70 §§70.6(a)(3)(i)(B) and 70.6(c)(1); and 40 <i>CFR</i> Part 64 - Compliance Assurance Monitoring. A new facility must comply with enhanced monitoring and compliance assurance monitoring requirements for any emission controlled unit subject to an emission standard with uncontrolled emissions from the unit in excess of the Title V major source thresholds. The engines can be considered an emission control device for VOCs. CAM is being established as continuous monitoring and recording of engine exhaust temperature and compliance testing at least once every five years for combustion efficiency of 98% or outlet NMOC concentration of 20 ppmvd and CO emission rate.</p>

(b) Non-Applicable Requirements

Pursuant to §5-1015(a)(14) of the *Regulations*, an owner or operator of a Facility may request a permit shield from specific state or federally enforceable regulations and standards which are not applicable to the source. The Permittee has requested a permit shield with respect to several potentially applicable requirements. The Agency has reviewed this request and is hereby granting a permit shield in accordance with §5-1015(a)(14) of the *Regulations* for the following requirements which have been determined not to be applicable to the Facility based on the information provided by the Permittee:

Non-Applicable Requirements for which a Permit Shield is Granted
<p>§5-231(3) - Prohibition of Particulate Matter: Combustion Contaminants. The Agency has determined that landfill gas is not a <i>fossil fuel</i> under the definition in the <i>Regulations</i>; therefore, this regulation is not applicable to flares or engines that combust landfill gas.</p>
<p>§5-271 - Control of Air Contaminants from Stationary Reciprocating Internal Combustion Engines. The Agency has determined that landfill gas is not a <i>fossil fuel</i> under the definition in the <i>Regulations</i> therefore this regulation is not applicable to engines that combust landfill gas.</p>

(c) Enforceability

This section delineates which permit conditions are federally enforceable and which conditions are state only enforceable. All federal enforceable conditions are subject to federal citizen suit provisions. All conditions of this Permit are enforceable under both state and federal authorities.

(d) Compliance Certification

The Permittee is required by this Permit to certify compliance as part of its annual registration with the Agency pursuant to the requirements of Subchapter X of the *Regulations*. Additionally, this Permit requires the submission of semi-annual reports of monitoring records used to demonstrate compliance with the limitations contained in this Permit.

(G) HAZARDOUS MOST STRINGENT EMISSION RATE

Pursuant to §5-261 of the *Regulations*, any stationary source whose current or proposed actual emission rate of a hazardous air contaminant ("HAC") is equal to or greater than the respective Action Level (found in Appendix C of the *Regulations*) shall achieve the Hazardous Most Stringent Emission Rate ("HMSER") for the respective HAC. Virgin gaseous fuels are exempt from this regulation; however, landfill gas is not classified as a virgin fuel.

Since this Facility is not responsible for the generation of the landfill gas, only its stack emissions following the combustion of the landfill gas are subject to review under §5-261. Stack emissions may include compounds formed during combustion or products in the landfill gas that are not completely combusted in the engines. While landfill gas is comprised principally of methane and carbon dioxide from the decomposition of wastes within the landfill, as this gas works its way to the ambient air it contacts and strips out other volatile HACs in the landfill such as from cleaning solvents, paints and petroleum contaminated materials. These HAC compounds are collectively referred to as non-methane organic compounds (NMOCs). While the uncontrolled landfill gas generated by the landfill may exceed certain hazardous air contaminant Action Levels only hydrogen sulfide is predicted to exceed its Action Level in the engine exhaust. Hydrogen sulfide emissions are based on landfill gas testing that revealed a concentration of 230 ppmv in the raw landfill gas. Several emission control technologies were evaluated for HMSER but all had very significant costs. Based on the U.S. EPA's document AP-42, internal combustion engines are assumed to have a typical destruction efficiency of 97.2%. The Agency has therefore determined HMSER to be use of the proposed engines to achieve good combustion of hydrogen sulfide. As a surrogate for good combustion of hydrogen sulfide, the Facility shall achieve a carbon monoxide emission limit of 2.75 g/bhphr and achieve a 98% destruction of NMOCs. Alternatively to demonstrating 98% destruction of NMOCs, the Facility may demonstrate that the outlet concentration of NMOCs from the combustion device does not exceed 20 ppmvd (as hexane equivalent) at 3% oxygen.

This HMSER evaluation shall be subject to re-evaluation five (5) years from the date of its determination and shall remain in effect until revised by the Agency. Upon reevaluation of this HMSER, the Agency intends to require further review of the status of emission control technologies, including but not limited to the status of catalytic control technologies, to determine their technical and economic feasibility at that time. This and prior HMSER determinations for this Facility are presented below.

Hazardous Most Stringent Emission Rate Determinations		
Date of Determination/ Permit #	Pollutant	Description/Emission limit
September 15, 2008 #AOP-08-015	Hydrogen sulfide	MSER: As a surrogate for good combustion of hydrogen sulfide in the raw landfill gas the Facility shall utilize engines to achieve a carbon monoxide emission limit of 2.75 g/bhphr and achieve a 98% destruction of NMOCs. Alternatively to demonstrating 98% destruction of NMOCs, the Facility may demonstrate that the outlet concentration of NMOCs from the combustion device does not exceed 20 ppmvd ¹ (as hexane equivalent) at 3% oxygen

¹ 20 ppmvd is parts per million by volume on a dry basis and is the alternative emission limit as provided in the federal regulations 40 *CFR* Part 60 §60.752 and Part 63 §63.1955 .

Based on the Agency's review of the Facility's application and the above Findings of Fact, the Agency concludes that the Facility, subject to the following Permit conditions, complies with all applicable state and federal air pollution control laws and regulations. Therefore, pursuant to 10 VSA §§556 and 556a, as amended, the Agency hereby proposes to issue a Permit approving the Facility, as described in the above Findings of Fact, subject to the following:

PERMIT CONDITIONS

- Construction Specifications and Operational Limitations -

- (1) The Permittee shall construct and operate the Facility in accordance with the plans and specifications submitted to the Agency and in accordance with the conditions set forth herein, including the equipment specifications as listed in Findings of Fact (A) or their equivalent as approved by the Agency. [10 V.S.A. §§556(c) and 556a(d)] [§5-501(1) of the *Regulations*]

Landfill Gas Control System Requirements

- (2) The Permittee shall ensure that all landfill gas delivered to its Facility is properly combusted in one or more of its Caterpillar G3520C landfill gas engines as specified in Finding of Fact A above, or their equivalent as approved by the Agency. The Permittee shall work with the landfill owner and operator to design and construct a gas collection and delivery system that will automatically route any excess actively collected landfill gas not being combusted in an engine to a properly operating flare or flares, such as when one or more of the engines goes off-line. The flare or flares shall have the capacity to combust the entire amount of landfill gas collected while still complying with the all the requirements of 40 *CFR* §60.18 including operation with no visible emissions and the limitations on gas exit velocity. The Permittee shall at no time allow the venting of landfill gas from the Facility that is not properly combusted in one of the landfill gas control system combustion devices without the prior written approval of the Agency. [10 V.S.A. §§556(c) and 556a(d)] [§§5-501 and 5-261(3) of the *Regulations*]
- (3) The Permittee shall maintain the exhaust temperature of each operating engine at or above 800°F during engine operation, except during startup and shutdown. Each engine shall be equipped with a continuous temperature monitoring system (CTMS) to continuously measure and permanently record exhaust temperature for each engine during operation. The CTMS shall also be installed, calibrated, operated, and maintained in accordance with the manufacturer's recommendations and shall be kept in good working order as specified below:
 - (a) The CTMS shall be installed following manufacturer's guidelines and shall be placed in a location that provides representative measurements of the engine exhaust temperature and is free from any interference which may affect the accuracy of the measurement and is easily accessible for maintenance.
 - (b) The CTMS shall have a measurement range appropriate to provide measurements of engine exhaust temperature during all engine operating scenarios and load levels. The CTMS must have a minimum measurement accuracy of +/-2% of full scale and permanently record the engine exhaust temperature using a digital data

acquisition system or calibrated analog strip chart recorder.

- (c) The CTMS must be operational at all times, continuously recording valid results without substantial interruption during all periods of engine operation including periods of startup, shutdown, and malfunction or emergency conditions; except for periods of CTMS calibration, quality assurance testing, routine maintenance or uncontrolled malfunction.
 - (d) Following written procedures acceptable to the Agency, the Permittee shall calibrate the CTMS measurement components and permanent data-recording devices annually in a manner consistent with the manufacturer's guidelines or whenever necessary to ensure the system is operating within the manufacturer's guidelines and this Permit Condition.
 - (e) The Permittee shall maintain records of all valid and invalid CTMS measurements, calibrations, QA/QC, maintenance, malfunction, corrective action and downtime associated with the respective CTMS in a permanent form suitable for inspection for a period of 5 years following the date of the record. Where applicable, all data records for the system shall be marked to show the times of both start-up and shutdown of the engine.
 - (f) The Permittee shall document any one (1) hour average exhaust temperature record that falls below the compliance temperature for each respective engine. Following any one (1) hour period in which the temperature falls below the compliance temperature, the Permittee shall immediately perform an inspection of the applicable systems and take expeditious and appropriate corrective actions to minimize the period during which the source is operating outside the established limit. All corrective actions will be documented following condition (e) above. [10 V.S.A. §§556(c) and 556a(d)] [§§5-405(1) and 5-1015(a) (3) and (4) of the *Regulations*] [40 CFR Part 64]
- (4) Stack heights: The exhaust gases from each of the landfill gas engines shall be vented vertically through a stack or stacks which extend a minimum of twenty (20) feet above the stack base grade elevation. The stacks shall not be equipped with any device that may obstruct the upward discharge of the exhaust gases such as a fixed raincap. [10 V.S.A. §§556(c) and 556a(d)] [§§5-406 and 5-501 of the *Regulations*]

- Emission Limitations -

- (5) Caterpillar G3520C Landfill Gas Engines: Emissions of the following pollutants from each Caterpillar G3520C engine shall not exceed the following limits:

Pollutant Emission Limitations		
Caterpillar Model G3520C (2,233 hp) Engine Generators	Emission Limitations	
	g/bhphr ¹ (unless otherwise noted)	lbs/hr ²
Carbon monoxide (CO)	2.75	13.5
Nitrogen oxides (as NO ₂)	0.5	2.5
Particulate Matter (as total PM)	0.20	0.9
Nonmethane organic compounds (NMOCs)	98% destruction efficiency or 20 ppmvd ³ as hexane @ 3% O ₂ outlet concentration	na

¹ g/bhphr equals grams of pollutant emitted per brake horsepower hour.

² lbs/hour equals pounds of pollutant emitted per hour based on full capacity of the engines (550 scfm each).

³ ppmvd equals parts per million by volume on a dry basis corrected to three (3) % oxygen.

Any emission testing conducted to demonstrate compliance with the above emission limits shall be performed at the rated load and speed of the engine and in accordance with 40 *CFR* Part 60, Appendix A, Reference Method 10 for CO, Method 7E for NO_x, Method 5 and Method 202 for PM, and Method 25C or Method 18 for NMOC destruction efficiency and NMOC outlet concentration or an alternative method which has been published in 40 *CFR*, provided the federally approved alternative method has been accepted in writing by the Agency before testing. [10 V.S.A. §§556(c) and 556a(d)] [§§5-261(3), 5-404 and 5-502(3) of the *Regulations*] [application for #AOP-08-015]

- (6) Visible Emissions [Facility Wide]: Emissions of visible air contaminants from any installation at the Facility, except where otherwise noted in this Permit, shall not exceed twenty (20) percent opacity for more than a period or periods aggregating six (6) minutes in any hour and at no time shall visible emissions exceed sixty (60) percent opacity.

Any emission testing conducted to demonstrate compliance with the above emission limits shall be performed in accordance with the proposed Federal Reference Method F-1 contained in the Federal Register Vol.51, No.168, pp. 31076-31081, August 29, 1986 or an equivalent method approved in writing by the Agency. [§§5-211(2), 5-211(3) and 5-404 of the *Regulations*]

- (7) Volatile Organic Compounds: Emissions of volatile organic compounds from the Facility shall not equal or exceed fifty (50) tons per year based on any rolling twelve (12) consecutive calendar month period. [§5-502 of the *Regulations*]
- (8) Hazardous Air Pollutants: Emission of federally regulated hazardous air pollutants (HAPs) from the Facility shall not equal or exceed ten (10) tons per year of any single HAP or twenty-five (25) tons per year of all HAPs combined based on any rolling twelve (12) consecutive calendar month period. [40 *CFR* Part 63]
- (9) Hazardous Air Contaminants: Emissions of state hazardous air contaminants (HACs) from the applicable operations at the Facility shall not equal or exceed their respective Action Level (found in Appendix C of the *Regulations*) unless the Agency has reviewed and approved such HAC emission under §5-261 of the *Regulations*. [§5-261 of the *Regulations*]
- (10) Nuisance and Odor: The Permittee shall not discharge, cause, suffer, allow, or permit from any source whatsoever such quantities of air contaminants or other material which will cause injury, detriment, nuisance or annoyance to any considerable number of people or to the public or which endangers the comfort, repose, health or safety of any such persons or the public or which causes or has a natural tendency to cause injury or damage to business or property. The Permittee shall not discharge, cause, suffer, allow, or permit any emissions of objectionable odors beyond the property line of the premises. [§5-241(1) and (2) of the *Regulations*]

- Compliance Testing and Monitoring -

- (11) The Permittee shall perform emission testing on one of the Caterpillar G3520C engines and shall furnish the Agency with a written report of the results within one-hundred eighty (180) days after the initial start-up date of the first engine at the Facility and at least once every five (5) years thereafter. The emission testing shall be performed in order to demonstrate compliance with the carbon monoxide (CO), nitrogen oxides (NO_x), nonmethane organic compound (NMOC) emission limitation(s) and temperature limitation specified in this Permit, respectively. At least thirty (30) days prior to performing the emission testing required above, the Permittee shall submit to the Agency a pretest report prepared in accordance with the Agency's "Source Emission Testing Guidelines". [§§5-402(1), 5-404(1) and 5-405(1) of the *Regulations*] [40 CFR Part 64]
- (12) Operation and Maintenance Plan [Engines]: The Permittee shall develop and implement an operation and maintenance plan (O&M Plan) for the LFGTE Facility within thirty (30) days following commencement of operation of one or both of the units. The purpose of said O&M Plan shall be to ensure the proper design, operation and maintenance of the LFGTE Facility in order to ensure continuous compliance with the respective conditions and emission limits of this Permit. The O&M Plan shall include, but not be limited to: (1) provisions for ensuring any excess actively collected landfill gas not being combusted in an engine is automatically routed to a properly operating flare or flares, such as when one or more of the engines is off-line or goes off-line such as due to a malfunction and/or shut-down, (2) provisions for routine operation and maintenance activities such as for the gas delivery and conditioning systems and the engines, (3) maintaining records of routine maintenance inspections, findings of those inspections, and any corrective actions which were taken. Said O&M Plan shall be present at the facility at all times and shall be made available to representatives of the Agency upon request. The Permittee shall revise said O&M Plan at the Agency's request or on its own motion based on operating experience or to reflect equipment or operational changes. [10 V.S.A. §§556(c) and 556a(d)] [§5-405(1) of the *Regulations*]

- Record Keeping and Reporting -

- (13) Records of Engine Operation: The Permittee shall maintain records of the operating status of each engine for all periods of operation, which shall include the kilowatts of power produced by the engines and the quantity of landfill gas, in standard cubic feet or BTU's per hour, delivered to the engines. [10 V.S.A. §§556(c) and 556a(d)] [§§5-405(1) and 5-1015(a)(3) and (4) of the *Regulations*]
- (14) Records of Engine Exhaust Temperature: Upon initial start-up of the engines, the Permittee shall commence and maintain records of the exhaust temperature of each engine while in operation. [10 V.S.A. §§556(c) and 556a(d)] [§§5-405(1) and 5-1015(a)(3) and (4) of the *Regulations*] [40 CFR Part 64]
- (15) Records of Engine Inspections and Maintenance: Consistent with the O&M Plan above, the Permittee shall maintain records of all maintenance and repairs completed on the engines. [10 V.S.A. §§556(c) and 556a(d)] [§§5-405(1) and 5-1015(a)(3) and (4) of the *Regulations*]
- (16) Records of all required compliance testing shall include the following:
- (a) the date, place, and time of sampling or measurements;
 - (b) the date analyses were performed;
 - (c) the company or entity that performed the analyses;
 - (d) the analytical techniques or methods used;
 - (e) the results of all such analyses; and
 - (f) the operating conditions existing at the time of sampling or measurement.
- [§§5-402(1), 5-405(1) and 5-1015(5) of the *Regulations*]
- (17) All records shall be retained for a minimum period of five (5) years from the date of record and shall be made available to the Agency upon request. [§§5-402(1), 5-405(1) and 5-1015(a)(7) of the *Regulations*]
- (18) Notification of Start-up: The Permittee shall notify the Agency in writing of the date of initial start-up of each Caterpillar G3520C engine within fifteen (15) days after such date. [§5-402(1) of the *Regulations*]
- (19) Notification of Violations: The Permittee shall notify the Agency in writing within ten (10) days of any violation, of which it is aware, of any requirements of this Permit. This notification shall include, at a minimum, the cause for the violation and corrective action or preventative maintenance taken to correct the violation. [§§5-402(1) and 5-1015(a)(6) of the *Regulations*]
- (20) Notification of Modifications to Facility: The Permittee shall notify the Agency in writing of any proposed physical or operational change at the Facility which may increase the emission rate of any air contaminant to the ambient air regardless of any concurrent emission reductions that may be achieved. If the Agency determines that a permit amendment is required, a new application and the appropriate application fee shall be submitted. The permit amendment shall be obtained prior to commencing any such change. [10 V.S.A. §556(c)] [§§5-402(1) and 5-501 of the *Regulations*]

- (21) Semi-Annual Periodic Monitoring Reports: Within thirty (30) days after July 1 and January 1 of each year, the Permittee shall submit to the Agency a report, signed by a responsible official of the Facility, containing the following information regarding the preceding six (6) months:
- (a) description and duration of all periods when the gas stream was diverted from the engines;
 - (b) a summary of the operating status of the engines during the reporting period;
 - (c) a summary of all periods engine exhaust temperature during operation fell below the allowed level;
 - (d) a summary of inspections and maintenance on the engines; and

[§§5-402(1), 5-405(1) and 5-1015(a)(5) of the *Regulations*]

- (22) Annual Compliance Certification: By February 1st of each year, the Permittee shall submit an annual certification of compliance for the previous calendar year which ascertains and identifies the compliance status of the Facility with respect to all terms and conditions of this Permit, including but not limited to the following:
- (a) Identification of each term or condition of the permit that is the basis of the certification;
 - (b) The compliance status;
 - (c) Whether compliance was continuous or intermittent; and
 - (d) The methods used for determining the compliance status of the Facility over the reporting period.

A copy of the compliance certification shall also be sent to the U.S. Environmental Protection Agency at the following address:

Air Technical Unit (Mail Code SEA)
Office of Environmental Stewardship
U.S. Environmental Protection Agency
John F. Kennedy Federal Building
Boston, MA 02203

[§114(a)(3) of the CAA] [§§5-402(1) and 5-1015(a)(11) of the *Regulations*]

- (23) Annual Registration: The Permittee shall calculate the quantity of emissions of air contaminants from the Facility annually. If the Facility emits more than five (5) tons of any and all air contaminants per year, the Permittee shall register the source with the Secretary of the Agency (hereinafter "Secretary"), and shall renew such registration annually. Each day of operating a source which is subject to registration without a valid, current registration shall constitute a separate violation and subject the Permittee to civil penalties. The registration process shall follow the procedures set forth in Subchapter VIII of the *Regulations*, including the payment of the annual registration fee on or before May 15 of each year. [Subchapter VIII §§5-802, 5-803, 5-807, 5-808 of the *Regulations*]

- (24) All records, reports, and notifications that are required to be submitted to the Agency by this Permit shall be submitted to:

Agency of Natural Resources
Air Pollution Control Division
103 South Main Street, Bldg 3 South
Waterbury, Vermont 05671-0402.

[§5-402(1) of the *Regulations*]

- Permit Shield -

- (25) In accordance with §5-1015(a)(14) of the *Regulations*, the Facility is granted a "permit shield" and is not subject to the regulations and standards listed in Finding of Fact (F)(b) of this Permit. The Agency's "permit shield" determination is based upon the information submitted by the Permittee in its application. The "permit shield" shall be binding only with respect to activities disclosed in the Permittee's application. [§5-1015(a)(14) of the *Regulations*]

- Standard Permit Conditions -

(26) Approval to construct or modify under this Permit shall become invalid if construction or modification is not commenced within eighteen (18) months after issuance of this Permit, if construction or modification is discontinued for a period of eighteen (18) months or more, or if construction is not substantially completed within a reasonable time. The Agency may extend any one of these periods upon a satisfactory showing that an extension is justified. The term "commence" as applied to the proposed construction or modification of a source means that the Permittee either has:

- (a) Begun, or caused to begin, a continuous program of actual on-site construction or modification of the source, to be completed within a reasonable time; or
- (b) Entered into binding agreements or contractual obligations, which cannot be cancelled or modified without substantial loss to the Permittee, to undertake a continuous program of actual on-site construction or modification of the source to be completed within a reasonable time.

[10 V.S.A. §556(c)] [§5-501 of the *Regulations*]

(27) These Permit conditions may be suspended, terminated, modified, or revoked for cause and reissued upon the filing of a written request with the Secretary of the Agency (hereinafter "Secretary") or upon the Secretary's own motion. Any modification shall be granted only with the written approval of the Secretary. If the Secretary finds that modification is appropriate, only the conditions subject to modification shall be re-opened. The filing of a request for modification, revocation and reissuance, or termination, or of a notification of planned changes or anticipated non-compliance does not stay any terms or conditions of this Permit. The Secretary may provide opportunity for public comment on any proposed modification of these conditions. If public comments are solicited, the Secretary shall follow the procedures set forth in 10 V.S.A. §556 and §556a, as amended. [10 V.S.A. §§556(d) and 556a(g)] [§§5-1008(a) and 5-1008(e) of the *Regulations*]

(28) Cause for reopening, modification, termination and revocation of this Permit includes, but is not limited to:

- (a) Inclusion of additional applicable requirements pursuant to state or federal law;
- (b) A determination that the permit contains a material mistake or that inaccurate information was used to establish emissions standards or other terms or conditions of the operating permit;
- (c) A determination that the operating permit must be modified or revoked to ensure compliance with applicable requirements;
- (d) A determination that the subject source has failed to comply with a permit condition;
- (e) For Title V subject sources, a determination by U.S. EPA that cause exists to terminate, modify, revoke or reissue an operating permit;
- (f) Those causes which are stated as grounds for refusal to issue, renew or modify an operating permit under §5-1008(a) of the *Regulations*; or
- (g) If more than three (3) years remain in the permit term and the source becomes subject to a new applicable requirement.

[§5-1008(e)(4) of the *Regulations*]

- (29) The Permittee shall furnish to the Agency, within a reasonable time, any information that the Agency may request in writing to determine whether cause exists to modify, revoke, reissue, or terminate the Permit or to determine compliance with this Permit. Upon request, the Permittee shall also furnish to the Agency copies of records required to be kept by this Permit. [10 V.S.A. §§556(c) and 556a(d)] [§5-402(1) of the *Regulations*] [40 CFR Part 70 §70.6(a)(6)(v)]
- (30) By acceptance of this Permit, the Permittee agrees to allow representatives of the State of Vermont access to the properties covered by the Permit, at reasonable times, to ascertain compliance with Vermont environmental and health statutes and regulations and with this Permit. The Permittee also agrees to give the Agency access to review and copy any records required to be maintained by this Permit, and to sample or monitor at reasonable times to ascertain compliance with this Permit. [10 V.S.A. §§556(c), 556a(d) and 557] [§§5-402(1), 5-404, and 5-1015(a)(10) of the *Regulations*]
- (31) All data, plans, specifications, analyses and other information submitted or caused to be submitted to the Agency as part of the application for this Permit or an amendment to this Permit shall be complete and truthful and, for Title V permit applications, certified by a responsible official whose designation has been approved by the Secretary. Any such submission which is false or misleading shall be sufficient grounds for denial or revocation of this Permit, and may result in a fine and/or imprisonment under the authority of Vermont statutes. [10 V.S.A. §§556(c) and 556a(d)] [§§5-505 and 5-1006(f) of the *Regulations*]
- (32) For the purpose of establishing whether or not a person has violated or is in violation of any condition of this Permit, nothing in this Permit shall preclude the use, including the exclusive use, of any credible evidence or information relevant to whether a source would have been in compliance with applicable requirements if the appropriate performance or compliance test or procedure had been performed. [10 V.S.A. §§556(c) and 556a(d)]
- (33) Any permit noncompliance could constitute a violation of the federal Clean Air Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. [10 V.S.A. §§556(c) and 556a(d)] [§§5-1008(a) and 5-1008(e) of the *Regulations*]
- (34) It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity to maintain compliance with the conditions of this Permit. [10 V.S.A. §§556(c) and 556a(d)]
- (35) No person shall build, erect, install or use any article, machine, equipment or other contrivances, the use of which, without resulting in a reduction in the total release of air contaminants to the atmosphere, reduces or conceals an emission which otherwise would constitute a violation of these *Regulations*. [§5-403 of the *Regulations*]
- (36) The provisions of this Permit are severable. If any provision of this Permit, or its application to any person or circumstances is held invalid, illegal, or unenforceable by a court of competent jurisdiction, the invalidity shall not apply to any other portion of this Permit which can be given effect without the invalid provision or application thereof. [10 V.S.A. §§556(c) and 556a(d)]

- (37) This Permit does not convey any property rights of any sort or any exclusive privilege, nor does it authorize any injury to private property or any invasion of personal rights. [10 V.S.A. §§556(c) and 556a(d)]
- (38) All subsequent owners and/or operators of this Facility must request an amendment and transfer of this Permit prior to commencing any operations covered by this Permit. All subsequent owners and/or operators shall submit to the Agency as part of the request for amendment all such information the Agency deems necessary to establish legal ownership and/or interest in the property and all such information the Agency deems necessary to ensure the new owners and/or operators will construct and operate the Facility in compliance with the *Regulations* and this Permit. The terms and conditions of this Permit shall remain in full force and effect after submittal of the request for amendment and until the issuance of an amended Permit or denial. Should the Secretary deny the request, the new owner and/or operator must take whatever action is necessary to comply with the denial. [10 V.S.A. §§556 and 556a] [§§5-501, 5-1004, and 5-1013(a) of the *Regulations*]
- (39) Conditions (1) through (5), (11) and (12) are derived from the new source review requirements of Subchapter V of the *Regulations*. With the exception of the cited new source review conditions, the Operating Permit shall expire on September 15, 2013. The Permittee shall submit to the Agency a complete application for renewal of the Operating Permit at least twelve (12) months before the expiration of the Operating Permit. If a timely and administratively complete application for an operating permit renewal is submitted to the Secretary, but the Secretary has failed to issue or deny such renewal before the end of the term of this Operating Permit, then the Permittee may continue to operate the subject source and all terms and conditions of this Operating Permit shall remain in effect until the Secretary has issued or denied the operating permit renewal. However, this Operating Permit shall automatically expire if, subsequent to the renewal application being determined or deemed administratively complete pursuant to §5-1006 of the *Regulations*, the Permittee fails to submit any additional information required by the Secretary as well as information pertaining to changes to the Facility within thirty (30) days or such other period as specified in writing by the Secretary. [§§5-1011 and 5-1012(a) of the *Regulations*] [§§5-1005(c) and 5-1012 of the *Regulations*]
- (40) Pursuant to 10 V.S.A. Chapter 220, any appeal of this decision must be filed with the clerk of the Environmental Court within 30 days of the date of the decision. The appellant must attach to the Notice of Appeal the entry fee of \$225.00 payable to the State of Vermont. The Notice of Appeal must specify the parties taking the appeal and the statutory provision under which each party claims party status; must designate the act or decision appealed from; must name the Environmental Court; and must be signed by the appellant or their attorney. In addition, the appeal must give the address or location and description of the property, project or facility with which the appeal is concerned and the name of the applicant or any permit involved in the appeal. The appellant must also serve a copy of the Notice of Appeal in accordance with the Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings. For further information, see the Vermont Rules for Environmental Court Proceedings, available on-line at www.vermontjudiciary.org. The address for the Environmental Court is 2418 Airport Road, Suite 1, Barre, Vermont 05641 (Tel. #802-828-1660).

The Agency's issuance of this Air Pollution Control Permit relies upon the data, judgment, and other information supplied by the Permittee. The Agency makes no assurances that the air contaminant source approved herein will meet performance objectives or vendor guarantees supplied to the source Permittee. It is the sole responsibility of the Permittee to operate the source in accordance with the conditions herein and with all applicable state and federal standards and regulations.

Dated this _____ day of _____, 200__, in the town of Waterbury, county of Washington, state of Vermont.

Agency of Natural Resources

Laura Q. Pelosi, Commissioner
Department of Environmental Conservation

By: _____
Richard A. Valentinetti, Director
Air Pollution Control Division

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A2 PPL Renewable Energy, LLC. - Moretown