

# Exhibit VRG-MH-2

#AOP-23-048

Operating Permit Expiration Date: June 24, 2029

State of Vermont  
Agency of Natural Resources  
Department of Environmental Conservation



Air Quality & Climate Division  
Montpelier, Vermont

## **AIR POLLUTION CONTROL PERMIT** **TO CONSTRUCT AND OPERATE**

Date Permit Issued: June 24, 2024

Owner/Operator: Vermont Renewable Gas, LLC  
145 Pine Haven Shores Rd  
Suite 1000A  
Shelburne, VT 05482

Source: Biomass Pyrolysis Producing Syngas And Biochar  
Syngas Fired Electric Generating Facility  
St. Johnsbury – Lyndon Industrial Park  
Lyndon, VT 05851

## **FINDINGS OF FACT**

### (A) FACILITY DESCRIPTION

Vermont Renewable Gas, LLC (also referred to herein as "Permittee") proposes to construct and operate a 2.2 MWe (net) Syngas Fired Electric Generating Facility on 7.8 acres in the St. Johnsbury/Lyndon Industrial Park in the town of Lyndon, Vermont (also referred to herein as "Facility"). The proposed Facility will produce synthetic fuel gas (syngas) from clean wood biomass using a fast High Temperature Ablative Pyrolysis (HTAP) process.

Wood biomass received at the Facility will be passed through a twin-shaft shredder to pre-size it to pieces of 30 mm or less. The biomass then passes through the Hammer Mill / Dryer Grinder (HMDG) which simultaneously dries it, using heated air, and reduces it to particles of the proper size for HTAP reactor ( $\leq 2.5$  mm). The drying air and moisture will be vented through cyclone separators, integral to the HMDG, and a CETY baghouse filter to remove entrained particulate. Particulate collected in the filters will be returned to the biomass feed. The sized biomass will be transported to two closed storage bins.

Dried biomass is transported to the HTAP reactor system via screw conveyors where it is converted into char (biochar) and syngas using dual stage fast pyrolysis technology in two connected reactor vessels. In the first vessel, high temperature pyrolysis extracts volatiles and produces syngas and biochar. The biochar falls to the bottom of the reactor vessel where it is removed via a high temperature rotary valve and a water-glycol cooled screw conveyor to the second vessel. In the second vessel thermos-catalytic cracking of volatiles occurs using biochar from the first vessel as the catalytic promoter material to decompose tar and other heavy organic compounds and produce additional syngas. Biochar collected from the cyclone filter and cracking chamber will be cooled and conveyed to the biochar storage bin before being transported offsite and sold for use as a soil amendment or other uses. The Permittee has indicated that there will be no emissions to the ambient air from the biochar process.

The synthetic fuel gas (syngas) will be used as fuel in three (3) Guascor Model G-56SL, reciprocating internal combustion engines (RICE) generator sets (gensets), each with a nominal electric output of 850 kWe and engine mechanical power output of 882 kW (1183 hp). Each genset engine will exhaust through a Miratech SCR/Oxidation Catalyst system, to reduce NO<sub>x</sub>, CO and NMNEHC emissions. The Facility is limited to 2,200 KWe of electric output to the grid in the aggregate.

Emissions from the Facility evaluated in this Permit will be associated with processing and handling of the wood biomass feedstock, the exhaust from the Guascor engines, and a Progeco Model HE1500 biogas combustion flare intended to be used infrequently during startup and shutdown to burn off excess syngas. The Facility will also include an IVAR Industry Model ASA800 oil-fired boiler to produce heat to dry the biomass during system startup and a Cummins C450 D6 emergency diesel engine powered electrical generator to provide electrical power in the event that utility power is unavailable.

Upon issuance of this Permit, the approved regulated operations at the Facility include the following air pollution related operations, equipment, and emission control devices:

# Exhibit VRG-MH-2

Vermont Renewable Gas, LLC

#AOP-23-048

<b>Equipment Specifications</b>			
Equipment/Make/Model	Rating <sup>1</sup>	Fuel Type <sup>2</sup>	Date Of Manufacture (Installation)
Three (3) Guascor Model G-56SL 16-cylinder SI RICE Gensets Controlled by Miratech SCR/Oxidation Catalyst Systems	1183 bhp (850 kWe) each	Syngas	Proposed 2024
Three (3) Miratech SCR/Oxidation Catalyst Systems	Control efficiencies: 97% NOx and CO 91% VOC (NMNEHC) 90% HAP	N/A	Proposed 2024
CETY Hammer Mill / Dryer Grinder (HMDG) Controlled by CETY KFE Baghouse	Biomass load as received: 3,000 kg/hr	Electricity	Proposed 2024
CETY KFE Baghouse Filter	Control efficiency: 99% PM	N/A	Proposed 2024
HTAP reactor – closed loop (no emissions)	N/A	N/A	Proposed 2024
Progeco Model HE1500 biogas combustion Emergency flare	1600 m <sup>3</sup> /hr max firing rate;	Syngas	Proposed 2024
IVAR Industry Model ASA800 Oil-fired Startup Boiler	3.6 MMBtu/hr, lhw;	ULSD	Proposed 2024
Emergency Cummins C450 D6 Genset Powered with a QSX15-G9 Diesel Engine	755 bhp (450 kWe)	ULSD	Proposed 2024

<sup>1</sup> bhp – brake horsepower, kWe – generator kilowatt electrical output; kg/hr – kilograms per hour; m<sup>3</sup>/h – cubic meters per hour; MMBtu/hr – Million British Thermal Units per hour maximum rated heat input.

<sup>2</sup> Syngas – combustible gas derived from the pyrolysis of hydrocarbon matter, ULSD – diesel fuel with a sulfur content of less than 0.0015 percent of sulfur by weight.

<b>Pollution Control Equipment Specifications</b>	
Equipment	Specifications
Generators – Three (3) Selective Catalytic Reduction / Oxidation Catalyst Systems	Manufacturer: Miratech Housing Model Number: SP-IQ2-28-TBD Element Model Number: SCRC-084-150-300 Calculated NOx Reduction: 97% Calculated CO Reduction: 96.6% Calculated NMNEHC Reduction: 91.4% Reactant: Urea (32.5%) Design Exhaust Flow Rate: 4,990 kg/hr Design Exhaust Temperature: 435 °C Est. Reactant Consumption: 1.1 gal/hr per engine
HMDG – Cyclone and Baghouse Filter	Manufacturer: CETY Type of Unit: Cyclone followed by Fabric Filter Total filtration surface area: 2,928 ft <sup>2</sup> Maximum inlet air flow rate: 15,303 cfm Air to Cloth Ratio: 5.2 Pressure drop: 8 in. H <sub>2</sub> O Inlet and outlet temperature; 200-210 °F Cleaning Method: automatic pulse jet filter regeneration system Estimated Collection Efficiency: 99.9%

# Exhibit VRG-MH-2

Vermont Renewable Gas, LLC

#AOP-23-048

## (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], (6)(a) [Fossil fuel-burning equipment] and (6)(c) [Stationary reciprocating internal combustion engines having a rating of 300 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 Quality & Climate Division (hereinafter "Agency") as one stationary air contaminant source for purposes of review under the *Regulations*.

## (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.

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 otherwise subject to Title 40 *Code of Federal Regulations* ("40 CFR") Part 70.

Allowable emissions from the Facility are estimated to be greater than the ten (10) tpy combined threshold for applicability with Subchapter X of the *Regulations*, but each pollutant is less than the one-hundred (100) tpy single pollutant threshold (50 tpy for VOC) for applicability to 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 "Subchapter X Major Source" and must obtain a Permit to Operate consistent with the requirements of Subchapter X of the *Regulations*.

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:

# Exhibit VRG-MH-2

Vermont Renewable Gas, LLC

#AOP-23-048

Allowable Air Contaminant Emissions (tons/year) <sup>1</sup>					
PM / PM10 / PM2.5	SO2	NOx	CO	VOC	HAPs
6.2	0.4	2.4	4.5	< 25	< 3

<sup>1</sup> PM/PM<sub>10</sub>/PM<sub>2.5</sub> – total particulate matter, total particulate matter of 10 micrometers in size or smaller and total particulate matter of 2.5 micrometers in size or smaller, respectively. Unless otherwise specified, all PM is assumed to be PM<sub>2.5</sub>; SO<sub>2</sub> - sulfur dioxide; NO<sub>x</sub> - oxides of nitrogen measured as NO<sub>2</sub> equivalent; CO - carbon monoxide; VOCs - volatile organic compounds; HAPs - hazardous air pollutants as defined in §112 of the federal Clean Air Act.

## (E) REVIEW OF CRITERIA POLLUTANT EMISSIONS 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 not result in a major increase in emissions. Consequently, the proposed project is designated as a non-major stationary source subject to §5-501 of the *Regulations* and is not subject to the major source permitting 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 criteria pollutants 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 non-major stationary source and therefore is not subject to review under the MSER requirements in §5-502 of the *Regulations*.

### (c) Ambient Air Quality Impact Evaluation

An ambient air quality impact evaluation for criteria pollutants is performed to demonstrate whether or not a proposed project will cause or contribute to violations of the national ambient air quality standards and/or significantly deteriorate existing air quality for the regulated criteria pollutants.

Based on the level of emissions from this Facility, it is not anticipated to cause or contribute to a violation of any national ambient air quality standard or significantly deteriorate air quality. Therefore, an air quality impact evaluation was not required by the Agency for the proposed project.

# Exhibit VRG-MH-2

Vermont Renewable Gas, LLC

#AOP-23-048

## (F) REVIEW OF CRITERIA POLLUTANT EMISSIONS 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:

<b>Applicable Requirements from the Vermont Air Pollution Control Regulations</b>
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(1) - Prohibition of Particulate Matter; Industrial Process Emissions.
Section 5-231(3) - Prohibition of Particulate Matter; Combustion Contaminants.
Section 5-231(4) - Prohibition of Particulate Matter; Fugitive Particulate Matter.
Section 5-241 – Prohibition of Nuisance and Odor.
Section 5-261(2) – Control of Hazardous Air Contaminants - Hazardous Most Stringent Emission Rate.
Section 5-271 – Control of Air Contaminants from Stationary Reciprocating Internal Combustion Engines.  <i>Applies to the Cummins QSX15-G9 engine powering the emergency electrical generator Model C450 D6 which will be certified to EPA Tier 2 standards. This does not apply to the three (3) Guascor Model G-56L engines rated at 1183 bhp each because they will be burning syngas and not fossil fuel.</i>
Section 5-402 – Written Reports When Requested.
Section 5-403 – Circumvention.
Section 5-404 – Methods for Sampling and Testing of Sources.
Section 5-405 – Required Air Monitoring.
Section 5-407 – Prevention of Air Contaminant Emissions.
Section 5-408 – Change in Ownership or Operational Control.
Section 5-409 – False or Misleading Information.
Subchapter VIII – Registration of Air Contaminant Sources.
Subchapter X – Operating Permits.

# Exhibit VRG-MH-2

Vermont Renewable Gas, LLC

#AOP-23-048

(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"). Based on the Facility's existing levels of emissions and emission controls, the Agency has not imposed any further 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:

<b>Applicable Requirements from Federal Regulations and the Clean Air Act</b>
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40 <i>CFR</i> Part 60, Subpart Dc - Standards of Performance for Small Industrial-Commercial- Institutional Steam Generating Units. Applies to all boilers with a heat input rating of 10 MMBTU/hr or greater manufactured or modified after June 9, 1989. Units larger than 30 MMBTU per hour installed after February 27, 2005 are subject to additional particulate matter requirements.
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<i>The IVAR Industry Superheated Water Startup Boiler is rated at less than the 10 MMBtu/hr threshold and therefore is not subject to this regulation</i>
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# Exhibit VRG-MH-2

Vermont Renewable Gas, LLC

#AOP-23-048

## Applicable Requirements from Federal Regulations and the Clean Air Act

40 CFR Part 63, Subpart JJJJJJ - National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial and Institutional Boilers. Applies to new and existing fuel oil and solid fuel fired boilers located at area sources (major sources are subject to Subpart DDDDD). Natural gas or propane fired boilers are not subject. The natural gas and propane exemption allows use of backup fuel during periods of gas curtailment, gas supply emergencies, and for periodic testing not to exceed 48 hours combined during any calendar year. Oil fired hot water boilers less than 1.6 MMBTU/hr are not subject. The rule requires a tune-up for each boiler once every two years, except boilers with oxygen trim and oil boilers less than 5 MMBTU/hr may conduct tune-ups every five years. Existing facilities with any single boiler greater than 10 MMBTU/hr were required to conduct a site wide energy assessment audit to identify potential heat use efficiencies. New boilers greater than 10 MMBTU/hr are subject to PM emission limits. Boilers that commenced construction on or before June 4, 2010 are considered an existing source. New or reconstructed boilers that commenced construction or reconstruction on or before September 14, 2016, when demonstrating initial compliance with the PM emission limit must conduct a performance stack test in accordance with §63.11212 and Table 4 of this Subpart. These units must retest every three years if greater than 50% of the applicable PM standard, or every five years if less than 50% of the standard. An initial performance test must be conducted by September 14, 2021. New or reconstructed oil-fired boilers that commenced construction on or before September 14, 2016 that combust only oil that contains no more than 0.50 weight percent sulfur are not subject to the PM emission limit in Table 1 of this Subpart until September 14, 2019, provided that the Facility monitors and records on a monthly basis the type of fuel combusted. Boilers that combust only oil that contains no more than 0.0015 weight percent sulfur are not subject to the PM emission limit in Table 1.

*Since Vermont has not taken delegation of this federal regulation, the U.S. EPA is the implementing authority and is responsible for determining applicability of this regulation.*

*Subpart JJJJJJ is anticipated to apply to the IVAR Industry Superheated Water Boiler at the Facility as it is a boiler used to heat water with a water side capacity of > 120 gallons and a heat input capacity of > 1.6 MMBTU/hr, located at an area source of HAPs.*

*Since the Facility is not a major source of HAPs, the Facility is not subject to Subpart DDDDD.*

40 CFR Part 60, Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (CI ICE). Applies to stationary CI RICE model year 2007 and later as well as those ordered after July 11, 2005 and with an engine manufacture date after April 1, 2006. Also applies to stationary CI RICE that are modified or reconstructed after July 11, 2005. This regulation requires engine manufacturers to certify that subject engines, with limited exceptions, comply with applicable Tier rating emission standards as established for non-road engines under 40 CFR Part 89 and/or 1039. Also requires engine operators to maintain and operate the engine according to the manufacturer's written recommendations for the life of the engine and also limits fuel usage to diesel fuel with a maximum sulfur content of 15 ppm (ULSD).

*Since Vermont has not taken delegation of this federal regulation, the U.S. EPA is the implementing authority and is responsible for determining applicability.*

*The Cummins Model QSX15-G9 engine powering the emergency electrical generator is anticipated to be subject to this regulation.*

# Exhibit VRG-MH-2

Vermont Renewable Gas, LLC

#AOP-23-048

## Applicable Requirements from Federal Regulations and the Clean Air Act

40 CFR Part 60, Subpart JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines. Applies to new spark ignition engines installed after June 12, 2006. Engines greater than 100 bhp firing landfill or digester gas must meet emission limits for NO<sub>x</sub>, CO and VOC and, for units 500 bhp and less, shall have a on-time compliance test and, for units greater than 500 bhp, shall have a compliance test at least once every 8.760 hours of operation or every 3 years, whichever occurs first.

*Since Vermont has not taken delegation of this federal regulation, the U.S. EPA is the implementing authority and is responsible for determining applicability of this regulation.*

*Subpart JJJJ is anticipated to apply to the three (3) Guascor Model G-56L spark ignition syngas-fueled engines rated at 1183 bhp each, however, pursuant to the fuels listed in 40 CFR 60.4233 (a-h) and the accompanying Table 1, the emission standards will not apply while burning syngas because Table 1 does not include syngas as a fuel.*

40 CFR Part 63, Subpart ZZZZ - National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines. Applies to new engines that commenced construction (installed) on or after June 12, 2006 at area sources of HAPs. Requires such engines to comply with NSPS Subpart IIII or JJJJ, as applicable. Also applies to existing engines that commenced construction (installed) prior to June 12, 2006 at area sources of HAPs. By May 3, 2013 requires non-emergency engines equal and greater than 300 bhp to meet CO emission standards, which may necessitate catalytic controls, and must install closed crankcase ventilation system or equivalent. Non-emergency engines <300 bhp must meet maintenance requirements including changing oil & filter and inspecting, and replacing if necessary, air filter, hoses and belts. Emergency units are subject to maintenance requirements and must install an elapsed hour meter and report electronically to EPA. Does not apply to existing emergency units at an area source residential/commercial/institutional facility unless they are enrolled in peak shaving or demand response (DR) programs. Emergency engines are unrestricted for actual emergency operation but restricted to 100 hours per year of testing and maintenance, of which 50 hours may be local DR (no qualifying programs currently known to exist) and 50 hours may be for non-compensated non-emergency operation. Most utility programs do not qualify as allowed emergency engine operation. 4Z ULSD requirements vary, however state regulations mandate ULSD across the board. For engines firing landfill or digester gas comprising 10% or more of the heat input, the engines are subject to management practices only (change oil & filter, inspect plugs, and inspect hoses and belts every 1440 hours or annually, whichever occurs first) as well as operating in accordance with manufacturer's recommendations and minimizing time at idle.

*Subpart ZZZZ applies to the three (3) Guascor Model G-56L SI engines and the Cummins Model QSX15-G9 engine powering the emergency electrical generator.*

*For engines subject to 40 CFR 60, Subparts IIII or JJJJ, 40 CFR 63, Subpart ZZZZ [40 CFR 63.6590(c)] only requires that the engines meet the applicable requirements from those NSPS Subparts. No other requirements under Subpart ZZZZ apply to these engines.*

**Applicable Requirements from  
Federal Regulations and the Clean Air Act**

40 CFR Part 60, Subpart CCCC—Standards of Performance for Commercial and Industrial Solid Waste Incineration Units for Which Construction Is Commenced After November 30, 1999 or for Which Modification or Reconstruction Is Commenced on or After June 1, 2001 (and Subpart DDDD for existing units). Applies to each commercial and industrial solid waste incineration (CISWI) unit. This rule does not apply to certain pathological waste incinerators that burn 90% or more by weight pathological waste (must notify Administrator and keep records), municipal waste combustion units, medical waste incineration units, small power production facilities, cogeneration facilities, hazardous waste combustion units, materials recovery units, air curtain incinerators, and sewage sludge incinerators. Burn off ovens including rack reclamation units, cyclonic burn barrels and soil treatment units are also not considered incinerators subject to this rule. Cellulosic biomass (virgin wood) and specification used oil are considered traditional fuels and not considered solid waste. Per 241.4 scrap tires, resinated wood, coal refuse and pulp and paper sludge are categorically exempt as solid wastes. Per 241.3 other fuels meeting the following legitimacy requirements of 241.3(d) are also exempt, by self-determination in some instances or by petition to EPA in others : (1) must be managed as a valuable commodity, (2) must have a meaningful heating value and be used as a fuel in a combustion unit that recovers energy, (3) must contain contaminants or groups of contaminants at levels comparable in concentration to or lower than those in traditional fuel(s) which the combustion unit is designed to burn.

*The HTAP process does not “combust” wood biomass but converts it into a gaseous fuel (syngas) by thermal decomposition in the absence of oxygen. In addition, the Facility will use clean cellulosic biomass which has not been discarded and is not, therefore, solid waste. Consequently, the Facility will not be subject to 40 CFR 60, Subpart CCCC.*

*In addition, the Facility will qualify as a small power production facility under Section 3(17)(C) of the Federal Power Act and would therefore be exempted from the requirements of 40 CFR 60, Subpart CCCC provided that the facility uses homogeneous waste and complies with the recordkeeping and notification requirements in 40 CFR 60.2020(d).*

(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 applicant has not requested such a permit shield in accordance with the requirements of §5-1015(a)(14) of the *Regulations*.

(G) CONTROL OF HAZARDOUS AIR CONTAMINANTS

Pursuant to §5-261 of the *Regulations*, any stationary source subject to the rule<sup>1</sup> with current or proposed actual emissions of a hazardous air contaminant (HAC) equal to or greater than the respective Action Level (found in Appendix C of the *Regulations*) shall be subject to the Regulation and shall achieve the Hazardous Most Stringent Emission Rate (HMSER) for the respective HAC. HMSER is defined as a rate of emissions which the Secretary, on a case-by-case basis, determines is achievable for a stationary source based on the lowest emission rate achieved in practice by such a category of source and

<sup>1</sup> APCR §5-261(1)(c)(ii) provides that solid fuel burning equipment (not including incinerators) installed or constructed prior to January 1, 1993, and all fuel burning equipment which combust virgin liquid or gaseous fuel shall not be subject to the requirements of §5-261.

# Exhibit VRG-MH-2

Vermont Renewable Gas, LLC

#AOP-23-048

considering economic impact and cost. HMSER may be achieved through application of pollution control equipment, production processes or techniques, equipment design, work practices, chemical substitution, or innovative pollution control techniques.

The Agency has determined that the Facility has or proposes to have emissions of 1,3-butadiene (106-99-0), acetaldehyde (75-07-0) and formaldehyde (50-00-0) in excess of their respective Action Levels. Therefore, the Facility must achieve HMSER, as determined by the Secretary, pursuant to §5-261(2) of the *Regulations*.

The Agency has determined HMSER to be the installation and operation of three (3) Selective Catalytic Reduction (SCR) systems capable of achieving 90% or greater reduction in non-methane, non-ethane hydrocarbons (NMNEHC). 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, unless the source is modified or reconstructed during the five year period. The HMSER determination for this Facility is presented below.

Hazardous Most Stringent Emission Rate Determinations		
Permit #	Pollutant	Description of HMSER
Initial determination: #AOP-23-048	1,3-Butadiene (106-99-0) Acetaldehyde (75-07-0) Formaldehyde (50-00-0)	Installation and operation of Selective Catalytic Reduction (SCR) Systems on each Guascor engine capable of achieving 90% or greater reduction in non-methane, non-ethane hydrocarbons (NMNEHC).

As the Agency has determined that the Facility, following imposition of HMSER as noted above, may continue to have estimated emissions of 1,3-butadiene (106-99-0), acetaldehyde (75-07-0) and formaldehyde (50-00-0) in excess of their respective Action Level, the Agency has considered whether or not an Air Quality Impact Evaluation should be required pursuant to §5-261(3) of the *Regulations*. The Agency has reviewed several factors relating to this Facility, including, but not limited to those listed in §5-261(3)(a)-(c) of the *Regulations* and the level of emissions and emission reduction measures typical for this category of emission source. Based on this review, the Agency is not requiring the Facility to conduct an air quality impact evaluation pursuant to §5-261(3) of the *Regulations* at this time.

# Exhibit VRG-MH-2

Vermont Renewable Gas, LLC

#AOP-23-048

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 issues a Permit approving the Facility, as described in the above Findings of Fact, subject to the following:

## **PERMIT CONDITIONS**

### **- Construction and Equipment Specifications -**

- (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). [10 V.S.A. §§556(c) and 556a(d)] [§5-409 and 5-501(1) of the *Regulations*] [Application for #AOP-23-048]
- (2) Emission Controls – Guascor Engines: The Permittee shall control emissions from the three (3) Guascor Model G-56L engines by installing and operating three (3) Miratech Selective Catalytic Reduction/Oxidation Catalyst systems, or a similar device capable of achieving equivalent emission reductions if approved in writing by the Agency. Each catalyst system shall be designed to reduce NO<sub>x</sub> and CO emissions by 95% or greater, and reduce VOC emissions by 90% or greater. All elements of this air pollution control system(s) shall be maintained in good working order at all times and operated in accordance with the manufacturer's operation and maintenance recommendations. The air pollution control system shall be in operation whenever the respective emission source is in operation. [10 V.S.A. §§556(c) and 556a(d)] [§§5-409, 5-261(2) and 5-501(1) of the *Regulations*] [Application for #AOP-23-048]
- (3) High Temperature Ablative Pyrolysis (HTAP) Reactor: The Permittee shall not vent any emissions from the HTAP Reactor to the outside air without the prior written approval of the Agency. Any subsequent pneumatic conveying of collected material shall be done in a manner that does not result in any particulate matter emissions to the outside air such as by the use of a closed loop conveying system that returns the conveying air back to the blower instead of discharging it. [10 V.S.A. §§556(c) and 556a(d)] [Application for #AOP-23-048]
- (4) Emission Controls – Hammer Mill / Dryer Grinder (HMDG): Particulate emissions from the HMDG shall be controlled with a cyclone collector in series with a CETY KFE fabric filter having a minimum total cloth area of 2,928 square feet and an air to cloth ratio<sup>1</sup> that shall not exceed 5.2, or an equivalent device capable of achieving similar emission reductions if approved in writing by the Agency. The fabric filter dust collector shall be equipped with a pressure differential gauge to continuously measure and display the pressure drop across the control device (e.g., manometer or magnehelic). The Permittee shall use the pressure drop measurement device to maintain the pressure drop across each fabric filter within acceptable ranges as specified by the manufacturer. All elements of these air pollution control systems shall be maintained in good working order at all times and shall be operated in accordance with the manufacturer's operation and maintenance recommendations and in a manner consistent with good air pollution control practices for minimizing emissions. Each air pollution control system shall be in operation whenever the respective emission source is in operation. [10 V.S.A. §§556(c) and 556a(d)] [§§5-231(4) and (5), 5-501 and 5-1015(a)(1), (3) and (4) of the *Regulations*] [Application for #AOP-23-048]

# Exhibit VRG-MH-2

<sup>1</sup> The air to cloth ratio is based on the air flow in actual cubic feet per minute (acfm) and the total cloth area of the fabric filter in square feet (sq.ft.). The stated acfm rating for the CETY Baghouse unit is 15,303 acfm.

- (5) **Flare:** The Permittee shall design the Facility in such a manner that any syngas is routed to a flare that is designed and operated in accordance with the requirements of 40 *CFR* Part 60, Subpart A, §60.18. Note that the gas flow rate is used to properly size a flare therefore the flare or flare tip may need to be resized over time to accommodate changes in gas generation from the HTAP. The flare shall also be equipped with a properly sized windscreen to prevent blowout of the flame. All elements of the flare system shall be maintained in good working order at all times and operated and maintained in accordance with the manufacturer's operation and maintenance recommendations. The flare or flares shall be in proper operation whenever gas is routed to them. [10 V.S.A. §§556(c) and 556a(d)]
  
- (6) **Flare:** The flare shall be equipped with an automatic gas ignition system, such as but not limited to solar powered spark systems or a continuous pilot light, to ensure immediate and continuous combustion of any gas that is routed to them. The flare ignition system shall be maintained in good working order at all times and operated and maintained in accordance with the manufacturer's operation and maintenance recommendations. [10 V.S.A. §§556(c) and 556a(d)]
  
- (7) **Stack heights:** The exhaust gases from the following emission sources shall be vented vertically through stacks of the configuration noted below. Where stack heights are noted in Findings of Fact (A) such stacks shall be configured accordingly. The stacks shall not be equipped with any device that may obstruct the upward discharge of the exhaust gases such as a fixed rain cap of a type that has not been approved by the Agency.

<b>Stack Height and Configuration</b>			
Emission source	Maximum stack diameter (inches) <sup>1</sup>	Minimum stack height Above stack grade (ft)	Stack Height Above Roof (ft)
Three (3) Guascor Model G-56SL 16-cylinder SI RICE Gensets	13.8	46.3	11.2
CETY HMDG / CETY KFE Baghouse Filter	19.1	46.9	11.8
Progeco Model HE1500 biogas Emergency combustion flare	94.5	29.5	N/A
IVAR Industry Model ASA800 oil-fired startup boiler	12	46.3	11.2
Cummins C450 D6 Emergency Genset Powered with a QSX15-G9 Diesel Engine			

<sup>1</sup> Stack diameter refers to internal diameter. Where stack diameter is not specified, it shall be based on the most recent respective permit application.

For all other non-fugitive emission points at the Facility, the Agency recommends that they each be exhausted vertically through a stack(s) which extend a minimum of four (4) feet above the roof where the stack penetrates the roof and that they not be equipped with any device that may obstruct the upward discharge of the exhaust gases such as a fixed rain cap of a type that has not been approved by the Agency. The Agency may require the

# Exhibit VRG-MH-2

Vermont Renewable Gas, LLC

#AOP-23-048

Permittee to increase the stack height, remove a rain cap, or conduct a dispersion analysis to verify compliance with ambient air quality standards for any stack at the Facility if, in the judgment of the Agency, adequate dispersion cannot be maintained at the current stack configuration. Adequacy may in part be based on the actual emission rate of air contaminants, the characteristics of the current stack configuration, or inspections of the Facility that indicate poor dispersion or that confirm significant visible emissions or nuisance or odor beyond the property line. [10 V.S.A. §§556(c) and 556a(d)] [§5-406 of the *Regulations*] [Application for #AOP-23-048]

## - Operational Limitations -

- (8) Hammer Mill / Dryer Grinder (HMDG) – Throughput Limit: The annual quantity of wood material processed through the HMDG shall not exceed 28,968 tons, including moisture, per calendar year. [10 V.S.A. §§556(c) and 556a(d)] [Application for #AOP-23-048]
- (9) High Temperature Ablative Pyrolysis (HTAP) – Biomass Feedstock Restriction: The Permittee shall utilize as biomass feedstock only *natural wood* as defined in the *Regulations*. Furthermore, the Permittee shall notify the Agency of all proposed sources of biomass feedstock other than whole tree wood chips or wood products manufacturing residuals, and of the nature of said biomass feedstock, prior to the securing of any purchase/utilization agreements for said biomass feedstock. Whole tree wood chips means chips made from virgin wood and include stumps, branches, bark, and sawdust incidental to chipping operations. Wood products manufacturing residuals means chips made from lumber that is not chemically treated with any preservative, paint, or oil and includes bark, sawdust, and shavings incidental to wood products manufacturing. [10 V.S.A. §§556(c) and 556a(d)] [§§5-101, 5-231(4) of the *Regulations*] [Application for #AOP-23-048]
- (10) Syngas Sulfur Concentration: Maximum sulfur concentration of syngas produced by the Facility shall not exceed the following limits:
  - (a) Syngas entering the Guascor engines shall not exceed 20 parts per million by weight (ppmw) on an hourly basis; and
  - (b) Sulfur concentrations shall be measured in accordance with the O&M Plan required by Condition (37) of this Permit. [10 V.S.A. §§556(c) and 556a(d)] [§5-261(2) of the *Regulations*] [Application for #AOP-23-048]
- (11) Flare – Annual Operation Limit: The total hours of operation of the flare shall not exceed 100 hours per calendar year. [10 V.S.A. §§556(c) and 556a(d)] [Application for #AOP-23-048]
- (12) Flare – Presence of Flame: The flare shall be operated with a flame present at all times that product syngas is routed through the flare. In addition, the flare shall be equipped with a windscreen to prevent flame out if necessary. [10 V.S.A. §§556(c) and 556a(d)] [40 CFR Part 60 Subpart A §60.18(c)(2)]
- (13) Flare – Heat Sensing Device: The flare shall be equipped with a heat sensing device, or the equivalent as approved by the Agency, such as an ultraviolet beam sensor or thermocouple, at the pilot light or the flame itself to indicate the continuous presence of a flame when syngas is being delivered to the respective flare. The device shall be installed, calibrated, maintained and operated in accordance with the manufacturer's specifications. In the event the heat sensing device detects a flame failure the gas flow to the flare shall be automatically shut down until the flame is reestablished. [10 V.S.A. §§556(c) and 556a(d)] [40 CFR Part 60 Subpart A §60.18(c)(2)]

# Exhibit VRG-MH-2

Vermont Renewable Gas, LLC

#AOP-23-048

- (14) Startup Boiler – Annual Operation Limit: The total hours of operation of the IVAR Industry Model ASA800 startup boiler shall not exceed 100 hours per calendar year. [10 V.S.A. §§556(c) and 556a(d)] [Application for #AOP-23-048]
- (15) Startup Boiler – Fuel Restriction: Only No.2 fuel oils, or lighter grade fuel oils, with a maximum sulfur content not to exceed 0.0015 percent by weight may be used as fuel in the IVAR Industry Model ASA800 startup boiler unless the Permittee obtains prior written approval from the Agency to use another type of fuel. [10 V.S.A. §§556(c) and 556a(d)] [§§5-501 and 5-1015(a)(1) of the *Regulations*] [§5-221(1)(a) of the *Regulations*] [Application for #AOP-23-048]
- (16) Guascor Model G-56L Internal Combustion Engines – Fuel Type Limitation: The three (3) Guascor Model G-56L engines at the Facility subject to 40 *CFR* Part 60 Subpart JJJJ and 40 *CFR* Part 63 Subpart ZZZZ may only be fired using syngas produced at the Facility, with a sulfur content not to exceed 0.002 percent by weight, unless the Permittee obtains prior written approval from the Agency to use another type of fuel. [10 V.S.A. §§556(c) and 556a(d)] [Application for #AOP-23-048]
- (17) Stationary Diesel Engines Fuel Specifications: Only fuel oils meeting the requirements of ultra-low sulfur diesel or distillate (ULSD) with a maximum sulfur content of 0.0015 percent by weight (15 ppm) may be used in all stationary and non-road (portable) diesel engines operated at the Facility, including emergency and non-emergency electric generators. [10 V.S.A. §§556(c) and 556a(d)] [§§5-221(1)(a), 5-501 and 5-1015(a)(1) of the *Regulations*] [Application for #AOP-23-048]
- (18) Stationary Engines: The Permittee shall not install or operate a stationary reciprocating internal combustion engine, as defined in the *Regulations*, unless the engine complies with §5-271 of the *Regulations* as may be applicable as well as any federal regulations including 40 *CFR* Part 60 Subpart IIII, 40 *CFR* Part 60 Subpart JJJJ and 40 *CFR* Part 63 Subpart ZZZZ, as may be applicable. All engines, including emergency engines, installed on or after July 1, 2007 must comply with the applicable emission standards (Tier 2) of §5-271 immediately upon installation. Installation of any size engine, even those below 300 bhp, may still require approval from the Agency in the form of an amended permit prior to installation. [10 V.S.A. §§556(c) and 556a(d)] [§§5-271 and 5-501 of the *Regulations*]
- (19) Stationary Engines: The Permittee shall install, operate and maintain each stationary reciprocating internal combustion engine, and any after-treatment control device (if any), in accordance with the manufacturer's written instructions and in a manner consistent with good air pollution control practices for minimizing emissions. [10 V.S.A. §§556(c) and 556a(d)] [§§5-407, 5-501 and 5-1015(a)(1) of the *Regulations*]
- (20) Stationary Emergency Engines: Stationary emergency engines, including those specified as such in Finding of Fact (A), shall be used only for emergency purposes and up to 100 hours per year for routine testing and maintenance, of which 50 hours may be for non-compensated non-emergency operation. Emergency purposes include periods of time when:
- (a) The usual source of power, heat or lighting is temporarily unavailable due to reasons beyond the reasonable control of the owner/operator;
  - (b) A fire or flood makes it necessary to pump water to minimize property damage.

In the event the Permittee must take action to restore the normal power source, the Permittee must take such action in a reasonable period of time. Emergency engines shall not be operated as part of any other ISO or utility peaking or load shedding activities

# Exhibit VRG-MH-2

without the approval of the Agency. The definition of emergency use for applicability to federal regulations NSPS Subpart IIII and NESHAP Subpart ZZZZ may be different and the Permittee should consult those regulations directly for applicability to those respective regulations. [10 V.S.A. §§556(c) and 556a(d)] [§§5-401(6)(c) and 5-501 of the *Regulations*]

- (21) Open Burning: Open burning is prohibited except as provided for in §5-202 of the *Regulations*. Prior to conducting open burning of any material, other than leaves, brush, or tree cuttings from normal grounds maintenance, the Permittee shall contact the Air Pollution Control Officer and obtain approval for such burning, if required. [10 V.S.A. §§556(c) and 556a(d)] [§5-202 of the *Regulations*]

### - Emission Limitations -

- (22) Guascor Model G-56SL Engine Emission Limitations: Emissions of air contaminants from the three (3) proposed Guascor Model G-56SL engines shall not exceed the following limits:

Guascor Model G-56SL Engine Emission Limitations				
Equipment	PM	NOx	CO	VOC
	gr/bhp-hr <sup>1</sup>	gr/bhp-hr <sup>1</sup>	gr/bhp-hr <sup>1</sup>	gr/bhp-hr <sup>1</sup>
Guascor Model G-56SL rated at 1183 bhp (each) w/ Miratech SCR Oxidation Catalyst System	0.013	0.047	0.12	0.071
Test Method(s)	Methods 5 & 202	Method 7E	Method 10 & 3A	Method 25A

<sup>1</sup> gr/bhp-hr equal grams of pollutant emitted per brake horsepower-hr of engine operation.

Any emission testing conducted to demonstrate compliance with the above emission limits shall be performed in accordance with the methods noted above and found in 40 *CFR* Part 60, Appendix A and Part 51, Appendix M, or equivalent methods approved in writing by the Agency. [10 V.S.A. §§556(c) and 556a(d)] [Application for #AOP-23-048]

- (23) Particulate Matter [HMDG Baghouse]: Emissions of particulate matter from the HMDG baghouse shall not exceed 0.010 grains per dry standard cubic foot (gr/dscf) of undiluted exhaust gas.

Any emission testing conducted to demonstrate compliance with the above emission limit shall be performed in accordance with 40 *CFR* Part 60, Appendix A, Reference Method 5, and Part 51, Appendix M, Reference Method 202, or an equivalent method approved in writing by the Agency. [10 V.S.A. §§556(c) and 556a(d)] [§§5-231 and 5-404 of the *Regulations*]

- (24) Volatile Organic Compounds [HMDG Baghouse]: Emissions of volatile organic compounds (VOC) from the HMDG baghouse shall not exceed 1.1 pounds per oven-dry ton (ODT) of biomass processed through the HMDG.

# Exhibit VRG-MH-2

Any emission testing conducted to demonstrate compliance with the above emission limit shall be performed in accordance with 40 *CFR* Part 60, Appendix A, Reference Method 25A, or an equivalent method approved in writing by the Agency. [10 V.S.A. §§556(c) and 556a(d)] [§§5-502 of the *Regulations*]

- (25) **Stationary Diesel Engines:** The following stationary diesel engines at the Facility shall at a minimum meet the respective US EPA engine tier emission certification standards of 40 *CFR* Part 89 and/or 1039 as noted below:

<b>Engine Specific US EPA Engine Tier Emission Certifications</b>	
Engine:	EPA Part 89 and/or 1039 Tier Emission Certification
Cummins Model C450 D6 755 bhp powering the 450 kW emergency electrical generator	Tier 2

Any emission testing conducted to demonstrate compliance with the respective emission limits shall be performed in accordance with 40 *CFR* Part 60, Appendix A, Reference Methods 5, 7E, and 10 or equivalent methods approved in writing by the Agency at the rated load and speed of the engine. Alternatively, compliance may be demonstrated by verifying that the engine has met the respective US EPA engine tier emission certification requirements of 40 *CFR* Part 89 and/or 1039. [10 V.S.A. §§556(c) and 556a(d)] [§§5-271(b) and 5-404 of the *Regulations*] [Application for #AOP-23-048]

- (26) **Flare:** Emissions of the following pollutants from the Progeco emergency flare shall not exceed the following limits:

<b>Progeco Emergency Flare Pollutant Emission Limitations</b>				
Equipment	PM	NOx	CO	VOC
	lbs/hr <sup>1</sup>	lbs/hr <sup>1</sup>	lbs/hr <sup>1</sup>	lbs/hr <sup>1</sup>
Emergency Flare	8.08	1.81	7.94	0.031
Test Method(s)	Methods 5 & 202	Method 7E	Method 10 & 3A	Method 25A

<sup>1</sup> lbs/hour equals pounds of pollutant emitted per hour.

Any emission testing conducted to demonstrate compliance with the above emission limit shall be performed in accordance with 40 *CFR* Part 60, Appendix A, Reference Method 5 and 202 for PM, Method 10 and 3A for CO, Method 7E for NOx, and Method 25A for VOC, 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. Open utility flares typically are not subject to stack emission testing due to the inherent limitations in the design of such flares and instead are required to comply with the visible emissions and gas velocity design criteria of 40 *CFR* Part 60.18. [10 V.S.A. §§556(c) and 556a(d)] [§§5-404 and 5-502(3) of the *Regulations*] [Application for #AOP-23-048]

# Exhibit VRG-MH-2

Vermont Renewable Gas, LLC

#AOP-23-048

- (27) Visible Emissions [Flare]: The flare shall be operated with no visible emissions, except for periods not to exceed a total of five (5) minutes during any two (2) consecutive hours, in accordance with 40 *CFR* §60.18(c)(1).

Any emission testing conducted to demonstrate compliance with the above emission limit shall be performed in accordance with 40 *CFR* Part 60, Appendix A, Reference Method 22 or an equivalent method approved in writing by the Agency. [10 V.S.A. §§556(c) and 556a(d)] [§5-502 of the *Regulations*] [40 *CFR* Part 60 Subpart A §60.18] [Application for #AOP-23-048]

- (28) Particulate Matter: Emissions of particulate matter ("PM") from any fossil fuel burning device, except motorized vehicles, with a heat input rating of less than ten (10) million British Thermal Units per hour ("MMBtu/hr") shall not exceed 0.5 pounds per MMBtu.

Any emission testing conducted to demonstrate compliance with the above emission limit shall be performed in accordance with 40 *CFR* Part 60, Appendix A, Reference Method 5 and Part 51, Appendix M, Reference Method 202, or equivalent methods approved in writing by the Agency. [10 V.S.A. §§556(c) and 556a(d)] [§§5-231(3)(a)(i) and 5-404 of the *Regulations*]

- (29) 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 40 *CFR* Part 51, Appendix M, Methods 203B and 203C, respectively, or equivalent methods approved in writing by the Agency. [10 V.S.A. §§556(c) and 556a(d)] [§§5-211(2), 5-211(3) and 5-404 of the *Regulations*]

- (30) Volatile Organic Compounds: Emissions of volatile organic compounds from the Facility shall not equal or exceed twenty-five (25) tons per calendar year. [10 V.S.A. §§556(c) and 556a(d)] [§5-502 of the *Regulations*]

- (31) Hazardous Air Pollutants: Emission of federally regulated hazardous air pollutants (HAPs) from the Facility shall not equal or exceed three (3) tons of total combined HAPs per calendar year. [10 V.S.A. §§556(c) and 556a(d)] [§§5-261 and 5-501 of the *Regulations*] [40 *CFR* Part 63] [Application for #AOP-23-048]

- (32) 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(2) of the *Regulations*. [10 V.S.A. §§556(c) and 556a(d)] [§5-261 of the *Regulations*]

- (33) Fugitive Particulate Matter Emissions: The Permittee shall take reasonable precautions at all times to control and minimize emissions of fugitive particulate matter from the operations at the Facility. Reasonable precautions to be taken shall include the following measures or other equally effective measures for those operations or activities under the Permittee's control or supervision:

- (a) The unpaved traffic and parking areas at the Facility shall be maintained as necessary by the application of water and/or generally accepted chemical treatments, such as calcium chloride unless otherwise restricted, which are applied at a rate and frequency to effectively limit visible dust emissions.

# Exhibit VRG-MH-2

Vermont Renewable Gas, LLC

#AOP-23-048

- (b) The paved traffic and parking areas at the Facility shall be maintained as necessary to prevent buildup of material that may generate fugitive dust emissions. Sweeping shall be performed in a manner to minimize fugitive dust air emissions, and may include lightly wetting the paved surface immediately before sweeping, or preferably by the use of a vacuum, regenerative, or high-efficiency sweeper.
- (c) Taking precautions to prevent fugitive particulate matter (i.e. biomass dust) during the handling and transport of biomass when it is transported onto or about the Facility or removed from the HMDG collected from the pyrolysis vessel. Any drop loading of biomass material from a silo, storage bin or similar unit into a receiving vehicle or trailer for subsequent removal shall be done in an area enclosed on at least three sides in order to prevent wind currents from re-entraining the material. The Agency may require additional dust control measures, such as requiring an enclosed chute or stocking be used to limit the drop distance, based on Agency inspections of the actual operations;
- (d) Taking precautions to prevent fugitive particulate matter (i.e. biochar dust) during the handling and transport of biochar collected from the pyrolysis vessel. Any drop loading of biochar material from a silo, storage bin or similar unit into a receiving vehicle or trailer for subsequent removal shall be done in an area enclosed on at least three sides in order to prevent wind currents from re-entraining the material. The Agency may require additional dust control measures, such as requiring an enclosed chute or stocking be used to limit the drop distance, based on Agency inspections of the actual operations;
- (e) All trucks owned, operated or under the control of the Permittee shall be securely covered when operated on public roadways when loaded with materials that may generate fugitive dust.

[10 V.S.A. §§556(c) and 556a(d)] [§§5-231(4) and 5-407 of the *Regulations*]

- (34) Nuisance and Odor: The Permittee shall not discharge, cause, suffer, allow, or permit from any source whatsoever such quantities of air contaminants, or odors beyond the property line of a premises, 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. [10 V.S.A. §§556(c) and 556a(d)] [§5-241(1) of the *Regulations*]

## - Compliance Testing and Monitoring -

- (35) Stack Testing (Guascor Engines): The Permittee shall perform emission testing on the Guascor Model G-56L engines for PM, CO, NO<sub>x</sub> and VOCs and shall furnish the Agency with a written report of the results within one-hundred eighty (180) days after the initial start-up date. The emission testing shall be performed in order to demonstrate compliance with the emission limitation(s) specified in condition (22) of this Permit. 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". [10 V.S.A. §§556(c) and 556a(d)] [§§5-402, 5-404(1) and 5-405(1) of the *Regulations*]
- (36) Stack Testing (HMDG Baghouse): The Permittee shall perform emission testing on the CETY KFE Baghouse Filter controlling emissions from the HMDG for particulate matter and VOCs, and shall furnish the Agency with a written report of the results within one-hundred eighty (180) days after the initial start-up date. The emission testing shall be

# Exhibit VRG-MH-2

Vermont Renewable Gas, LLC

#AOP-23-048

performed in order to demonstrate compliance with the emission limitation(s) specified in condition(s) (23), and (24) of this Permit. 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". [10 V.S.A. §§556(c) and 556a(d)] [§§5-402, 5-404(1) and 5-405(1) of the *Regulations*]

- (37) Operation and Maintenance Plan: The Permittee shall develop, maintain and implement an operation and maintenance plan (O&M Plan) for the syngas/biochar processing plant within thirty (30) days following commencement of operation of the unit(s). The purpose of said O&M Plan shall be to ensure the proper operation and maintenance of the unit in order to ensure optimum performance and continuous compliance with the respective conditions and emission limits of this Permit. All data required to be collected by the O&M plan shall be maintained on-site for five (5) years. The O&M Plan shall include, but not be limited to:
- (a) Wood Waste Dust Collection System Fabric Filters: A description of routine maintenance and inspection procedures, provisions for maintaining pressure drop in a normal range as specified by the manufacturer, provisions for maintaining records of all maintenance and inspections, findings of those inspections, and any corrective actions which were taken,
  - (b) SCR Oxidation Catalyst Systems: A description of routine maintenance and inspection procedures, provisions for maintaining temperature and pressure differential in a normal range as specified by the manufacturer, provisions for maintaining records of all maintenance and inspections, findings of those inspections, and any corrective actions which were taken,
  - (c) Sulfur Monitoring: Provisions for monitoring of sulfur concentrations of syngas entering the Guascor engines consisting of at least one (1) measurement per calendar quarter of operation. At the Agency's discretion, monitoring frequency may be increased based on results. Concentrations of sulfur may be measured using colorimetric tubes, electronic gas detection meters, or chemical analysis. One syngas sample shall be collected and analyzed annually for sulfur in a fixed-base chemical analytical laboratory to provide confirmation of sulfur concentrations measured using colorimetric tubes, electronic gas detection meters, or other field measurement methods, and
  - (d) Flare: Provisions for maintaining a logbook of operating hours for the flare, including a description of the measures taken to minimize the operating hours of the flare.

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)] [§§5-261(2) and 5-405(1) of the *Regulations*] [40 CFR Part 60 Subpart A §60.18] [application for #AOP-23-048]

## - Record Keeping and Reporting -

- (38) Records of Fuel Use [Stationary Diesel Engines]: The Permittee shall maintain records of the total quantity of syngas consumed in all stationary engines at the Facility, in standard cubic feet, each month. At the beginning of each calendar year, the Permittee shall calculate the total quantity of syngas consumed in all stationary engines, in standard cubic feet, during the previous calendar year. [10 V.S.A. §§556(c) and 556a(d)] [§5-405(1) of the *Regulations*]

# Exhibit VRG-MH-2

Vermont Renewable Gas, LLC

#AOP-23-048

- (39) Records of Syngas Production: The Permittee shall maintain records of the total quantity of syngas produced, in standard cubic feet, each month. [10 V.S.A. §§556(c) and 556a(d)] [§5-405(1) of the *Regulations*]
- (40) Records of Compliance Monitoring: The Permittee shall maintain records of the sulfur monitoring concentrations required by Condition (37)(c) of this Permit. [10 V.S.A. §§556(c) and 556a(d)] [§5-405(1) of the *Regulations*]
- (41) Records of Biomass Processed [Hammermill / Dryer Grinder]: The Permittee shall maintain records of the quantity of wood biomass processed in the hammermill / dryer grinder (HMDG), each month. At the beginning of each calendar year, the Permittee shall calculate the total operating hours of the flare during the previous calendar year. [10 V.S.A. §§556(c) and 556a(d)] [§5-405(1) of the *Regulations*]
- (42) Records of Flare Operation: The Permittee shall maintain records of the total hours of operation of the flare each month. At the beginning of each calendar year, the Permittee shall calculate the total operating hours of the flare during the previous calendar year. [10 V.S.A. §§556(c) and 556a(d)] [§5-405(1) of the *Regulations*]
- (43) Records of Emergency Generator/Engine Usage: The Permittee shall maintain records in a log book, or electronic record system, of all hours of operation of each stationary emergency generator/engine and shall make such records available to the Agency upon request. The records shall include: the dates on which each engine was operated; the number of hours the engine was operated on the respective date, including the starting and ending hours shown on the engine's elapsed hour meter; the purpose of the operation be it emergency, testing or maintenance; and, if the purpose of the operation was for an emergency, the records shall include a brief description of the emergency and its cause. [10 V.S.A. §§556(c) and 556a(d)] [§5-405(1) of the *Regulations*]
- (44) Records: 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.
- [10 V.S.A. §§556(c) and 556a(d)] [§§5-402, 5-405(1) and 5-1015(5) of the *Regulations*]
- (45) Records: 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. [10 V.S.A. §§556(c) and 556a(d)] [§§5-402, 5-405(1) and 5-1015(a)(7) of the *Regulations*]
- (46) Notification: 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. [10 V.S.A. §§556(c) and 556a(d)] [§§5-402 and 5-1015(a)(6) of the *Regulations*]
- (47) Notification: The Permittee shall notify the Agency in writing of the date of initial start-up of the three (3) Guascor Model G-56SL engines within fifteen (15) days after such date. [10 V.S.A. §§556(c) and 556a(d)] [§5-402 of the *Regulations*]

# Exhibit VRG-MH-2

Vermont Renewable Gas, LLC

#AOP-23-048

(48) Notification: 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. This notification requirement includes the proposed installation of any new equipment that is a source of air pollution, including the replacement of an existing permitted air pollution source. 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 except as may otherwise be allowed by the *Regulations*. [10 V.S.A. §§556(c) and 556a(d)] [§5-402 and 5-501 of the *Regulations*]

(49) 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 or if the Facility performs one or more of the air contaminant emitting operations listed in 5-802(2) of the *Regulations*, 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. [10 V.S.A. §§556(c) and 556a(d)] [Subchapter VIII §§5-802, 5-803, 5-807, 5-808 of the *Regulations*]

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

Air Quality & Climate Division  
Department of Environmental Conservation  
Agency of Natural Resources  
Davis 4  
One National Life Drive  
Montpelier, Vermont 05620-3802

[10 V.S.A. §§556(c) and 556a(d)] [§5-402 of the *Regulations*]

(51) All records, notifications and reports that are required to be submitted to the U.S. EPA by this Permit shall be submitted to:

Attn: Air Compliance Clerk  
Director, Enforcement and Compliance Division  
U.S. EPA Region I  
5 Post Office Square  
Suite 100 (04-2)  
Boston, MA 02109-3912

[10 V.S.A. §§556(c) and 556a(d)] [§5-402 of the *Regulations*]

# Exhibit VRG-MH-2

Vermont Renewable Gas, LLC

#AOP-23-048

## - Standard Permit Conditions -

(52) At all times, including periods of startup, shutdown, and malfunction, owners and operators shall, to the extent practicable, maintain and operate any affected facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Agency which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source. [10 V.S.A. §§556(c) and (g) and 556a(d)] [40 CFR Part 60.11(d) and 63.6(e)]

(53) 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*]

(54) 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*]

(55) 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;

# Exhibit VRG-MH-2

Vermont Renewable Gas, LLC

#AOP-23-048

- (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.

[10 V.S.A. §§556(c) and 556a(d)] [§5-1008(e)(4) of the *Regulations*]

- (56) 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 of the *Regulations*]
- (57) 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, 5-404, and 5-1015(a)(10) of the *Regulations*]
- (58) 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)] [§§5-409 and 5-1006(f) of the *Regulations*]
- (59) 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)]
- (60) 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*]
- (61) 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)]
- (62) 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*. [10 V.S.A. §§556(c) and 556a(d)] [§5-403 of the *Regulations*]

# Exhibit VRG-MH-2

Vermont Renewable Gas, LLC

#AOP-23-048

- (63) 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)]
- (64) 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)]
- (65) 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] [§§5-408, 5-501, 5-1004, and 5-1013(a) of the *Regulations*]
- (66) Renewable Energy Projects – Right to Appeal to Public Utilities Commission: If this decision relates to a renewable energy plant for which a certificate of public good is required under 30 V.S.A. §248, any appeal of this decision must be filed with the Vermont Public Utilities Commission pursuant to 10 V.S.A. §8506. This section does not apply to a facility that is subject to 10 V.S.A. §1004 (dams before the Federal Energy Regulatory Commission), 10 V.S.A. §1006 (certification of hydroelectric projects) or 10 V.S.A. Chapter 43 (dams). Any appeal under this section must be filed with the Clerk of the Public Utilities Commission within 30 days of the date of this decision; the appellant must file with the Clerk an original and six copies of its appeal. The appellant shall provide notice of the filing of an appeal in accordance with 10 V.S.A. 8504(c)(2), and shall also serve a copy of the Notice of Appeal on the Vermont Department of Public Service. For further information, see the Rules and General Orders of the Public Utilities Commission, available on line at [www.psb.vermont.gov](http://www.psb.vermont.gov). The address for the Public Utilities Commission is 112 State Street, Montpelier, Vermont, 05620-2701 (Tel. # 802-828-2358). [10 V.S.A. §§556(c), 556a(d) and 8506]
- (67) All Other Projects – Right to Appeal to Environmental Court: 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 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 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](http://www.vermontjudiciary.org). The address for the Environmental Court is 2418 Airport Road, Suite 1, Barre, VT 05641 (Tel. # 802-828-1660). [10 V.S.A. §§556(c) and 556a(d)]

# Exhibit VRG-MH-2

Vermont Renewable Gas, LLC

#AOP-23-048

- (68) This Operating Permit shall expire as indicated on the cover page to this Permit. The Permittee shall submit to the Agency a complete application for renewal of the Operating Permit at least six (6) 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. [10 V.S.A. §§556(c) and 556a(d)] [§§5-1011 and 5-1012(a) of the *Regulations*] [§§5-1005(c) and 5-1012 of the *Regulations*]
- (69) The conditions of this Permit as set forth above supersede all conditions contained in all prior Permits issued by the Agency to the Permittee for this Facility. [10 V.S.A. §§556(c) and 556a(d)]

# Exhibit VRG-MH-2

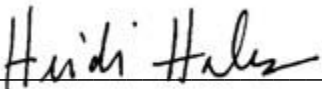
Vermont Renewable Gas, LLC

#AOP-23-048

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.

Permit issued and effective this 24th day of June, 2024.

Permit issuance authorized by:  
Julie S. Moore, Secretary  
Vermont Agency of Natural Resources

By:   
Heidi C. Hales, Director  
Air Quality & Climate Division