



Commonwealth of Massachusetts  
Executive Office of Energy & Environmental Affairs

## Department of Environmental Protection

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Rashi Akki, President  
Rockwood AG-Grid, LLC  
7 Greenbriar Lane  
Kennett Square, PA 19348

**RE: GRANVILLE**  
Transmittal No.: X275354  
Approval No.: WE-17-009  
FMF No.: 584586  
**AIR QUALITY PLAN APPROVAL**

Dear Ms. Akki:

The Massachusetts Department of Environmental Protection (MassDEP), Bureau of Waste Prevention, has reviewed your non-major Comprehensive Plan Application (“Application”) listed above. This Application concerns the approval of an anaerobic gas digestion system, an associated engine, and an enclosed flare (the “Plant”) at Rockwood Farm located at 355 Granby Road in Granville, Massachusetts (the “Facility”). The Application bears the seal and signature of Michael T. Lannan, Massachusetts Registered Professional Engineer number 45607.

This Application was submitted in accordance with 310 CMR 7.02 Plan Approval and Emission Limitations as contained in 310 CMR 7.00 “Air Pollution Control,” regulations adopted by MassDEP pursuant to the authority granted by Massachusetts General Laws, Chapter 111, Section 142 A-O, Chapter 21C, Section 4 and 6, and Chapter 21E, Section 6. MassDEP’s review of your Application has been limited to air pollution control regulation compliance and does not relieve you of the obligation to comply with any other regulatory requirements.

MassDEP has determined that the Application is administratively and technically complete and that the Application is in conformance with the Air Pollution Control regulations and current air pollution control engineering practice, and hereby grants this **Plan Approval** for said Application, as submitted, subject to the conditions listed below.

Please review the entire Plan Approval, as it stipulates the conditions with which the Permittee must comply in order for the Plant to be operated in compliance with this Plan Approval.

This information is available in alternate format. Contact Michelle Waters-Ekanem, Director of Diversity/Civil Rights at 617-292-5751.

TTY# MassRelay Service 1-800-439-2370

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## **1. DESCRIPTION OF FACILITY AND APPLICATION**

Rockwood Farm (the “Facility”) is located in Granville, Massachusetts and produces raw milk for wholesale distribution to cooperative processing facilities. The farm has approximately 310 cows. Rockwood Farm operates 700 acres of land at and nearby the Facility for crops to feed the cows.

Rockwood AG Grid, LLC (the Permittee) proposes to install an anaerobic digestion/biogas-to-energy system (the “Plant”), which consists of a 480 kilowatt (kW) biogas-fired combined heat and power engine/generator set, a back-up enclosed flare, and an anaerobic digestion system at Rockwood Farm. The biogas is used to produce electricity and heat via the lean burn engine. The heat is used by the Plant while the electricity is used by the Plant and the Facility as well as supplied to the electric grid via net metering.

The Plant combines the facility’s cow manure with other Source Separated Organic (SSO) materials, generated and trucked in by suppliers, to produce biogas. The SSO is collected and homogenized at a separate pre-processing location and delivered to the plant as liquid slurry and stored in a 54,000 gallon concrete tank. The SSO passes through an internal bar screen to remove contaminants and is macerated by a chopper pump to ensure a homogeneous consistency. The material is subsequently stirred 4 times per day to prevent stratification.

Martin Construction Resource International, LLC (“Martin”) will construct the anaerobic digestion system at the facility. The digestion system consists of an 810,000 gallon tank with a full working volume of feedstock, consisting of cow manure and SSO materials at an operating depth of twelve feet. The material is held for a period of up to 30 days. The combined feedstock has an ideal total solids content of eight percent (8%) percent by weight. Operating under this scenario, the Plant can generate up to 450 kilowatts of electricity per hour.

The anaerobic digestion/biogas-to-energy system will include the following emission units (EUs):

1. SSO feedstock tank
2. anaerobic digester tank
3. engine and generator
4. enclosed backup flare
5. manure tank
6. effluent tank
- 7 & 7A. liquid fertilizer tanks

### **Cow Manure and Feedstock Tanks**

The SSO Feedstock Tank designated as Emission Unit-1 (EU-1) is a two-vessel concrete vault with a cast concrete lid. Only two feet of the tank is above ground level. The east facing

wall is 6 ft above ground level. The SSO tank has a capacity of 54,000 gallons which can provide a hydraulic storage buffer of up to 3 days of capacity for the Anaerobic Digester (“AD”) Tank.

The liquefied SSO feedstock is delivered to the site in tanker trucks. The access point is a lockable hatch to prevent unauthorized deliveries. The SSO is pumped into the Feedstock Tank, under air tight conditions, with all displaced air filtered through a series of two carbon beds. The SSO passes over an internal bar screen four feet (4’) square to remove large solids. The screen is washed down after each delivery by the truck driver. Any remaining solids are removed by an employee with a rake.

Each vessel of the SSO has a working depth of twelve feet (12’) with a two foot headspace. The SSO is heated by the generator’s coolant system and mixed by an internal chopper pump and an adjustable mixer. There is one chopper pump and one mixing unit in each of the two sections. The chopper pumps are fixed to the wall of each section one foot from the bottom, while the mixers are adjusted with a winch to attain the proper height for a given volume. The pumps and mixers are utilized 4 times per day. The mixers will run just prior to the pumps running to prevent the stratification of material, ensuring a consistent mix. Currently the plan is to provide seventy percent (70%) of the feed to the AD from this EU. SSO and manure will be periodically supplied to the AD to maintain the required solids/liquids/nutrients ratio in the AD of eight percent (8%) solids.

Air in the headspace of the SSO tank passes through a pollution control device (“PCD”) which consists of a two deep beds of activated carbon (PCD-1) to remove potential odors as the headspace air is displaced during filling. A fan, with a 138 cubic feet per minute (“cfm”) capacity operates during filling operations and as pressure inside reaches predetermined levels. The first of two carbon beds in series has a face area of seven (7) square feet with a bulk density of twenty-seven (27) pounds per cubic foot and a volume of fifteen (15) cubic feet.

Odor will be monitored at the inlet and outlet of the second carbon bed, by collecting weekly samples until the performance of the filter is determined. The filter will be monitored by-weekly thereafter, using a Draeger tube or an equivalent method approved by the MassDEP, to determine whether breakthrough has occurred<sup>1</sup>. When breakthrough of 5 parts per million hydrogen sulfide (H<sub>2</sub>S) is detected by the Draeger tube, a new carbon bed will be installed prior to any additional filling of the tank. A back-up carbon bed will be kept on-site at all times to ensure continuous treatment of the displaced volume of gas.

The existing manure tank, EU-5, holds approximately 9,000 gallons. The manure is not heated prior to transfer into the AD. A ten horsepower (10 HP) submerged pump is located one foot from the bottom of the tank, and is utilized four times per day to feed the AD the remaining thirty percent (30%) of the required volume.

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<sup>1</sup> Breakthrough is considered to have occurred when the ratio of the concentration in the gas stream leaving the filter unit to the concentration in the feed is equal to 0.05 to 0.10.

## **Anaerobic Digester Tank**

The Anaerobic Digester Tank (“AD”) (EU-2) provides the mean hydraulic retention time (approximately 26-30 days) necessary to allow methanogenic bacteria to convert approximately sixty percent (60%) of the biomass into methane. The material in the AD, called digestate, will be heated to maintain an ideal temperature of approximately 100 degrees Fahrenheit (°F). The actual AD temperature will be maintained at approximately 90 - 100 °F via a heat exchanger using waste heat from the proposed CHP generator for optimal digestion.

EU-2 is cast in place concrete tank ninety-two (92) feet in diameter with a working volume of 810,000 gallons. It is eighteen feet in height with a slightly concave roof. The tank operates at full volume with the fill level controlled by a weir. Excess material flows back into the manure tank via the weir. The working depth of sixteen feet (16’) leaves approximately two feet (2’) of headspace between the digestate and the top of the wall. The conditioned SSO from EU-1, and the manure from EU-5 are fed into the AD four times per day and the mixers are then run for one hour each of the four feedings to prevent stratification of any material inside the AD, and to ensure a complete and consistent mix.

Biogas storage is primarily within the two foot headspace of the AD described above, the single membrane roof system marginally inflates and deflates to accommodate additional biogas however it is primarily designed to lay flat with a marginal concavity. Safe pressure levels are maintained by a pressure relief valve between the AD and the Flare (EU-4) that allows gas to vent if the pressure reaches 0.85 inches water column and will vent to atmosphere under emergency conditions. If pressure inside the AD reaches a negative pressure of 1.0 inch (-1.0”) water column a negative pressure valve will open to break the vacuum.

Iron impregnated wood chips inside the iron sponge scrubber bind H<sub>2</sub>S with ferric oxide removing it from the biogas stream. One iron sponge hydrogen sulfide removal system (PCD-2) provides sufficient H<sub>2</sub>S control to maintain the H<sub>2</sub>S concentration below 200 parts per million by volume (ppmv), prior to the combustion of the biogas in either the lean burn engine, (EU-3) or the back-up enclosed flare (EU-4).

The H<sub>2</sub>S level is monitored daily at the outlet of PCD-2. When the H<sub>2</sub>S level is observed to be consistently rising, the treatment efficiency of the iron sponge scrubber will be monitored by checking the inlet and outlet H<sub>2</sub>S concentrations. It is predicted to take six months for breakthrough to occur. The media in the iron sponge will be completely replaced as needed based on monitoring results.

## **Effluent Management System**

Effluent leaving the AD flows by gravity into the 14,000-gallon Effluent Tank (EU-6) for short term storage of 1/2 day. From EU-6, effluent is pumped via a power takeoff device, into a 1,200,000-gallon Liquid Fertilizer Storage Tank (EU-7). The liquid fertilizer can be pumped as

needed onto fields by a twelve horsepower (12 HP) submerged pump that is affixed three feet (3') from the bottom of the tank. A three million (3,000,000) gallon liquid fertilizer tank (EU-7A) is proposed for the future after the full RCC has been approved by MassDEP's Solid Waste Division. This will aid the farm in supplying liquid fertilizer to the field and crops on a more evenly distributed basis.

### **Lean Burn Engine and Back-up Enclosed Flare**

Biogas from the AD serves as fuel for the Guascor Model No. SFGLD 360 engine (EU-3). The biogas contains approximately 607 British thermal units per standard cubic foot (Btu/scf) of gas. The methane concentration in the biogas is expected to be about 60% by volume while oxygen (O<sub>2</sub>) levels will be maintained between 0.2 and 4%. A back-up enclosed flare combusts the biogas whenever the engine is down for maintenance or an excess amount of gas is produced.

EU-3 is capable of producing 480kW of electricity per hour but shall be de-rated to 450kW. At this rating the engine has a maximum heat input capacity of over 3.97 million British Thermal Units per hour (MMBtu/hr), and is capable of combusting up to 109 standard cubic feet per minute (scfm) of digester gas operating at 100% of the de-rated load. It will be equipped with a ten (10) inch diameter vertical exhaust stack. The opening of this vertical stack is situated 40 feet above ground level. The exhaust gas exit velocity from EU-3 will be approximately seventy-three feet per second (73 fps) at a stack gas temperature of approximately 480 degrees Fahrenheit (°F).

The back-up enclosed flare (EU-4) has a maximum heat input capacity of 6.6 MMBtu/hr. EU-4 is capable of combusting up to 180 scfm of digester gas at any time excess gas is produced as well as during engine malfunction and maintenance. It has an infinite turndown ratio via a two speed fan, to accommodate any amount of excess biogas. EU-4 is equipped with a 46.2 inch diameter vertical exhaust, the top of which is situated twenty (20) feet above ground level. The exhaust gas exit velocity from the flare will be approximately 10.7 feet per second at a stack gas temperature of approximately 1,400 °F.

Raptor protection shall be installed for the exhaust exit points of both, the Generator and the Flare, EU-3 and EU-4, respectively.

### **SCADA System**

The Supervisory Control and Data Acquisition (SCADA) system monitors process control parameters such as digester temperature, digester gas biogas pressure, mixer on/off, pumps, control of heating zones in heat exchanger, and output generation from the engine/generator set in addition to being capable of controlling all system functions by operators that can remotely access the SCADA system via the internet. The SCADA system as well as the

process tanks, effluent management system, and biogas processing equipment (i.e., engine, enclosed flare) will be serviced by local technicians in the area.

A full inventory of spare parts for the entire plant will be kept at an offsite location and available within two hours. Currently Martin has a facility in Uxbridge, MA which is located within two hours of the Plant. In addition, Martin maintains a larger facility in Ephrata, PA from which parts can be shipped express overnight. The Uxbridge facility has critical components while the Ephrata maintains an inventory of the “more robust” components.

### **Sound Suppression Equipment, Sound Monitoring and Modeling Study**

Operation of the proposed equipment will cause sound emissions that may cause noise. The application described the following proposed sound-emitting equipment and associated sound suppression and sound transmission prevention features:

EU-1: SSO Tank and associated PCD-1 (Carbon filter);

- blower fan will be enclosed in an insulated wooden housing or wrapped in lagging material,
- internal mixing/chopper system and pump are submerged in liquid,
- carbon filter (PCD-1) has no moving parts.

EU-2: AD Tank and associated PCD-2, (Iron Scrubber);

- internal mixing system and pumps are submerged in liquid,
- blower fan is enclosed in the insulated engine shack,
- iron sponge (PCD-2) has no moving parts.

EU-3: Combined Heat and Power engine/generator and associated cooling system;

- engine and generator are enclosed in a prefabricated insulated shack,
- no insulation is on the ceiling as it is comprised mostly of exhaust louvers to provide the necessary air flow for cooling,
- building air intake and exhaust louvers and doors are equipped with acoustical dampening materials,
- increased size of intake and exhaust fans to run at slower speeds,
- engine exhaust has critical silencer (hospital extreme grade),
- catalytic oxidizer (PCD-3) has no moving parts,
- “low noise design” of radiator and water jacket fans and pumps,
- gas chiller optimized fan orifice to minimize sound and optimize air flow performance,
- radiator fan, gas chiller and coolant jacket pump noise are dampened by existing retaining wall to the west.

EU-4: Flare;

- Will be operated when engine is offline or when there is excess gas,
- Flare does not require the rest of the plant to be running, therefore of the other extraneous equipment: pumps, fans, etc., will not be sources of sound emissions.

The Permittee conducted background sound level monitoring and established ambient sound levels at locations of interest based on these measurements and MassDEP guidance. The Permittee then calculated or modeled predicted sound impacts from measured ambient sound levels and project sound emissions. Table A summarizes the predicted sound levels at the following locations:

<b>Table A</b>				
<b>Sound Modeling Locations</b>	Lowest Background Sound Level (L <sub>90</sub> , dBA)	Predicted Maximum Sound Level from Facility (dBA)	Total Predicted sound Level (dBA)	Predicted Sound Level Change (dBA)
Location 1: Southwest Property Line (long term)	32.0	37.4	38.4	+6.4
Location 2: Northwest property Line (short term 1)	28.0	23.9	28.6	+1.8
Location 3: East Property Line (short term 2)	25.9	26.1	28.7	+3.4
Location 4: South Property Line (short term 3)	35.6	28.1	36.3	+0.7
Receptor 1: 286 Granby Road	26.8	17.7	27.3	+0.5
Receptor 2: 312 Granby Road	25.3	22.9	27.3	+2.0
Receptor 3: 355 Granby Road	32.0	40.4	40.9	+8.9
Receptor 4: 372 Granby Road	32.0	34.6	36.4	+4.4

Based on review of the engineering design of the facility including sound mitigation measures and predicted facility sound level impacts, MassDEP has determined that the Plant incorporates sound suppression and sound transmission prevention elements that constitute necessary

equipment, service and maintenance, and necessary precautions to prevent unnecessary sound emissions, as required by 310 CMR 7.10.

After the Plant commences operation, the Permittee shall conduct a sound survey as described in Table 3, Condition #1. The sound survey shall be performed in accordance with a protocol reviewed and approved by MassDEP in accordance with Table 3, Condition #1.

### **Emissions modeling**

The Permittee modeled emissions impact based on maximum predicted emissions from the equipment. All impacts were below ambient standards with the exception of Formaldehyde. The maximum modeled 24 hour concentrations were below the Threshold Exposure Limit (TEL) but the maximum modeled annual average concentrations were above the Allowable Ambient Limit (AAL). The permittee has proposed to utilize a catalytic oxidizer to reduce formaldehyde emissions by ninety percent and is proposing to exhaust emissions through a stack which is as high as practical. These measures minimize the ambient impacts from the formaldehyde.

The modeling reveals that the hillside and neighboring driveway are the locations of the highest recorded concentrations. Given that the operational life of the project is only 25 years and the location of the impact is not at a location where a house is anticipated to be built, the increased risk from formaldehyde due to this project is minimal.



## 2. EMISSION UNIT (EU) IDENTIFICATION

Each Emission Unit (EU) identified in Table 1 is subject to and regulated by this Plan Approval:

<b>Table 1</b>			
<b>EU#</b>	<b>Description</b>	<b>Design Capacity</b>	<b>Pollution Control Device (PCD)</b>
EU-1	SSO Feedstock Tank	54,000 gallons	Deep Bed Carbon Filter (PCD-1)
EU-2	Digester Tank	810,000 gallons	Iron Sponge H <sub>2</sub> S Dry Scrubber (PCD-2)
EU-3	Guascor Model No. SFGLD-360 engine and genset	3.97 MMBtu/hr (heat input) 480 kW max output	Catalytic Oxidizer (PCD-3), operate engine in lean burn range and de-rated to 450 kW power output
EU-4	Varec Biogas Model #244E Back-up enclosed flare	6.6 MMBtu/hr (heat input)	none
EU-5	Cow Manure Tank	9,000 gallons	none
EU-6	Effluent Transfer Tank	14,000 gallons	none
EU-7	Liquid Fertilizer Storage Tanks	1,200,000 gallons	none
EU-7A <sup>1</sup>		3,000,000 gallons	none

**Table 1 Key:**

**EU#** = Emission Unit Number **PCD** = Pollution Control Device **kW** = kilowatts **max** = maximum  
**MMBtu/hr** = million British Thermal Units per hour **H<sub>2</sub>S** = hydrogen sulfide  
**SSO** = Source Separated Organics

**Table 1 Notes:**

<sup>1</sup> To be constructed once plant is under successful operation. Permittee to notify MassDEP BAW Permitting Section Chief in writing at least thirty (30) days prior to start of construction and shall comply with all other MassDEP regulations regarding this work.

### 3. APPLICABLE REQUIREMENTS

#### A. OPERATIONAL, PRODUCTION and EMISSION LIMITS

The Permittee is subject to, and shall not exceed the Operational, Production, and Emission Limits as contained in Table 2 below:

<b>Table 2</b>			
<b>EU#</b>	<b>Operational / Production Limit</b>	<b>Air Contaminant</b>	<b>Emission Limit</b>
EU-3 <sup>1</sup>	none	NO <sub>x</sub>	0.08 lbs/hr 1.8 lbs/MW-hr 0.70 TPM 3.5 TPY
		CO	0.50 lbs/hr 1.1 lbs/MW-hr 0.44 TPM 2.2 TPY
		VOC	0.93 lbs/hr 2.1 lbs/MW-hr 0.82 TPM 4.1 TPY
		PM/PM <sub>10</sub> /PM <sub>2.5</sub>	0.12 lbs/hr <sup>2</sup> 0.27 lbs/MW-hr 0.11 TPM 0.53 TPY
		SO <sub>2</sub>	1.1 lbs/hr @ 1000 ppmv H <sub>2</sub> S 0.22 lbs/hr @ 200 ppmv H <sub>2</sub> S 2.5 lbs/MW-hr 0.19 TPM 1.0 TPY
		CO <sub>2</sub>	744 lbs/hr 1654 lbs/MW-hr 652 TPM 3259 TPY
		Formaldehyde	0.093 lbs/hr 0.21 lbs/MW-hr 0.082 TPM 0.41 TPY
	Daily average of H <sub>2</sub> S shall be less than or equal to 200 <sub>3</sub> ppmv	H <sub>2</sub> S	N/A

<b>Table 2</b>			
<b>EU#</b>	<b>Operational / Production Limit</b>	<b>Air Contaminant</b>	<b>Emission Limit</b>
		Opacity	<5%, EXCEPT 5 TO <10% FOR $\leq 2$ MINUTES DURING ANY ONE HOUR
		Smoke	310 CMR 7.06(1)(a)
EU-4 <sup>3</sup>	none	NO <sub>x</sub>	0.45 lbs/hr 0.39 TPM 2.0 TPY
		CO	2.0 lbs/hr 1.8 TPM 8.9 TPY
		VOC	0.4 lbs/hr 0.3 TPM 1.7 TPY
		PM/PM <sub>10</sub> /PM <sub>2.5</sub>	0.07 lb/hr 0.051TPM 0.31 TPY
		SO <sub>2</sub>	1.83 lbs/hr @ 1000 ppmv H <sub>2</sub> S 0.37 lbs/hr @ 200 ppmv H <sub>2</sub> S 0.27 TPM 1.60 TPY
		CO <sub>2</sub>	1229 lbs/hr 897 TPM 5383 TPY
EU-4 <sup>3</sup>	Daily average of H <sub>2</sub> S shall be less than or equal to 200 ppmv <sup>3</sup>	H <sub>2</sub> S	N/A
		Opacity	<5%, EXCEPT 5 TO <10% FOR $\leq 2$ MINUTES DURING ANY ONE HOUR
		Smoke	310 CMR 7.06(1)(a)
Facility-wide	none	NO <sub>x</sub>	1.2 lbs/hr 1.1 TPM 5.5 TPY
		CO	2.5 lbs/hr 2.2 TPM 11.1 TPY
		VOC	1.3 lbs/hr 1.1 TPM 5.8 TPY
		PM/PM <sub>10</sub> /PM <sub>2.5</sub>	0.19 lbs/hr 0.161 TPM 0.84 TPY

<b>Table 2</b>			
<b>EU#</b>	<b>Operational / Production Limit</b>	<b>Air Contaminant</b>	<b>Emission Limit</b>
		SO <sub>2</sub>	2.93 lbs/hr @ 1000ppmv H <sub>2</sub> S 0.59 lbs/hr @ 200ppmv H <sub>2</sub> S 0.46 TPM 2.6 TPY
		CO <sub>2</sub>	1973 lbs/hr 1549 TPM 8642 TPY
		Formaldehyde	0.093 lbs/hr 0.21 lbs/MW-hr 0.082 TPM 0.41 TPY
		H <sub>2</sub> S	N/A

**Table 2 Key:**

**EU#** = Emission Unit Number    **NO<sub>x</sub>** = Nitrogen Oxides    **CO** = Carbon Monoxide    **SO<sub>2</sub>** = Sulfur Dioxide  
**PM** = Total Particulate Matter    **H<sub>2</sub>S** = Hydrogen Sulfide    **VOC** = Volatile Organic Compounds  
**PM<sub>10</sub>** = Particulate Matter less than or equal to 10 microns in diameter    **N/A** = not applicable  
**PM<sub>2.5</sub>** = Particulate Matter less than or equal to 2.5 microns in diameter    **CO<sub>2</sub>** = Carbon Dioxide  
**lbs/MW-hr** = pounds per megawatt hour    **lbs/hr** = pounds per hour    **TPM** = tons per month  
**TPY** = tons per consecutive 12-month period    **@** = at  
**ppmv** = parts per million by volume    **%** = percent    **<** = less than    **≤** = less than or equal to

**Table 2 Notes:**

- <sup>1</sup> These emission limitations shall apply to all engine/generator loads.  
 Compliance with these emission limitations shall be determined based on one-hour averages.  
 These emission limits are based upon biogas containing 607 British thermal units per standard cubic foot.
- 2 This emission limit is based on limited engine testing data for PM emissions. The final emission limit will take into consideration results of engine emission testing per Table 3, Provision 3. The greatest emission rate of three (3) averaged runs will be selected and scaled up by approximately 10%. The newly determined emission limit will be added to a revised plan approval and will account for variations in biogas heat content and will provide general operational flexibility.
- <sup>3</sup> H<sub>2</sub>S emissions are regulated by restricting the inlet H<sub>2</sub>S concentrations to the engine and back-up enclosed flare to less than or equal to 200 ppm<sub>v</sub>. SO<sub>2</sub> emissions are based upon 99.9 percent removal efficiency of the Iron Scrubber, PCD-2.

**B. COMPLIANCE DEMONSTRATION**

The Permittee is subject to, and shall comply with, the monitoring, testing, record keeping, and reporting requirements as contained in Tables 3, 4, and 5 below:

<b>Table 3</b>	
<b>EU#</b>	<b>Monitoring and Testing Requirements</b>
EU-1 EU-2 EU-3 EU-4	<p>1. The Permittee shall conduct a noise survey (during daytime and nighttime operation), which is in accordance with MassDEP guidelines, to demonstrate that the noise impacts from the operation of these EUs are in compliance with Regulation 310 CMR 7.10 and the Bureau of Air and Waste Noise Policy No. 90-001. This survey shall be conducted within 45 days of the commencement of continuous operation of these EUs. The noise survey results shall be submitted to MassDEP’s Western Regional Office (WERO), in writing, attention BAW Permit Chief, within 75 days of the commencement of continuous operation of these EUs.</p> <p>2. The Permittee shall work in full cooperation with MassDEP if the sound survey results deviate from the predicted sound levels specified in this Approval. The reason for the deviation shall be investigated and changes shall be implemented to remediate any excess sound being generated. MassDEP shall be notified in advance of any physical changes at the facility to reduce sound, and of the times any sound measurements will be made to determine the effect of the changes made.</p>
EU-3	<p>3. The Permittee shall conduct emissions testing for NO<sub>x</sub>, CO, H<sub>2</sub>S, VOC, SO<sub>2</sub>, and CO<sub>2</sub> within 90 days of the commencement of continuous operation of the engine. An additional emissions test shall be conducted by no later than 3 years from initial emissions test. All compliance testing shall be conducted in accordance with the test methods and procedures set forth in 40 CFR 60, Appendix A. All compliance testing shall be witnessed by MassDEP personnel at a mutually agreeable date and time. The Permittee shall submit a test protocol for the required emission test for review and MassDEP approval at least 30 days prior to the anticipated date of testing. The Permittee shall submit the emission test results report to MassDEP’s WERO within 60 days of completion of the compliance stack testing.</p> <p>4. For compliance testing purposes, this EU shall be constructed so as to accommodate the emissions testing requirements as stipulated in 40 CFR Part 60, Appendix A. The two (2) inlet and two (2) outlet sampling ports should ideally be located at two duct diameters upstream and eight duct diameters downstream of any flow disturbance. The corresponding sampling ports should be 90 degrees apart from each other.</p>
EU-3 EU-4	<p>5. The Permittee shall monitor the daily, monthly, and twelve month rolling biogas consumption for EU-3 and EU-4 and the electrical output for EU-3 to document compliance with the emission limitations contained in Table 2 above.</p>
EU-2 EU-3 EU-4	<p>6. The Permittee shall monitor daily the hydrogen sulfide concentration (in ppm by volume) exiting EU-2 before the biogas is combusted in either EU-3 or EU-4 to document compliance with the emission limitations contained in Table 2 above. Permittee may petition MassDEP to test weekly once sufficient data has been obtained to show operation performs as described.</p>

<b>Table 3</b>	
<b>EU#</b>	<b>Monitoring and Testing Requirements</b>
EU-1	7. The Permittee shall monitor daily the amount of SSO that EU-1 receives.
	8. The Permittee personnel shall be trained in the proper operation of the activated carbon system for EU-1.
EU-1	9. The Permittee shall monitor the activated carbon bed (PCD-1) on a daily basis. Permittee may petition MassDEP to test weekly once sufficient data has been obtained to show operation performs as described. When breakthrough of greater than 5 parts per million (ppm) of hydrogen sulfide has occurred, the Permittee shall immediately replace the activated carbon bed with the second bed in series and replace the second bed with a new activated carbon bed to replace the existing second bed. No further deliveries of SSO shall be accepted until PCD-1 has been replaced.
EU-2	10. The Permittee shall monitor the oxygen (O <sub>2</sub> ) content exiting EU-2 daily, so that the amount of O <sub>2</sub> measured in the cleaned biogas can average between 0.5 and 4% by volume. Permittee may petition MassDEP to test weekly once sufficient data has been obtained to show operation performs as described.
Facility-wide	11. The Permittee shall conduct additional emissions testing on the subject units if and when MassDEP deems it necessary as per 310 CMR 7.13 – Stack Testing. All emissions testing shall be performed in accordance with USEPA Reference Test Methods and regulation 310 CMR 7.13.

**Table 3 Key:**

**EU#** = Emission Unit Number    **PCD** = Pollution Control Device    **NO<sub>x</sub>** = Nitrogen Oxides    **CO** = Carbon Monoxide  
**SO<sub>2</sub>** = Sulfur Dioxide    **H<sub>2</sub>S** = Hydrogen Sulfide    **VOC** = Volatile Organic Compounds    **CO<sub>2</sub>** = Carbon Dioxide  
**O<sub>2</sub>** = oxygen    **ppm** = parts per million    **%** = percent    **twelve month rolling** – any consecutive 12- month period  
**PM** = Total Particulate Matter    **PM<sub>10</sub>** = Particulate Matter less than or equal to 10 microns in diameter  
**PM<sub>2.5</sub>** = Particulate Matter less than or equal to 2.5 microns in diameter  
**SSO** = source separated organics (i.e. food waste)    **CMR** = Code of Massachusetts Regulations  
**WERO** = MassDEP Western Regional Office    **MassDEP** = Massachusetts Department of Environmental Protection  
**BAW** = Bureau of Air and Waste    **SOMP** = Standard Operating and Maintenance Procedure  
**USEPA** = United States Environmental Protection Agency    **NERO** = MassDEP Northeast Regional Office

**Table 4**

EU#	Record Keeping Requirements
EU-1 EU-2 EU-3 EU-4	1. The Permittee shall quantify all periods of excess emissions, even if attributable to an emergency/malfunction, startup/shutdown or equipment cleaning in the determination of annual emissions and compliance with the emission limits as stated in Table 2.
	2. The Permittee shall maintain a record keeping system for these EUs and associated PCDs to be established on-site. All such records shall be maintained up-to-date such that year-to-date information is readily available for MassDEP examination upon request and shall be kept on site for a minimum of five (5) years. Record keeping shall, at a minimum, include: <ul style="list-style-type: none"> <li>a) Compliance records sufficient to document the actual monthly and twelve month rolling emission rates of NO<sub>x</sub>, CO, VOC, total PM, SO<sub>2</sub>, H<sub>2</sub>S, and CO<sub>2</sub> from each EU, so as to determine compliance status with the emission limitations contained in Table 2 above. Such records shall include, but are not limited to, the daily, monthly, and twelve month rolling biogas consumption rates for each applicable EU, electrical output for EU-3, emissions test results, monitoring equipment data and reports, and hours of operation.</li> <li>b) Maintenance: A record of routine maintenance activities performed on these EUs and their PCDs and monitoring equipment including, at a minimum, the type or a description of the maintenance performed on each and the date and time the work was completed.</li> <li>c) Malfunctions: A record of all malfunctions of these EUs, their associated PCDs and their monitoring equipment including, at a minimum: the date and time the malfunction occurred; a description of the malfunction and the corrective action taken; the date and time corrective actions were initiated; and the date and time corrective actions were completed and the equipment was returned to compliance.</li> </ul>
EU-3 EU-4	3. The Permittee shall maintain records on-site of the daily, monthly, and twelve month rolling biogas consumption for EU-3 and EU-4 and the electrical output for EU-3 to document compliance with the emission limitations contained in Table 2 above.
EU-2 EU-3 EU-4	4. The Permittee shall maintain daily on-site records of the maximum, minimum, and average hydrogen sulfide concentrations (in ppm by volume) exiting EU-2 and PCD-2 before the biogas is combusted in either EU-3 or EU-4 to document compliance status with the emission limitations contained in Table 2 above.
EU-1	5. The Permittee shall maintain daily records on-site of the amount of SSO that EU-1 receives.
	6. The Permittee personnel shall record the date, time, and delivery amount of SSO in a logbook, or similar record keeping system, that shall be maintained near EU-1.
	7. The Permittee shall maintain weekly records on-site on the condition of the activated carbon system (PCD-1) and install a fresh second drum of activated carbon when breakthrough has occurred.
EU-2	8. The Permittee shall maintain weekly records on-site of the oxygen (O <sub>2</sub> ) content in EU-2 so that the amount of O <sub>2</sub> measured in the cleaned biogas is maintained between 0.5 and 4% by volume.

<b>Table 4</b>	
<b>EU#</b>	<b>Record Keeping Requirements</b>
Facility-wide	9. The Permittee shall maintain adequate records on-site to demonstrate compliance status with all operational, production, and emission limits contained in Table 2 above. Records shall also include the actual emissions of air contaminant(s) emitted for each calendar month and for each consecutive twelve month period (current month plus prior eleven months). These records shall be compiled no later than the 15 <sup>th</sup> day following each month. An electronic version of the MassDEP approved record keeping form, in Microsoft Excel format, can be downloaded at <a href="http://www.mass.gov/dep/air/approvals/aqforms.htm#report">http://www.mass.gov/dep/air/approvals/aqforms.htm#report</a> .
	10. The Permittee shall maintain records of monitoring and testing as required by Table 3.
	11. The Permittee shall maintain a copy of all noise survey results on-site
	12. The Permittee shall maintain a copy of this Plan Approval, underlying Application and the most up-to-date SOMP for the EUs and PCDs approved herein on-site.
	13. The Permittee shall maintain records required by this Plan Approval on-site for a minimum of five (5) years.
	14. The Permittee shall make records required by this Plan Approval available to MassDEP and USEPA personnel upon request.

**Table 4 Key:**

**EU#** = Emission Unit Number    **PCDs** = Pollution Control Devices    % = percent    **O<sub>2</sub>** = Oxygen  
**NO<sub>x</sub>** = Nitrogen Oxides    **CO** = Carbon Monoxide    **SO<sub>2</sub>** = Sulfur Dioxide    **H<sub>2</sub>S** = Hydrogen Sulfide  
**VOC** = Volatile Organic Compounds    **CO<sub>2</sub>** = Carbon Dioxide    **PM** = Total Particulate Matter  
**SOMP** = Standard Operating and Maintenance Procedure    **SSO** = Source Separated Organics  
**MassDEP** = Massachusetts Department of Environmental Protection  
**USEPA** = United States Environmental Protection Agency  
**Twelve month rolling** – any consecutive 12 month period

<b>Table 5</b>	
<b>EU#</b>	<b>Reporting Requirements</b>
EU-3	1. The Permittee shall submit a compliance test protocol on the required initial compliance test to MassDEP's Western Regional Office (WERO) for review and approval at least 30 days prior to the scheduled commencement of said testing. Test protocols for any subsequent required emissions testing shall be submitted to MassDEP's Western Regional Office (WERO) for review and approval at least 30 days prior to the scheduled commencement of said testing.
	2. The Permittee shall submit the emission test results report to WERO for review within 60 days of the completion of any required compliance stack testing. Subsequent emission test results shall be submitted to WERO.



<b>Table 5</b>	
<b>EU#</b>	<b>Reporting Requirements</b>
EU-1 EU-2 EU-3 EU-4	3. The noise survey results shall be submitted to WERO, in writing, attention BAW Permit Chief, within 45 days of completion.
	4. The Permittee shall submit the final Standard Operating and Maintenance Procedures (SOMP) for these EUs and PCDs to WERO within 60 days of completion of their required initial compliance testing. Any subsequent changes to the SOMP shall be submitted to WERO, within 15 days of said revision(s).
	5. The Permittee shall notify MassDEP's WERO by telephone, fax, or email as soon as possible, but in any case no later than three (3) business days, and subsequently in writing within seven days, after the occurrence of any upsets or malfunctions to these EUs and related equipment which results in an excess emission to the air and/or a condition of air pollution.
	6. All notifications and reporting required and not specified by this Approval shall be made to:  Department of Environmental Protection/Bureau of Air and Waste 436 Dwight Street Springfield, Massachusetts 01103 ATTN: BAW Permit Chief Phone: 413-755-2115 Fax: 413-784-1149
EU-1 EU-2 EU-3 EU-4	7. The Permittee shall notify MassDEP's WERO, ATTN: BAW Permit Chief, within three (3) business days by fax at (413) 784-1149 of any exceedances of the H <sub>2</sub> S emission limit found in Table 2 above. In the same manner, the Permittee shall notify MassDEP whenever the H <sub>2</sub> S gas monitoring probe is offline and again when it is back on-line.
Facility- wide	8. The Permittee shall submit to MassDEP all information required by this Plan Approval over the signature of a "Responsible Official" as defined in 310 CMR 7.00 and shall include the Certification statement as provided in 310 CMR 7.01(2)(c).
	9. The Permittee shall notify MassDEP's WERO, BAW Permit Chief by telephone (413-755-2115), email, Marc.Simpson@state.ma.us, or fax (413-784-1149), as soon as possible, but no later than one (1) business day after discovery of an exceedance(s) of Table 2 requirements. A written report shall be submitted to Permit Chief at MassDEP within three (3) business days thereafter and shall include: identification of exceedance(s), duration of exceedance(s), reason for the exceedance(s), corrective actions taken, and action plan to prevent future exceedance(s).
	10. The Permittee shall provide a copy to MassDEP of any record required to be maintained by this Plan Approval within 30-days from MassDEP's written request.

**Table 5 Key:**

**EU#** = Emission Unit Number    **H<sub>2</sub>S** = hydrogen sulfide    **WERO** = MassDEP Western Regional Office  
**MassDEP** = Massachusetts Department of Environmental Protection    **BAW** = Bureau of Air and Waste  
**SOMP** = Standard Operating and Maintenance Procedure    **SSO** = Source Separated Organics  
**USEPA** = United States Environmental Protection Agency    **NERO** = MassDEP Northeast Regional Office

#### 4. SPECIAL TERMS AND CONDITIONS

The Permittee is subject to, and shall comply with, the following special terms and conditions:

A. The Permittee shall comply with the Special Terms and Conditions as contained in Table 6 below:

<b>Table 6</b>	
<b>EU#</b>	<b>Special Terms and Conditions</b>
EU-3	1. EU-3 shall be housed in an acoustically treated enclosure for sound mitigation with acoustic noise suppression for the air intake and exhaust louvers to minimize the potential of a pure tone condition. In addition, EU-3 shall be equipped with an extreme grade silencer, (a GT Exhaust Model A201-7100 or equivalent) concurrent with the installation of the EU.
EU-4	2. The Permittee shall provide raptor protection at the enclosed flare exit.
EU-3 EU-4	3. The Permittee shall properly operate and maintain PCD-2 for the purpose of maintaining the H <sub>2</sub> S concentration below 200 parts per million by volume (ppmv) prior to the combustion of the biogas in these EUs.
EU-2	4. The O <sub>2</sub> content in the cleaned biogas shall average between 0.2 and 4% by volume.
Facility- wide	5. The Permittee shall operate the subject EUs consistent with the final SOMP and the conditions/parameters established during the initial compliance test.
	6. The Permittee shall install silencers on the discharges of the process blowers.
	7. The Permittee shall install materials in the roof and walls to attenuate sound transmission.
	8. A full inventory of spare parts for the entire anaerobic digestion facility shall be kept at an offsite location for use within two hours of the facility.

<b>Table 6</b>	
<b>EU#</b>	<b>Special Terms and Conditions</b>
Facility-wide	<p>9. The Permittee shall submit a standard operations and maintenance plan (SOMP) for the activated carbon system, the iron sponge hydrogen sulfide removal system and the catalytic oxidizer to MassDEP, WERO, ATTN: BAW Permit Chief, within sixty (60) days of startup of the Facility. This plan shall be implemented and followed immediately upon startup of the Facility and, at a minimum, include the following information:</p> <ul style="list-style-type: none"> <li>i. A description of each system, including materials of construction and key operating parameter value(s) or range(s);</li> <li>ii. A description of how each said system shall be operated and maintained, including a schedule for routine maintenance and material replacement, equipment specifications of the system's odorous air blower, and dimensions and location of each system;</li> <li>iii. A description of how each system's key operating parameters shall be monitored and corrective actions performed if any key operating parameter(s) fall outside its (their) expected value(s) or range(s);</li> <li>iv. A description of any periodic sampling or testing performed on each system and emissions exiting it for odor-causing compounds; and</li> <li>v. A description of how any system malfunctions shall be reported to the MassDEP.</li> </ul>
	<p>10. This Facility may be subject to the Federal New Source Performance Standards (NSPS) for Stationary Spark Ignition Internal Combustion Engines (40 CFR Part 60 Subpart JJJJ). Since MassDEP has not accepted delegation for Subpart JJJJ, you are advised to consult with the EPA for additional information. There may be additional notification, record keeping and reporting requirements. Their address is US EPA Region 1, 5 Post Office Square – Suite 100, Boston, MA 02109-3912.</p>
	<p>11. This Facility may be subject to the Federal National Emissions Standards for Hazardous Air Pollutants (NESHAPs) for Stationary Reciprocating Internal Combustion Engines (RICE) under 40 CFR Part 63 Subpart ZZZZ. This regulation includes stationary RICE units at an area source. Since MassDEP has not accepted delegation for Subpart ZZZZ, you are advised to consult with the United States Environmental Protection Agency (USEPA) for additional information. There may be additional notification, record keeping and reporting requirements. Their address is USEPA Region 1, 5 Post Office Square – Suite 100, Boston, MA 02109-3912.</p>
	<p>12. Compliance with the conditions of this approval does not relieve the Permittee from the obligation to comply with 310 CMR 7.01 and 310 CMR 7.10 when operating the approved Plant or any other activities at the Facility.</p>

**Table 6 Key:**

**EU#** = Emission Unit Number    **O<sub>2</sub>** = oxygen    **%** = percent    **PCD** =Pollution Control Device  
**MassDEP** = Massachusetts Department of Environmental Protection    **H<sub>2</sub>S** = hydrogen sulfide  
**WERO** = MassDEP Western Regional Office    **NERO** = MassDEP Northeast Regional Office  
**BAW**= Bureau of Air and Waste    **SOMP** = Standard Operating and Maintenance Procedure  
**USEPA/EPA** = United States Environmental Protection Agency  
**NSPS** = New Source Performance Standards    **RICE** = Reciprocating Internal Combustion Engines

B. The Permittee shall install and use an exhaust stack, as required in Table 7, on each of the Emission Units that is consistent with good air pollution control engineering practice and that discharges so as to not cause or contribute to a condition of air pollution. Each exhaust stack shall be configured to discharge the gases vertically and shall not be equipped with any part or device that restricts the vertical exhaust flow of the emitted gases, including but not limited to rain protection devices known as “shanty caps” and “egg beaters.” The Permittee shall install and utilize exhaust stacks with the following parameters, as contained in Table 7 below, for the Emission Units that are regulated by this Plan Approval:

<b>Table 7</b>				
<b>EU#/PCD</b>	<b>Stack Height Above Ground (feet)</b>	<b>Stack Inside Exit Dimensions (inches)</b>	<b>Stack Gas Exit Velocity (feet per second)</b>	<b>Stack Gas Exit Temperature (°F)</b>
EU-3	40	10.0	73	480
EU-4	20	3.85 (feet)	10.7	1400

**Table 7 Key:** EU# = Emission Unit Number °F = Degrees Fahrenheit

## **5. GENERAL CONDITIONS**

The Permittee is subject to, and shall comply with, the following general conditions:

- A. Pursuant to 310 CMR 7.01, 7.02, 7.09 and 7.10, should any nuisance condition(s), including but not limited to smoke, dust, odor or noise, occur as the result of the operation of the Facility, then the Permittee shall immediately take appropriate steps including shutdown, if necessary, to abate said nuisance condition(s).
- B. If asbestos remediation/removal will occur as a result of the approved construction, reconstruction, or alteration of this Facility, the Permittee shall ensure that all removal/remediation of asbestos shall be done in accordance with 310 CMR 7.15 in its entirety and 310 CMR 4.00.
- C. If construction or demolition of an industrial, commercial or institutional building will occur as a result of the approved construction, reconstruction, or alteration of this Facility, the Permittee shall ensure that said construction or demolition shall be done in accordance with 310 CMR 7.09(2) and 310 CMR 4.00.
- D. Pursuant to 310 CMR 7.01(2)(b) and 7.02(7)(b), the Permittee shall allow MassDEP and / or USEPA personnel access to the Facility, buildings, and all pertinent records for the purpose of making inspections and surveys, collecting samples, obtaining data, and reviewing records.

- E. This Plan Approval does not negate the responsibility of the Permittee to comply with any other applicable Federal, State, or local regulations now or in the future.
- F. Should there be any differences between the Application and this Plan Approval, the Plan Approval shall govern.
- G. Pursuant to 310 CMR 7.02(3)(k), MassDEP may revoke this Plan Approval if the construction work is not commenced within two years from the date of issuance of this Plan Approval, or if the construction work is suspended for one year or more.
- H. This Plan Approval may be suspended, modified, or revoked by MassDEP if MassDEP determines that any condition or part of this Plan Approval is being violated.
- I. This Plan Approval may be modified or amended when in the opinion of MassDEP such is necessary or appropriate to clarify the Plan Approval conditions or after consideration of a written request by the Permittee to amend the Plan Approval conditions.
- J. Pursuant to 310 CMR 7.01(3) and 7.02(3)(f), the Permittee shall comply with all conditions contained in this Plan Approval. Should there be any differences between provisions contained in the General Conditions and provisions contained elsewhere in the Plan Approval, the latter shall govern.

## **6. MASSACHUSETTS ENVIRONMENTAL POLICY ACT**

MassDEP has determined that the filing of an Environmental Notification Form (ENF) with the Secretary of Energy & Environmental Affairs, for air quality control purposes, was not required prior to this action by MassDEP. Notwithstanding this determination, the Massachusetts Environmental Policy Act (MEPA) and 301 CMR 11.00, Section 11.04, provide certain “Fail-Safe Provisions,” which allow the Secretary to require the filing of an ENF and/or an Environmental Impact Report (EIR) at a later time.

## **7. APPEAL PROCESS**

This Plan Approval is an action of MassDEP. If you are aggrieved by this action, you may request an adjudicatory hearing. A request for a hearing must be made in writing and postmarked within twenty-one (21) days of the date of issuance of this Plan Approval.

Under 310 CMR 1.01(6)(b), the request must state clearly and concisely the facts, which are the grounds for the request, and the relief sought. Additionally, the request must state why the Plan Approval is not consistent with applicable laws and regulations.

The hearing request along with a valid check payable to the Commonwealth of Massachusetts in the amount of one hundred dollars (\$100.00) must be mailed to:

Commonwealth of Massachusetts  
Department of Environmental Protection  
P.O. Box 4062  
Boston, MA 02211

This request will be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver as described below. The filing fee is not required if the appellant is a city or town (or municipal agency), county, or district of the Commonwealth of Massachusetts, or a municipal housing authority.

MassDEP may waive the adjudicatory hearing-filing fee for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file, together with the hearing request as provided above, an affidavit setting forth the facts believed to support the claim of undue financial hardship.

Should you have any questions concerning this Plan Approval, please contact Bob Shultz by telephone at 413-755-2210, or in writing at the letterhead address.

Sincerely,

This final document copy is being provided to you electronically by the Department of Environmental Protection. A signed copy of this document is on file at the DEP office listed on the letterhead.

Date: September 15, 2017

Marc Simpson  
Permitting Section Chief  
Bureau of Air and Waste  
Western Regional Office

ecc: MassDEP/Boston - Yi Tian  
ecc: Marc Simpson, Peter Czapienski, Catherine Skiba – MassDEP, WERO  
ecc: T. Jones – Tech Environmental

**Certified Mail Number: 7016 1970 0000 4853 4830**