Exeter Agri-Energy, LLC
Penobscot County
Exeter, Maine
A-1047-71-D-A (SM)

Departmental
Findings of Fact and Order
Air Emission License
Amendment #3

FINDINGS OF FACT

After review of the air emissions license amendment application, staff investigation reports and other documents in the applicant's file in the Bureau of Air Quality, pursuant to 38 M.R.S.A., §344 and §590, the Maine Department of Environmental Protection (Department) finds the following facts:

I. REGISTRATION

A. Introduction

Exeter Agri-Energy, LLC (Exeter Agri-Energy) was issued Air Emission License A-1047-71-A-N on March 11, 2011, permitting the operation of emission sources associated with their anaerobic digester and electric generator facility. The license was subsequently amended on October 5, 2011 (A-1047-71-B-M) and on July 9, 2013 (A-1047-71-C-A).

Exeter Agri-Energy has requested an amendment to their air emission license for a proposed phased facility operations expansion which will include two new electricity-producing cogeneration units firing biogas (annual average capacity 1.2 megawatt (MW) each) and two new anaerobic digesters with associated flares.

This amendment also includes clarifying and revising the tons/year calculations for the existing Cogeneration Unit 1 and adding an existing flare which was not listed in the original license. Cogeneration Unit 1 is de-rated to no more than 0.98 MW output and the ton/year numbers will be updated to correspond to the de-rating. The original license included two anaerobic digesters, but only one flare; however, each of the two existing anaerobic digesters has its own flare. No changes to the currently licensed emergency generator or sawmill diesel drive unit were proposed for this amendment.

The equipment addressed in this license is located at Stonyvale Farm at 226 Fogler Road, Exeter, Maine.

B. Emission Equipment

The following equipment is addressed in this air emission license:

Cogenerator Engines

Equipment	Maximum Capacity (MMBtu/hr)	Horsepower (hp)	Max. Firing Rate (scf/hr)	Fuel Type	Install. Date	Stack #
Cogeneration Unit 2	11.18*	1810*	18,633*	Biogas	2013	2
Cogeneration Unit 3	11.18*	1810*	18,633*	Biogas	TBD	3

* The ratings in this table are maximum design values. Exeter Agri-Energy has proposed to operate each engine at a de-rated annual average of 1.2 MW, which will limit the output from each unit to approximately 1610 hp with a corresponding annual heat input of 9.95 MMBtu/hr and fuel flow average of 16,584 scf/hr. Digester gas heat value used was 600 Btu/scf from AP-42 Table 3.1-1 dated 4/2000.

Flares

Equipment	Maximum Design Capacity (MMBtu/hr)	Install. Date
Flare 1▫	5 (approx.)	2011
Flare 2▫	5 (approx.)	2011
Flare 3	5 (approx.)	2013
Flare 4	5 (approx.)	TBD

▫ Flares 1 and 2 are listed in air emission license A-1047-71-A-N as one flare, but this license clarifies that there are two flares, one on each existing anaerobic digester.

Process Equipment

Two new anaerobic digesters processing manure, food wastes, and other type 1 wastes and type 3 residuals such as glycerin from biodiesel manufacture will be installed as part of the proposed cogeneration process, controlled by the cogeneration units and flares.

C. Application Classification

The modification of a minor source is considered a major or minor modification based on whether or not expected emission increases exceed the "Significant Emission Levels" as defined in the Department's regulations. The emission

increases are determined by subtracting the current licensed emissions preceding the modification from the maximum future licensed allowed emissions, as follows:

Pollutant	Current License (TPY)	Future License (TPY)	Net Change (TPY)	Sig. Level
PM	5.0	14.96	+9.96	100
PM_{10}	5.0	14.96	+9.96	100
SO_2	15.9	47.9	+32.0	100
NO_x	22.3	51.29	+28.99	100
CO	31.7	97.3	+65.6	100
VOC	10.2	31.07	+20.87	50
CO_2e	<100,000	<100,000	<100,000	100,000

This modification is determined to be a minor modification and has been processed as such. With the de-rating of the cogeneration units and the operating hour restrictions on the emergency generator and sawmill generator, the facility is licensed below the major source thresholds and is considered a synthetic minor.

II. BEST PRACTICAL TREATMENT (BPT)

A. Introduction

In order to receive a license, the applicant must control emissions from each unit to a level considered by the Department to represent Best Practical Treatment (BPT), as defined in *Definitions Regulation*, 06-096 CMR 100 (as amended). Separate control requirement categories exist for new and existing equipment as well as for those sources located in designated non-attainment areas.

BPT for new sources and modifications requires a demonstration that emissions are receiving Best Available Control Technology (BACT), as defined in *Definitions Regulation*, 06-096 CMR 100 (as amended). BACT is a top-down approach to selecting air emission controls considering economic, environmental and energy impacts.

Before proceeding with the control requirements for each unit, a general process description is provided to identify where the equipment fits into the process.

Facility History and General Process Description

Exeter Agri-Energy is a wholly owned subsidiary of Stonyvale dairy farm, which is currently licensed to operate an anaerobic digester system to produce biogas fuel to power a combined heat and electric cogeneration unit (de-rated to an

annual average rate of 0.98 MW). The material input for the two parallel anaerobic digester units (1500 m^3 each) includes cow manure from Stonyvale's approximately 1200 milking head equivalent farm, silage produced on-site, food processing wastes from outside sources, and other approved Type 1 and Type 3 waste. The facility has a solid waste facility license from the Department to accept off-site wastes.

The system generates biogas, composed of approximately 60% methane (CH_4) and 40% carbon dioxide (CO_2), which is fired in the cogeneration unit to power the 1MW electric generator for production of electrical energy to the grid and thermal heat for the facility. Waste heat captured from the generator is used to optimize the anaerobic digester temperature and to provide heat for other purposes. When the cogeneration unit is not available, the digester emissions are flared. Each anaerobic digester has its own flare. Effluent material from the digesters is run through a solid-separator. The solid fraction is used as livestock bedding and the liquid fraction is land-applied as a nutrient-rich organic fertilizer. The existing system began operation in December 2011.

Once the process was in operation and biogas hydrogen sulfide (H_2S) samples were taken from the anaerobic digester outlet, the SO_2 licensed emissions from the process and the H_2S monitoring requirements were adjusted in a subsequent amendment to the original license. An amendment was also issued addressing the use of a small rental unit boiler for back-up purposes, rather than having a small boiler permanently on-site.

Exeter Agri-Energy has proposed to add two new anaerobic digesters with flares and two new cogeneration units to increase capacity and to improve system reliability.

Stonyvale Farms also owns and is licensed to operate two small stationary diesel engines on the adjacent property to the Exeter Agri-Energy operations. One unit is an emergency generator and the other unit powers a small sawmill on-site. These two stationary engines are included in Exeter Agri-Energy's current license since Stonyvale Farms owns Exeter Agri-Energy and they are on the same site.

B. Cogeneration Unit 1

The existing biogas-fired Cogeneration Unit 1 is a 2010 Guascor Power SFGM 560 combined heat and power generator with a maximum rating of 1475 hp (9.46 MMBtu/hr and 15,767 scf/hr); however, its operation is de-rated to a maximum annual load equating to 980 kW (1341 hp, 14,333 scf/hr, 8.6 MMBtu/hr).

Short-term emissions are not changing in this amendment and are based on the maximum rating, but the tons/year calculations are being revised based on the de-rated annual load of 0.98 MW (1341 hp), the unit's grams per horsepower-hour

emissions, and operations of 8760 hrs/yr. In order to document compliance with the calculated ton per year limits, Exeter Agri-Energy shall be limited to an annual electrical production of 8,585 MW-hrs/yr from Cogeneration Unit 1 and the facility shall keep electrical production records from the unit on a monthly and 12 month rolling total basis.

C. Cogeneration Units 2 and 3

The proposed biogas-fired Cogeneration Units 2 and 3 are Guascor Power Model HGM 560 combined heat and power generators each rated at a maximum 1810 hp (6178 Btu/bhp-hr, 11.18 MMBtu/hr, and 18,633 scf/hr). However, for operational and engine wear purposes, Exeter Agri-Energy will de-rate each unit to 1.2 MW on an annual average, which corresponds to 1610 hp (9.95 MMBtu/hr and 16,584 scf/hr). As with Cogeneration Unit 1, short term lb/hr emissions will be based on the maximum input capacity. Tons/year will be based on the de-rated power output, with an electrical production limit of 10,512 MW-hrs/yr on each unit.

The cogeneration units will be new units and will utilize lean burn combustion technology. The cogeneration units will each have their own stack at a minimum height of 20 feet above ground level.

1. NSPS Requirements

The cogeneration units are subject to New Source Performance Standards (NSPS) 40 CFR Part 60, Subpart JJJJ, *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines*. The applicability for these engines is under the category of engines manufactured after July 1, 2007 with a maximum engine power greater than or equal to 500 hp burning landfill/digester gas (§60.4230(a)(4)(i)). Owners of units in this category must comply with the standards of 40 CFR Part 60, Subpart JJJJ, Table 1 listed below, either through manufacture certification or on-site testing.

Subpart JJJJ, Table 1 Standards for Digester Gas

Units of Standard (may choose to comply with either standard)	**NO_X**	**CO**	**VOC**
g/HP-hr	2.0	5.0	1.0
ppmvd at 15% O_2	150	610	80

2. NESHAP Requirements

The cogeneration units are also subject to 40 CFR Part 63, Subpart ZZZZ, *National Emission Standards for Hazardous Air Pollutants (NESHAP) for Stationary Reciprocating Internal Combustion Engines*. The cogeneration units are considered new stationary reciprocating internal combustion engines

at an area HAP source (construction commenced on or after June 12, 2006); however, since the units are subject to 40 CFR Part 60, Subpart JJJJ there are no further requirements under 40 CFR Part 60, Subpart ZZZZ (§63.6590(c)(1)).

3. Best Available Control Technology

Exeter Agri-Energy submitted a BACT analysis as part of the license application. The summary of the BACT analysis for Cogeneration Units 2 and 3 is the following:

PM/PM_{10}– The options for controlling particulate matter from the cogeneration units include add-on controls and good operating practices. Add on-controls were not considered for these units. The anaerobic digester system uses a particulate filter to remove particulate matter from the biogas prior to combustion. The cogeneration units have their own fuel and air filters which further remove particulates and improve engine performance and reliability. These filters, inherent combustion efficiencies of a new lean burn unit, and good operating practices are considered BACT, with the PM emission limit for the cogeneration units based on the emission standard in *Fuel Burning Equipment Particulate Emission Standard*, 06-096 CMR 103 (as amended).

The BACT emission limit for PM/PM_{10} from each of the Cogeneration Units 2 and 3, calculated using the maximum rating of 11.18 MMBtu/hr, is the following:

	Basis	**lb/MMBtu**	**lb/hr**
PM	06-096 CMR 103	0.12	1.34
PM_{10}	06-096 CMR 103	0.12	1.34

SO_2 – Sulfur dioxide emissions result from the combustion oxidation of hydrogen sulfide (H_2S) and possibly other reduced sulfur compounds formed through the anaerobic digestion process. H_2S and other reduced sulfur compounds can also lead to corrosion in the fuel handling systems. Based on evaluations of uncontrolled sources, raw H_2S concentrations were estimated to be approximately 2000 parts per million by volume (ppmv). The proposed system at Exeter Agri-Energy converts H_2S to sulfate (SO_4) which remains in the liquid effluent. A small percentage of air is injected into the digester head space which biologically converts most of the H_2S present in the digester gas zone to SO_4. Historical data from the existing cogeneration unit has shown the remaining H_2S concentration to be less than 1400 ppmv, with H_2S levels continuing to drop.

Exeter Agri-Energy proposes the internal system design technology as BACT to minimize SO_2. External H_2S removal systems exist, but were not considered for this facility due to cost effectiveness.

The BACT emission limit for SO_2 from each of the Cogeneration Units 2 and 3 is the following:

	Basis	lb/hr
SO_2	Complete conversion of 1400 ppmv H_2S in fuel*	4.29

* Calculations and conversions used to determine the SO_2 emission limits from the H_2S value (assuming 100% conversion of H_2S to SO_2):

H_2S in Digester Gas (ppmv)	ppmv converted to mg/m3	H_2S conc. (lb/ft3)	Digester gas input (scf/hr)	H_2S input rate (lb/hr)	Hourly SO_2 emissions (lb/hr)
1400	1961.92	1.2248E-04	18,637	2.28	4.29

Conversions:		
	H_2S molecular weight:	34.08 g/mol
	SO_2 molecular weight:	64.06 g/mol
	Pounds per milligram (lb/mg):	2.2046E-6
	Cubic feet per cubic meter (ft3/m3):	35.315
	Digester gas heat value (AP-42 3.1-1 dated 4/2000):	600 Btu/scf

Exeter Agri-Energy shall perform monthly monitoring for H_2S in the biogas entering the cogeneration units, with immediate action taken for any monitoring test result above 1400 ppmv H_2S. An annual test shall be performed for H_2S and total sulfur using an approved test method.

NO_X – Exeter Agri-Energy evaluated various options for controlling nitrogen oxides from the cogeneration units. NO_X emissions from internal combustion engines are primarily reduced by optimizing combustion to limit NO_X formation or by using control systems.

SCR is an add-on control which uses urea or ammonia injection in the flue gas to react with the NO_X in the presence of a catalyst to form water and nitrogen. The use of SCR in digester gas fired internal combustion engines appears to be experimental. Performance and catalyst life are decreased due to the presence of H_2S and silica compounds in the biogas. In addition, the cost for equipment, maintenance, reagents, and loss of production during maintenance would not be justifiable for a source of this size. Therefore, SCR was not considered technologically or economically feasible for Exeter Agri-Energy.

SNCR is an add-on control which also uses ammonia or urea injection, but without a catalyst. The reaction requires the injection point at a specific temperature (1600-2100°F), which is above the expected 975°F Exeter Agri-Energy exhaust temperature, therefore SNCR was not considered technically feasible for the facility without needing to increase the normal exhaust temperature.

Firing biogas fuel can be considered a part of a NO_X emissions reduction control strategy. Biogas consists of large amounts of CO_2, causing peak engine temperatures to be reduced, and thereby minimizing NO_X formation. This is a viable method to reducing NO_X from the cogeneration units. These units shall burn biogas fuel produced in the anaerobic digesters.

Lean burn combustion engines are designed to be operated at high excess air levels resulting in lower combustion temperatures and therefore lower NO_X emissions. Lean burn combustion simultaneously minimizes emissions of NO_X along with PM, CO, and VOC. Lean burn technology for digester gas-fired internal combustion engines is widely accepted as BACT. Exeter Agri-Energy is proposing to use lean burn technology cogeneration units.

Ignition timing retard delays the ignition timing to minimize peak combustion temperature, reducing NO_X formation but potentially increasing CO and PM emissions. Since the cogeneration units will be equipped with lean burn technology, using ignition timing retard to reduce the already low NO_X levels was not justified since adjusting ignition timing could increase other pollutant levels.

Proper operation and good combustion and maintenance practices minimize emissions for all pollutants including NO_X. The cogeneration units' fuel and air filters will improve engine performance and the anaerobic digester systems will utilize a condenser system to remove moisture from the biogas prior to combustion. These filter and condenser systems improve engine efficiency and reliability. Exeter Agri-Energy will maintain the anaerobic digester systems and cogeneration units in accordance with the manufacturers' written instruction for proper operation and maintenance.

De-rating consists of limiting the engine capacity to less than full power rating, reducing NO_X formation by reducing cylinder pressures and temperatures. In addition, emissions ratings are based on grams per boiler horsepower (g/bhp), so by decreasing horsepower output, the emissions output in grams per hour (g/hr) are directly reduced. De-rating also

reduces wear on the engines. Exeter Agri-Energy has proposed to de-rate the two cogeneration units to 1.2 MW each.

Exeter Agri-Energy proposed the use of biogas fuel, lean burn combustion technology, de-rating of the units, proper operation, and good combustion and maintenance practices as BACT for the cogeneration units to minimize NO_X emissions.

The BACT emission limit for NO_X from Cogeneration Units 2 and 3 is the following:

	Basis	**lb/hr**
NO_X	- Tuning each unit to 1.0 g/hp-hr (more stringent than 40 CFR Part 60, Subpart JJJJJJ requirement (2 g/hp-hr)) - Maximum 1810 hp	3.99

CO – The options for controlling carbon monoxide from the cogeneration units include good combustion control and an add-on oxidation catalyst. Add on-controls were not considered for the units. The inherent combustion efficiencies of a new lean burn unit and good operating practices are considered BACT.

The BACT emission limit for CO from each of the Cogeneration Units 2 and 3 is the following:

	Basis	**lb/hr**
CO	- Tuning each unit to 2.2 g/hp-hr (more stringent than 40 CFR Part 60, Subpart JJJJJJ requirement (5 g/hp-hr)) - Maximum 1810 hp	8.78

VOC – The options for controlling volatile organic compounds from the cogeneration units include good combustion control and an add-on oxidation catalyst. Add on-controls were not considered for these units. The inherent combustion efficiencies of a new lean burn unit and good operating practices were proposed as BACT.

The BACT emission limit for VOC from each of the Cogeneration Units 2 and 3 is the following:

	Basis	lb/hr
VOC	- Tuning each unit to 0.7 g/hp-hr (more stringent than 40 CFR Part 60, Subpart JJJJJJ requirement (1 g/hp-hr)) - Maximum 1810 hp	2.79

Opacity – Visible emissions from each of the cogeneration units shall not exceed 20% opacity on a 6 minute block average, except for no more than two (2) six (6) minute block averages in a 3 hour period.

Greenhouse Gases – The operation of digesters in general is promoted by the US Department of Agriculture and the Department of Energy as a method of reducing greenhouse gas emissions. The overall methane and CO_2 emissions from the farm will be significantly reduced by the operation of the digester and the firing of biogas in the cogeneration unit. Exeter Agri-Energy is proposing to operate the anaerobic digester system with methane collection and cogeneration as part of their greenhouse gas emissions control strategy.

Periodic Monitoring

Exeter Agri-Energy shall keep records of the hours of operation and MW output of each of the cogeneration units on a monthly and 12 month rolling total basis.

Exeter Agri-Energy shall log sampling levels of H_2S in the biogas from each anaerobic digester at least once per calendar month using a handheld monitor or equivalent. Any monitoring results over 1400 ppmv will require immediate corrective action.

Exeter Agri-Energy shall analyze H_2S and total sulfur from each anaerobic digester once per calendar year using ASTM Test Method D5504, or other methods as approved by the Department. Concurrent with the annual test, measurements of H_2S shall be taken with the handheld monitor, or equivalent, to validate the handheld monitor.

Compliance with the emission requirements in 40 CFR Part 60, Subpart JJJJ shall be demonstrated by certification from the manufacturer or an initial performance test and subsequent tests every 8760 hours of operation or 3 years, whichever comes first, if a manufacturer certification is unavailable per §60.4243(b). A maintenance plan shall be kept and the equipment shall be maintained and operated in a manner consistent with good air pollution control practices for minimizing emissions.

D. Flares 1 - 4

The two existing anaerobic digesters each utilize a flare (flares 1 and 2) as control of the digester gases when the cogeneration unit is not available. The two proposed anaerobic digesters will also utilize a flare for each digester (flares 3 and 4). Each digester flare (1-4) is rated at approximately 5 MMBtu/hr. The flares are designed to combust all biogas from the respective digester and associated structures during an emergency or maintenance period. By flaring the biogas, the resulting emissions are safer and more environmentally friendly than if venting the biogas uncontrolled. Additional benefits include a reduction in odor, the destruction of VOCs, and the conversion of H_2S to SO_2 which would not occur with direct venting.

The flares will not produce an increase in emissions for any pollutant compared to the normal operation of biogas firing in the cogeneration units. BACT is proposed to be the use of a flare for control of digester gases during downtimes of the associated cogeneration unit.

The BPT/BACT emission limits for flares 1-4 were based on the following:

PM/PM_{10} – 0.12 lb/MMBtu based on 06-096 CMR 103
SO_2 – conversion of 1400 ppmv of H_2S and all of the sulfur from the three engines going to the four flares ((3.63 lb/hr+4.29 lb/hr+4.29 lb/hr)/4=3.05 lb/hr each)
NO_X – 0.07 lb/MMBtu: AP-42, Table 13.5-1 dated 9/91
CO – 0.37 lb/MMBtu: AP-42, Table 13.5-1 dated 9/91
VOC – 0.14 lb/MMBtu: AP-42, Table 13.5-1 dated 9/91
Opacity – based on 06-096 CMR 101

The BPT/BACT flare lb/hr emission limits are the following:

	PM (lb/hr)	**PM_{10} (lb/hr)**	**SO_2 (lb/hr)**	**NO_X (lb/hr)**	**CO (lb/hr)**	**VOC (lb/hr)**
Each Flare 1, 2, 3, and 4 (approx. 5 MMBtu/hr each)	0.6	0.6	3.05	0.35	1.85	0.7

Visible emissions from each flare shall not exceed an opacity of 10% on a 6 minute block average basis, except for no more than one (1) six (6) minute block average in a 3 hour period.

Periodic Monitoring

Exeter Agri-Energy shall maintain a written or electronic log of when each flare is in operation. Acceptable compliance records may include, but are not limited to, relevant parameters such as flare temperature or flare gas fuel flow readings.

E. Annual Emissions

1. Total Annual Emissions

Exeter Agri-Energy shall be restricted to the following annual emissions, calculated with the cogeneration units operating 8760 hrs/year at the de-rated annual loads (8,585 MW-hrs/yr for Cogeneration Unit 1 and 10,512 MW-hrs/yr each for Cogeneration Units 2 and 3), the emergency generator operating 500 hrs/year, and the sawmill diesel drive unit operating 200 hrs/year, based on a 12 month rolling total:

Total Licensed Annual Emissions for the Facility
Tons/year
(used to calculate the annual license fee)

	PM	**PM_{10}**	**SO_2**	**NO_x**	**CO**	**VOC**
Cogeneration Unit 1*	4.5	4.5	14.5	19.4	28.5	9.1
Cogeneration Unit 2*	5.2	5.2	16.7	15.5	34.2	10.9
Cogeneration Unit 3*	5.2	5.2	16.7	15.5	34.2	10.9
Emergency Generator	0.04	0.04	0.0005	0.64	0.30	0.12
Sawmill Diesel Drive Unit	0.02	0.02	0.002	0.25	0.14	0.05
Total TPY	**14.96**	**14.96**	**47.9**	**51.29**	**97.3**	**31.07**

* This is worst case scenario. Operations of the back-up flares/back-up boiler when the cogeneration units are not available have lower emissions than the continuous operation of all cogeneration units.

HAP annual emissions from the cogeneration units were calculated based on AP-42 Table 3.2-2 Emission Factors for Natural Gas Combustion from 4-stroke Lean-Burn Engines dated 7/2000 (natural gas was used in lieu of information on biogas). HAP annual emissions from the diesel units were calculated based on AP-42, Table 3.3-2 dated 10/1996 Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines. The highest single HAP emission was formaldehyde at 6.9 tons/year and total HAP emissions were 9.4 ton/year. These emissions are below the major HAP thresholds of 10 ton/year of a single HAP and 25 tons/year total HAPs.

2. Greenhouse Gases

Greenhouse gases are considered regulated pollutants as of January 2, 2011, through 'Tailoring' revisions made to EPA's *Approval and Promulgation of Implementation Plans,* 40 CFR Part 52, Subpart A, §52.21 Prevention of

Significant Deterioration of Air Quality rule. Greenhouse gases, as defined in 06-096 CMR 100 (as amended), are the aggregate group of the following gases: Carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. For licensing purposes, greenhouse gases (GHG) are calculated and reported as carbon dioxide equivalents (CO_2e).

Based on the facility's biogas firing rate, the worst case emission factors from AP-42, IPCC (Intergovernmental Panel on Climate Change), and *Mandatory Greenhouse Gas Reporting*, 40 CFR Part 98, and the global warming potentials contained in 40 CFR Part 98, Exeter Agri-Energy is below the major source threshold of 100,000 tons of CO_2e per year. Therefore, no additional licensing requirements are needed to address GHG emissions at this time.

III. AMBIENT AIR QUALITY ANALYSIS

The level of ambient air quality impact modeling required for a minor source shall be determined by the Department on a case-by case basis. In accordance with 06-096 CMR 115, an ambient air quality impact analysis is not required for a minor source if the total emissions of any pollutant released do not exceed the following levels and there are no extenuating circumstances:

Pollutant	Tons/Year
PM_{10}	25
SO_2	50
NO_x	50
CO	250

The total facility licensed emissions are slightly above the NO_X emission levels contained in the table above; however, removing both the emergency generator and limited use sawmill generator emissions, the cogeneration units' emissions are 50.4 ton/year. The 50.4 tons/year annual emissions were calculated using worst case 8760 hr/year with all three units operating. In reality, due to maintenance and other downtime issues, the actual tons/year emissions will fall under the 50 tons/year modeling cutoff. The Department has determined that an ambient air quality impact analysis is not required for the facility at this time and that Ambient Air Quality Standards (AAQS) will not be exceeded.

ORDER

Based on the above Findings and subject to conditions listed below, the Department concludes that the emissions from this source:

- will receive Best Practical Treatment,
- will not violate applicable emission standards, and
- will not violate applicable ambient air quality standards in conjunction with emissions from other sources.

The Department hereby grants Air Emission License A-1047-71-D-A subject to the conditions found in Air Emission License A-1047-71-A-N, in amendments A-1047-71-B-M and A-1047-71-C-A, and in the following conditions.

Severability. The invalidity or unenforceability of any provision, or part thereof, of this License shall not affect the remainder of the provision or any other provisions. This License shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.

SPECIFIC CONDITIONS

The following shall replace condition (16) in air emission license A-1047-71-A-N and in air emission license amendment A-1047-71-C-A:

(16) **Cogeneration Units 1, 2, and 3**

A. The cogeneration units shall fire biogas. [06-096 CMR 115, BACT]

B. Emissions from each Cogeneration Unit 1, 2, and 3 shall not exceed the following:

Pollutant	lb/MMBtu	Origin and Authority
PM	0.12	06-096 CMR 103(2)(B)(1)(a)

C. Emissions from each cogeneration unit shall not exceed the following [06-096 CMR 115, BACT/BPT]:

Unit	PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Cogeneration Unit 1	1.14	1.14	3.63	4.9	7.2	2.3
Cogeneration Unit 2	1.34	1.34	4.29	3.99	8.78	2.79
Cogeneration Unit 3	1.34	1.34	4.29	3.99	8.78	2.79

D. Visible emissions from each Cogeneration Unit 1, 2, and 3 shall not exceed 20% opacity on a six (6) minute block average, except for no more than two (2) six (6) minute block averages in a continuous 3-hour period. [06-096 CMR 101]

E. The stack for each Cogeneration Unit 1, 2, and 3 shall be a minimum of 20 feet in height. [06-096 CMR 115, BACT]

F. Cogeneration Unit 1 shall utilize timing retard to minimize emissions and shall keep records on site documenting the ideal settings for the unit. [06-096 CMR 115, BACT]

G. Exeter Agri-Energy shall keep records of the hours of operation of each of the Cogeneration Units 1, 2, and 3 on a monthly and 12 month rolling total basis. [06-096 CMR 115, BACT]

H. De-rating

1. Cogeneration Unit 1 shall be operated at an annual maximum de-rating of 8,585 MW-hrs/yr.
2. Cogeneration Units 2 and 3 shall each be operated at an annual maximum de-rating of 10,512 MW-hrs/yr.
3. Exeter Agri-Energy shall keep records of the MW-hrs of each Cogeneration Unit 1, 2, and 3 on a monthly and 12 month rolling total basis.

[06-096 CMR 115, BACT]

I. Sampling, H_2S Action Threshold, and Testing

1. Exeter Agri-Energy shall log H_2S sampling of the biogas from each anaerobic digester at least once per calendar month using the handheld monitor or equivalent.
2. Exeter Agri-Energy shall take immediate action to reduce the H_2S level from the anaerobic digester for any monitoring test result above 1400 ppmv H_2S. A log shall be maintained describing the action taken. A follow-up sample result shall be taken and recorded after action is completed.

3. Exeter Agri-Energy shall conduct testing on each anaerobic digester at least once per calendar year using ASTM Test Method D5504, or other methods as approved by the Department, to analyze for H_2S and total sulfur. The facility shall log the results of the tests.
4. Concurrent with the annual test, measurements of H_2S shall be taken with the handheld monitor, or equivalent. If the results of the handheld (or equivalent) sampling does not correspond within reasonable accuracy to the annual test results, Exeter Agri-Energy shall re-assess/replace/recalibrate the handheld monitor, or equivalent, as appropriate to obtain valid sampling results.

[06-096 CMR 115, BACT]

J. NSPS, 40 CFR Part 60, Subpart JJJJ

Exeter Agri-Energy shall meet all applicable requirements of 40 CFR Part 60, Subpart JJJJ for each of the Cogeneration Units 1, 2, and 3, including, but not limited to, notifications, recordkeeping, and compliance documentation, including the following:

1. The cogeneration units shall each be equipped with a non-resettable hour meter. [40 CFR §60.4237 and 06-096 CMR 115, BACT]
2. Emission Requirements
   i. The cogeneration units are subject to emission requirements set forth in 40 CFR 60, Subpart JJJJ for NO_X, CO, and VOC.

Subpart JJJJ, Table 1 Standards for Digester Gas

Units of Standard (may choose to comply with either standard)	**NO_X**	**CO**	**VOC**
g/HP-hr	2.0	5.0	1.0
ppmvd at 15% O_2	150	610	80

Compliance with these emission requirements shall be demonstrated by certification from the manufacturer or an initial performance test in the timeframe specified by the rule and subsequent tests every 8760 hours of operation or 3 years, whichever comes first, if a manufacturer certification is unavailable. [40 CFR §60.4243]

ii. The emission testing or emission certification results shall also document compliance with the lb/hr license limits for NO_X, CO, and VOC (the limits are based on lower g/hp-hr limits than the 40 CFR Part 60 Subpart JJJJ emission limits). [06-096 CMR 115, BACT]

3. Exeter Agri-Energy must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practices for minimizing emissions. [40 CFR §60.4243]

The following shall replace condition (18) in air emission license A-1047-71-A-N and in air emission license amendment A-1047-71-C-A:

(18) **Flares 1-4**

A. The flares (each approx. 5 MMBtu/hr) shall fire biogas and shall be operated when the associated cogeneration unit is off-line. [06-096 CMR 115, BACT]

B. Emissions from each flare shall not exceed the following:

Pollutant	lb/MMBtu	Origin and Authority
PM	0.12	06-096 CMR 103

C. Emissions from each flare shall not exceed the following [06-096 CMR 115, BACT]:

PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
0.60	0.60	3.05	0.35	1.85	0.70

D. Visible emissions from each flare shall not exceed an opacity of 10% on a 6 minute block average basis, except for no more than one (1) six (6) minute block average in a 3 hour period. [06-096 CMR 115, BACT]

E. Records shall be maintained indicating the date, time, and duration of each flare's operations. Such records may be in the form of a written or electronic log. Acceptable records include, but are not limited to, relevant parameters such as flare temperature or flare gas fuel flow readings recorded by the computer control system. [06-096 CMR 115, BACT]

The following is a new condition:

(23) **Annual Emission Statement**

In accordance with *Emission Statements*, 06-096 CMR 137 (as amended), the licensee shall annually report to the Department the information necessary to accurately update the State's emission inventory by means of either:

1) A computer program and accompanying instructions supplied by the Department; or
2) A written emission statement containing the information required in 06-096 CMR 137.

The emission statement must be submitted as specified by the date in 06-096 CMR 137.

DONE AND DATED IN AUGUSTA, MAINE THIS 23 DAY OF October , 2013.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: Marc Allen Robert Cone for
PATRICIA W. AHO, COMMISSIONER

The term of this amendment shall be concurrent with the term of Air Emission License A-1047-71-A-N.

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: June 3, 2013
Date of application acceptance: June 6, 2013

Date filed with the Board of Environmental Protection:

This Order prepared by Kathleen E. Tarbuck, Bureau of Air Quality.

Filed
OCT 23 2013
State of Maine
Board of Environmental Protection