



STATE OF MAINE  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JOHN ELIAS BALDACCI  
GOVERNOR

DAVID P. LITTELL  
COMMISSIONER

Loring BioEnergy, LLC  
Aroostook County  
Limestone, Maine  
A-880-71-E-N (SM)

Departmental  
Findings of Fact and Order  
Air Emission License

After review of the air emission license 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., Section 344 and Section 590, the Department finds the following facts:

**I. REGISTRATION**

A. Introduction

1. Loring BioEnergy, LLC (LBE) submitted an application to renew its minor source air emissions license. The Air Emission License for LBE expired on July 19, 2009. LBE has applied to renew their expired license permitting the operation of emission sources associated with their facility which has not yet been constructed. LBE will be located at the former Loring Air Force Base in Limestone, Maine. The project will include a combustion turbine, combustion turbine generator, duct-fired heat recovery steam generator (HRSG), and a steam turbine generator to produce electric power and process steam for sale.
2. LBE will be designed to produce approximately 55 megawatts (MW) of electric power during the summer and 70 MW during the winter (actual electricity production will vary depending upon atmospheric conditions). LBE will use a combustion turbine capable of firing natural gas, #2 fuel oil, and biodiesel with a maximum heat input of approximately 600 MMBtu/hour followed by a nominally rated 300 MMBtu/hr heat recovery steam generator (HRSG) to produce superheated steam.

B. Emission Equipment to be licensed

**Fuel Burning Equipment**

Equipment	Licensed Capacity (MMBtu/hr)	Fuel Type, %Sulfur	Licensed Firing Rate <sup>2</sup>	Stack # and Stack height
Turbine #1	600 <sup>1</sup> 610 <sup>1</sup>	Natural Gas #2 fuel oil, 0.05% biodiesel and/or biodiesel blends	600,000 scf/hr 4,357 gal/hr	#1 (100 ft)

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17 STATE HOUSE STATION  
AUGUSTA, MAINE 04333-0017  
(207) 287-7688 FAX: (207) 287-7826  
RAY BLDG., HOSPITAL ST.

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106 HOGAN ROAD, SUITE 6  
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(207) 941-4570 FAX: (207) 941-4584

PORTLAND  
312 CANCO ROAD  
PORTLAND, MAINE 04103  
(207) 822-6300 FAX: (207) 822-6303

PRESQUE ISLE  
1235 CENTRAL DRIVE, SKYWAY PARK  
PRESQUE ISLE, MAINE 04679-2094  
(207) 764-0477 FAX: (207) 760-3143

Duct Burner	300	Natural Gas #2 fuel oil, 0.05% biodiesel and/or biodiesel blends	300,000 scf/hr 2,143 gal/hr	#1 (100 ft)
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<sup>1</sup> Based on ambient temperature of -14° Fahrenheit and base load

<sup>2</sup> Assuming 1000 Btu/scf for gas and 140,000 Btu/gallon for #2 fuel oil

C. Application Classification

The previous air emission license for LBE expired on July 19, 2009. A complete application was not submitted on time, therefore LBE is considered to be an existing source applying for an after-the-fact renewal. The Department has determined the facility is a minor source and the application has been processed through Major and Minor Source Air Emission License Regulations, 06-096 CMR 115 (last amended December 24, 2005). With the fuel limit on turbine and duct burner, the facility is licensed below the major source thresholds and is considered a synthetic minor.

D. Acid Rain Program

The combustion turbine and duct-fired HRSG represent a “utility unit” as defined in 40 CFR Part 72 of EPA’s Acid Rain Regulation. A utility unit is defined as a fossil fuel-fired combustion device that will supply more than one-third of its potential electrical output capacity (PEOC) and more than 25 MW output to any power distribution system for sale. The Loring plant’s PEOC was determined in accordance with 40 CFR Part 72 Appendix D, and found to meet the definition of a utility unit. LBE does not qualify as a new “clean unit” from the Acid Rain Program since the combustion turbine generator will have a nominal electrical generating capacity greater than 25 MW.

LBE’s combustion turbine generator is considered an “affected unit” and is considered an “affected source” under the Acid Rain Program. LBE has submitted a Phase II Acid Rain Permit Application to the Department and has published a public notice announcing the selection of a Designated Representative.

Per 40 CFR Part 72, LBE shall:

- ◆ acquire SO<sub>2</sub> allowances in the amount of one allowance for each ton of SO<sub>2</sub> emitted;
- ◆ install a NO<sub>x</sub> continuous emission monitoring system (CEMS) that meets the specifications of 40 CFR Part 75;

- ♦ name a designated representative to be responsible for submitting compliance monitoring reports and for obtaining necessary allowances on behalf of the facility; and
- ♦ submit an acid rain license application to the Department.

E. Part 70 license applicability

As an affected source under the Acid Rain Program, LBE is required by 06-096 CMR 140 of the Department's regulations to apply for and obtain a Part 70 license, even though LBE will be a non-major source. LBE will be required to submit an application for an initial Part 70 license within twelve months after initial startup of the plant. LBE's initial Part 70 license will also be considered their acid rain permit.

## II. BEST PRACTICAL TREATMENT

### 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 06-096 CMR 100 of the Air Regulations. 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 06-096 CMR 100 of the Air Regulations. BACT is a top down approach to selecting air emission controls considering economic, environmental and energy impacts. BPT for an after-the-fact renewal requires an analysis similar to a Best Available Control Technology analysis per 06-096 CMR 115. Descriptions of the applicable requirements are provided below under the appropriate headings.

### Project Description

LBE plans to construct and operate a combined cycle cogeneration plant at the former Loring Air Force Base in Limestone, Maine. The project will include a combustion turbine, combustion turbine generator, duct-fired heat recovery steam generator (HRSG), and steam turbine to produce electric power and process steam for sale. While a specific gas turbine manufacturer has not yet been selected, LBE's application is based on the use of either a General Electric (GE) Frame 6 or LM6000 turbine. The proposed turbine is rated at approximately 600 MMBtu/hr and the duct burner will have a maximum heat

input capacity of approximately 300 MMBTU/hour. The firing rate of the duct burner will vary based on process steam demands, combustion turbine load, ambient air temperature, and other factors. Under ideal conditions, the duct burner would be fired on a continuous basis throughout the year to maximize process steam sales. LBE's initial air license for the combined heat and power (CHP) plant, as amended through Minor Revision #3, authorized the use of natural gas, biodiesel (B100) or biodiesel blends, and #2 fuel oil in both the combustion turbine and duct burner. LBE will maintain this fuel flexibility in this license renewal.

LBE is designed to produce approximately 55 Megawatts (MW) of electric power (net) during the summer and 70 MW (net) during the winter (actual electricity production will vary depending upon atmospheric conditions). The generation of electricity by a combined cycle combustion turbine generator set can be described as follows: combustion air enters through the inlet air filters and is compressed by the turbine-driven compressor. Fuel and compressed air are mixed and burned in the combustion section of the turbine, creating a high-pressure, hot gas. This gas is then expanded through the power turbine section where most of its thermal energy is converted to work as it turns the turbine. The combustion turbine drives both the air compressor and the electric generator attached to the combustion turbine. Waste heat from the combustion turbine is routed to a Heat Recovery Steam Generator (HRSG). Supplemental heat is generated through the use of a duct burner at the inlet to the HRSG. Steam generated by the HRSG is (1) routed to the steam turbine generator to produce electricity and (2) sold directly to offsite users.

In addition to the combustion turbine and duct burner HRSG, there will be other potential sources of air emissions at LBE, such as general maintenance activities and plant up-keep. Such activities are exempt from licensing in accordance with 06-096 CMR 115, Appendix B, Section A. Also, LBE will be equipped with a mechanical draft cooling tower. The cooling tower is exempt from licensing pursuant to 06-096 CMR 115, Appendix B, Section A. LBE will also use an existing 660,000-gallon aboveground fuel oil storage tank for storage of its #2 fuel oil. This tank was constructed prior to July 23, 1984 and has not been modified or reconstructed since this date. Therefore, the tank is not subject to Subpart Kb of EPA's New Source Performance Standards. The potential VOC emissions from the tank are less than one ton per year, thus the tank is exempt from licensing pursuant to 06-096 CMR 115, Appendix B, Section B.

## B. New Source Performance Standard (NSPS)

LBE's proposed project was subject to New Source Performance Standards (NSPS), 40 CFR Part 60, Subpart GG - Standards of Performance for Stationary Gas Turbines, for which construction is commenced after October 3, 1977. However, the facility has not been constructed since the issuance of its original air license (July 2004), therefore the facility is now subject to 40 CFR Part 60, Subpart KKKK.

This subpart establishes emission standards and compliance schedules for the control of emissions from stationary combustion turbines that commenced construction, modification or reconstruction after February 18, 2005. Stationary combustion turbines regulated under this Subpart are exempt from the requirements of Subpart GG. Heat recovery steam generators and duct burners regulated under this Subpart are exempted from the requirements of Subparts Da, Db, and Dc.

Subpart KKKK contains the following emission performance limits that are applicable to the LBE:

- NO<sub>x</sub> emission limit on natural gas fuel: 25 ppm<sub>dv</sub> @ 15% oxygen or 1.2 lbs/MW-hr
- NO<sub>x</sub> emission limit on liquid fuel: 74 ppm<sub>dv</sub> @ 15% oxygen or 3.6 lbs/MW-hr
- NO<sub>x</sub> emission limit at turbine loads less than 75% or at ambient temperatures less than 0°F, regardless of fuel type: 96 ppm<sub>dv</sub> @ 15% oxygen or 4.7 lbs/MW-hr
- The above NO<sub>x</sub> emission limits apply to the combined emissions from the combustion turbine and duct burner
- SO<sub>2</sub> emission limit: 0.06 lbs/MMBTU (achievable by using 0.05% or lower sulfur for liquid fuels and 20 grains or less of sulfur per 100 cubic feet for natural gas)

A BACT determination for an emission source must be at least as stringent as any applicable New Source Performance Standards established by EPA in 40 CFR Part 60 of the Code of Federal Regulations. A summary of the BACT analysis for each of the pollutants is discussed below:

## C. BACT for the Gas Turbine Generator and Duct Burner

Although LBE has not yet made a final selection as to the combustion turbine manufacturer, this BACT analysis and related emission rates are based on a

General Electric combustion turbine of either the Frame 6 or the LM6000 type.

Nitrogen Oxides

A detailed BACT analysis can be found in the renewal application received December 7, 2009. The facility reviewed NOx control technology including Dry Low NOx (DLN), Diluent Injection, Catalytic Combustion, and post combustion control technologies including selective catalytic reduction (SCR) and EMx™ catalyst technology (second generation of SCONOX™). The following is a summary of the conclusions of this study.

BACT for the LBE is the use of SCR in conjunction with either DLN combustors or water injection for gas fuel and water injection for liquid fuel is consistent with the most stringent BACT determinations made on recently permitted projects. Based on preliminary emission guarantees obtained from a duct burner vendor, the maximum NOx emission contribution from the duct burner will be 0.11 lb/MMBTU on gas and 0.13 lb/MMBTU on oil. LBE will also utilize an SCR system that is designed to achieve a minimum 90% NOx removal efficiency during normal operations. By using these technologies, the resulting NOx emission concentrations from LBE's stack are expected to fall within a range of 3 to 4 ppmdv @ 15% O<sub>2</sub> when firing gas, and 6 to 8 ppmdv @ 15% O<sub>2</sub> when firing liquid fuel. The actual NOx concentration at any given time will be dependent on several factors, including gas turbine load, ambient temperature, duct burner firing rate, and nitrogen content of the fuel.

The Department has determined that LBE shall limit NOx emissions during natural gas firing to 4.5 ppmdv @ 15% O<sub>2</sub> on a 30-day rolling average, and to 6 ppmdv @ 15% O<sub>2</sub> over any 24-hour block average. These limits are identical to those that are applicable to other recently licensed cogeneration facilities that utilize duct burners. The operation of duct burners results in NOx concentrations that are higher than those plants operating without duct burners. Thus, the NOx limits on natural gas fuel will provide LBE with the flexibility it needs in order to operate the plant as a true combined heat and power plant having a potentially wide range of operating conditions.

The Department has determined that LBE shall limit its NOx emissions to 15 ppmdv @ 15% O<sub>2</sub> when firing liquid fuel. This limit, during liquid fuel firing, is more stringent than other licensed Maine co-generation facilities. LBE will operate its SCR system during liquid and gas fuel firing to reduce NOx emissions.

Carbon Monoxide

Carbon Monoxide (CO) results from the incomplete combustion of fuel in the turbine. As with other types of combustors, combustion efficiency is optimized at the design load case. Both DLN and water injection based combustors are designed to achieve efficient, stable combustion and to minimize emissions of multiple pollutants. CO control is inherently designed into these combustion technologies. LBE is proposing to install an oxidation catalyst as a means to limit its potential annual emissions of CO to less than 100 tons per year, thereby remaining a minor source. LBE's proposed use of combustion controls and an oxidation catalyst is consistent with the most stringent CO controls employed. The oxidation catalyst system to be used by LBE will achieve a minimum of 80% CO reduction efficiency during normal operations.

By using these technologies, the resulting CO emission concentrations exiting the LBE stack are expected to fall within a range of 8 to 9 ppm<sub>dv</sub> @ 15% O<sub>2</sub> when firing gas, and 12 to 13 ppm<sub>dv</sub> @ 15% O<sub>2</sub> when firing #2 fuel oil. The actual CO concentration at any given time will be dependent on several factors, including gas turbine load, ambient temperature, and duct burner firing rate. This overall CO emission performance level is consistent with the permitted levels for the RBLC facilities using an oxidation catalyst. The maximum licensed allowed CO emission rate from the LBE stack is 10.7 pounds per hour during gas firing and 15.1 pounds per hour during oil firing.

Particulate Matter and PM<sub>10</sub>

LBE identified several options for potential particulate control including the combustion of clean fuels and good combustion practices. However, add-on controls such as baghouses, electrostatic precipitators, and scrubbers have not been applied on gas or oil-fired turbine facilities. Add-on controls could create unacceptable back pressure, thus reducing efficiency and increasing fuel usage and the high level of excess air produced by combustion turbines would in turn increase the size and cost of the add-on control, making them economically infeasible. The clean, low sulfur fuels and state-of-the-art combustion technology to be employed at LBE will ensure that particulate matter emissions are minimal and that add-on control technology is not warranted. All of the combined cycle gas turbine plants listed in the RBLC, and all plants recently permitted by Maine and New Hampshire, were determined to meet BACT for PM<sub>10</sub> through the use of clean fuels and combustion controls.

In developing PM<sub>10</sub> emission rates, LBE has considered the potential formation of ammonium salts resulting from the presence of both an oxidation catalyst and an SCR system. LBE has also considered the contribution of condensable particulate matter to overall PM<sub>10</sub> emission rates. The maximum predicted PM<sub>10</sub> emission rates for LBE are 19.8 pounds per hour during gas firing and 35.8 pounds per hour during liquid fuel firing. LBE's inclusion of condensable particulate matter in its original ambient air quality analysis provided assurance that the facility will comply with ambient air quality standards when condensables are considered. For purposes of consistency with the other gas turbine plants, any PM<sub>10</sub> emission performance testing for LBE will be based solely on filterable particulates until the Department uniformly changes its particulate testing policy.

#### Sulfur Dioxide (SO<sub>2</sub>)

Sulfur dioxide is formed from the oxidation of sulfur present in the fuel. The sulfur content of the natural gas supply for LBE is not expected to exceed 2 grains per 100 standard cubic feet of natural gas. Any liquid fuel burned in the turbine and/or duct burner, whether #2 fuel oil, biodiesel (B100), or a blend thereof, will contain no more than 0.05% sulfur by weight. These fuel sulfur levels are compliant with the applicable NSPS, Subpart KKKK contained in 40CFR60, and render flue gas desulfurization systems unnecessary. The BACT determinations for the combined cycle gas turbine plants listed in EPA's RBLC list the use of low sulfur fuels as BACT for SO<sub>2</sub> emissions. This is consistent with the SO<sub>2</sub> BACT determinations made by Maine DEP and New Hampshire DES on turbine plants.

LBE will use pipeline quality natural gas, and/or liquid fuels having a sulfur content of 0.05% by weight or less, in both the combustion turbine and duct burner. Using these low sulfur fuels meets BACT for SO<sub>2</sub> emissions. The maximum predicted SO<sub>2</sub> emission rate from LBE's stack will be 5.4 pounds per hour during gas firing and 47.3 pounds per hour during liquid fuel firing.

#### Volatile Organic Compounds (VOC)

Volatile organic compounds are produced by the combustion of fuel in the combustion turbine and duct burner as a result of incomplete combustion. VOCs produced from the combustion of fuel can be reduced by an oxidation catalyst. The oxidation catalysts employed to control CO emissions also reduce VOC, but to a lesser extent. The VOC reduction achieved by an oxidation catalyst is generally regarded as a secondary benefit.

LBE will be equipped with state-of-the-art combustion controls and an oxidation catalyst to control CO emissions. This combination of technology is also the most effective control method for VOC emissions. The maximum predicted VOC emission rate from the stack will be 9.9 pounds per hour during gas firing and 13.7 pounds per hour during oil firing.

Ammonia (NH<sub>3</sub>)

In order for the LBE to achieve compliance with the stringent NO<sub>x</sub> emission rates that have been determined to represent BACT, ammonia gas must be injected into the exhaust gas in quantities that exceed the stoichiometric ratio theoretically required to reduce all of the NO<sub>x</sub> present. Due to imperfect gas mixing, a small portion of the injected ammonia will be released from the stack as ammonia “slip”. Slip levels are controlled through proper SCR operation and maintenance.

Ammonia slip emissions can be controlled to very low levels when operating conditions are relatively steady state. As combustion turbine load and/or duct burner firing rates change, so does the exhaust gas profile and pollutant loading. As the exhaust conditions change and ammonia injection control system adjusts to match the new condition, ammonia slip levels can increase beyond those achievable under steady-state conditions. Consequently, to account for this variability and to encourage maximum NO<sub>x</sub> reductions, the Department has established a two-tiered ammonia slip limit for most of the gas turbine plants that employ SCR. To meet BACT, LBE will control ammonia concentrations to less than 20 ppm<sub>dv</sub> at 15% O<sub>2</sub> based on a 24-hour average and 5 ppm<sub>dv</sub> at 15% O<sub>2</sub> based on a 30-day rolling average.

Sulfuric Acid Mist (H<sub>2</sub>SO<sub>4</sub>)

Like SO<sub>2</sub>, H<sub>2</sub>SO<sub>4</sub> is also produced as a result of the oxidation of sulfur in fuel. A small fraction (typically less than 5%) of the sulfur contained in the fuel fired in the combustion turbine and duct burner will be oxidized to sulfur trioxide (SO<sub>3</sub>) during the initial combustion reactions. For power plants using an oxidation catalyst for CO control, it is estimated that roughly one-third of the sulfur dioxide formed during combustion will oxidize to SO<sub>3</sub> as it passes through the oxidation catalyst. Smaller amounts of SO<sub>2</sub> can also be converted to SO<sub>3</sub> in the SCR catalyst bed if vanadium is present. A portion of the SO<sub>3</sub> formed by these different mechanisms may dissolve in water vapor present in the exhaust to form H<sub>2</sub>SO<sub>4</sub>. Depending on the exhaust gas temperatures, a portion of the sulfuric acid vapor can condense in the exhaust gas ductwork and/or stack to form sulfuric acid mist. For gas turbine plants utilizing SCR

for NOx control, the SO<sub>3</sub> that is formed in the exhaust gas is subject to participation in chemical reactions with ammonia gas that is injected into the exhaust gas. These reactions with ammonia compete with, and thus reduce the amount of SO<sub>3</sub> that will react with water vapor to form H<sub>2</sub>SO<sub>4</sub>.

The low sulfur fuels to be used at LBE will ensure that emissions of sulfuric acid mist are receiving BACT. LBE will utilize both an oxidation catalyst and an SCR system. Therefore, the emission rate of sulfuric acid mist from the LBE's stack will depend upon many factors, including the sulfur level in the fuel; the actual conversion rate of SO<sub>2</sub> to SO<sub>3</sub> across the oxidation catalyst; the conversion rate of SO<sub>3</sub> to ammonium salts; and the exhaust gas temperature profile downstream of the SCR system. LBE's initial license and this renewal license will limit emissions of sulfuric acid mist to 46.5 tons per year.

#### Summary of BACT Determination

The emission control methods and emission rates being proposed as BACT for LBE were determined by conducting a "top down" BACT analysis, as defined in 06-096 CMR 115 of the Maine DEP regulations and as outlined in EPA's New Source Review Workshop Manual (Draft, October 1990). LBE has determined that the use of either dry low NOx (DLN) combustors or water injection, along with Selective Catalytic Reduction (SCR) technology, represents BACT for NOx emissions when burning natural gas and the use of water injection in conjunction with SCR represents BACT when burning liquid fuel. The use of state-of-the-art combustion controls represents BACT for CO and VOC emissions. CO and VOC emissions will be further controlled through the use of an oxidation catalyst. BACT for SO<sub>2</sub>, H<sub>2</sub>SO<sub>4</sub> and PM<sub>10</sub> emissions will be met by using clean, very low sulfur fuels, specifically pipeline quality natural gas, and liquid fuels (either biodiesel fuel, #2 fuel oil or a blend thereof) having a maximum sulfur content of 0.05% by weight. A summary of the proposed emission control methods and emission rates is included in the following table.

**Emission Control Methods and Emission Rates<sup>1</sup>**

Pollutant	Natural Gas	Liquid Fuel <sup>2</sup>
NOx	DLN or Water injection ≥90% removal using SCR 4.5 ppmdv @ 15% O <sub>2</sub> (30-day rolling avg) 6 ppmdv @ 15% O <sub>2</sub> (24-hr block avg) 6.6 pounds per hour	Water injection ≥90% removal using SCR 15 ppmdv @ 15% O <sub>2</sub> (24-hr block avg) 14.1 pounds per hour

CO	≥80% removal using oxidation catalyst 10.7 pounds per hour	≥80% removal using oxidation catalyst 15.1 pounds per hour
VOC <sup>3</sup>	Oxidation catalyst 9.9 pounds per hour	Oxidation catalyst 13.7 pounds per hour
SO <sub>2</sub> & H <sub>2</sub> SO <sub>4</sub>	Pipeline quality natural gas SO <sub>2</sub> : 5.4 pounds per hour	Sulfur limit of 0.05% by weight SO <sub>2</sub> : 47.3 pounds per hour
PM <sub>10</sub> <sup>4</sup>	Pipeline quality natural gas 19.8 pounds per hour	Biodiesel or petroleum distillate 35.8 pounds per hour
NH <sub>3</sub>	20 ppmdv @ 15% O <sub>2</sub> (24-hr avg.) 5 ppmdv @ 15% O <sub>2</sub> (30-day rolling)	20 ppmdv @ 15% O <sub>2</sub> (24-hr avg.) 5 ppmdv @ 15% O <sub>2</sub> (30-day rolling)

- <sup>1</sup> The listed emission rates do not apply when the combustion turbine is operating below 50% of base load, nor during start-up, shutdown, or fuel transfer conditions. The hourly mass emission rates represent the maximum expected emissions from the stack at a -14°F ambient temperature, with the combustion turbine at base load and the duct burner firing at its maximum heat input capacity of 300 MMBTU/hour. The emission rates also assume that the combustion turbine and duct burner are burning the same fuel.
- <sup>2</sup> The hourly mass emission rates shown for liquid fuel apply to #2 fuel oil. As allowed by license condition #30 established in Minor Revision #2 to LBE's initial license, the hourly emission rates when firing biodiesel and/or biodiesel blends will not exceed 150% of the values listed for #2 fuel oil.
- <sup>3</sup> Expressed as non-methane VOC, as measured using EPA Method 25A.
- <sup>4</sup> As measured using EPA Method 201 or 201A for filterables and EPA Method 202 for condensables.

#### D. Streamlining

The following is a brief description of the origin of some of the emission limits to which LBE is subject. In the situations where LBE is subject to both a regulatory limit and a BACT or NSPS limit, the most stringent limit is listed within the Order section of this license and compliance with that limit is considered to be a demonstration of compliance with the other limits. The following shows BACT limits which are more stringent and are therefore streamlined in the Order section of this license.

##### Opacity

LBE accepts streamlining for opacity requirements. 06-096 CMR 101, Section 2(B)(1)(a)(i) of the Department's regulations, and Best Available Control Technology (BACT) requirements are applicable. The BACT opacity limit is more stringent. Therefore, only the more stringent BACT opacity limit is included in this license.

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Particulate Matter

LBE accepts streamlining for particulate matter requirements. 06-096 CMR 103(2)(B)(1)(c) of the Department's regulations, and BACT requirements are applicable. The BACT particulate matter limit is more stringent. Therefore, only the more stringent BACT particulate matter limit is included in this license.

Sulfur Dioxide

LBE accepts streamlining for sulfur dioxide requirements. 40 CFR Part 60, Subpart KKKK and BACT requirements are applicable. The BACT limit is more stringent. Therefore, only the more stringent BACT sulfur dioxide limit is included in this license.

Nitrogen Oxide

LBE accepts streamlining for nitrogen oxide requirements. 40 CFR Part 60, Subpart KKKK and BACT requirements are applicable. BACT incorporates the NSPS for the gas turbines, therefore only the more stringent BACT nitrogen oxide limit is included in this license.

Periodic Monitoring

Periodic monitoring shall consist of record keeping which includes sulfur content of liquid fuel, and continuous monitoring of NOx, ammonia and opacity. LBE shall operate monitors and record the following as specified for each parameter:

Turbine and Duct Burner	Monitor	Record
Natural gas flow rate	Continuously *	1-hr block average
#2 fuel oil/biodiesel flow rate	Continuously	1-hr block average

\* Continuously is defined as a minimum of two points in a one-hour period.

**E. 40 CFR Part 64, Compliance Assurance Monitoring (CAM)**

As stated in 40CFR64.2(a), the Compliance Assurance Monitoring (CAM) Rule is applicable to a pollutant-specific emissions unit at a major source that is required to obtain a part 70 or 71 permit, and that satisfies certain criteria. While LBE is required to obtain a part 70 permit as an "affected source" under the Acid Rain regulations, LBE is not a major source, and therefore is not subject to the CAM

Rule. LBE will utilize a combination of continuous emission monitors, continuous operating parameter monitors, and emission performance tests to assure compliance with applicable requirements.

**F. Facility Emissions and Fuel Use Cap**

Facility emissions are based on the operation of LBE's natural gas/oil/biodiesel fired turbine generator along with emissions from the duct burner which can also burn natural gas, oil, or biodiesel. The highest emissions are a result of fuel oil/biodiesel combustion. Therefore, LBE is limited to an annual #2 fuel oil, biodiesel, biodiesel blend consumption rate of 17,500,000 gallons.

**Total Licensed Annual Emissions for the Facility**  
(used to calculate the annual license fee)

Pollutant	TPY
PM	98.8
PM <sub>10</sub>	98.8
SO <sub>2</sub>	77.4
NO <sub>x</sub>	36.4
CO	48.3
VOC	40.8
H <sub>2</sub> SO <sub>4</sub>	46.5
NH <sub>3</sub>	19.7

**III. AMBIENT AIR QUALITY ANALYSIS**

LBE previously submitted an ambient air quality analysis demonstrating that emissions from the facility, in conjunction with all other sources, do not violate ambient air quality standards. The full analysis can be found in LBE's initial Air Emission License, A-880-71-A-N issued July 19, 2004. An additional ambient air quality analysis is not required for this renewal.

**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,
- will not violate applicable ambient air quality standards in conjunction with emissions from other sources.

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The Department hereby grants Air Emission License A-880-71-E-N subject to the conditions 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.

### STANDARD CONDITIONS

- (1) Employees and authorized representatives of the Department shall be allowed access to the licensee's premises during business hours, or any time during which any emissions units are in operation, and at such other times as the Department deems necessary for the purpose of performing tests, collecting samples, conducting inspections, or examining and copying records relating to emissions (38 M.R.S.A. §347-C).
- (2) The licensee shall acquire a new or amended air emission license prior to commencing construction of a modification, unless specifically provided for in Chapter 115. [06-096 CMR 115]
- (3) Approval to construct shall become invalid if the source has not commenced construction within eighteen (18) months after receipt of such approval or if construction is discontinued for a period of eighteen (18) months or more. The Department may extend this time period upon a satisfactory showing that an extension is justified, but may condition such extension upon a review of either the control technology analysis or the ambient air quality standards analysis, or both. [06-096 CMR 115]
- (4) The licensee shall establish and maintain a continuing program of best management practices for suppression of fugitive particulate matter during any period of construction, reconstruction, or operation which may result in fugitive dust, and shall submit a description of the program to the Department upon request. [06-096 CMR 115]
- (5) The licensee shall pay the annual air emission license fee to the Department, calculated pursuant to Title 38 M.R.S.A. §353. [06-096 CMR 115]
- (6) The license does not convey any property rights of any sort, or any exclusive privilege. [06-096 CMR 115]

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- (7) The licensee shall maintain and operate all emission units and air pollution systems required by the air emission license in a manner consistent with good air pollution control practice for minimizing emissions. [06-096 CMR 115]
- (8) The licensee shall maintain sufficient records to accurately document compliance with emission standards and license conditions and shall maintain such records for a minimum of six (6) years. The records shall be submitted to the Department upon written request. [06-096 CMR 115]
- (9) The licensee shall comply with all terms and conditions of the air emission license. The filing of an appeal by the licensee, the notification of planned changes or anticipated noncompliance by the licensee, or the filing of an application by the licensee for a renewal of a license or amendment shall not stay any condition of the license. [06-096 CMR 115]
- (10) The licensee may not use as a defense in an enforcement action that the disruption, cessation, or reduction of licensed operations would have been necessary in order to maintain compliance with the conditions of the air emission license. [06-096 CMR 115]
- (11) In accordance with the Department's air emission compliance test protocol and 40 CFR Part 60 or other method approved or required by the Department, the licensee shall:
  - A. perform stack testing to demonstrate compliance with the applicable emission standards under circumstances representative of the facility's normal process and operating conditions:
    1. within sixty (60) calendar days of receipt of a notification to test from the Department or EPA, if visible emissions, equipment operating parameters, staff inspection, air monitoring or other cause indicate to the Department that equipment may be operating out of compliance with emission standards or license conditions; or
    2. pursuant to any other requirement of this license to perform stack testing.
  - B. install or make provisions to install test ports that meet the criteria of 40 CFR Part 60, Appendix A, and test platforms, if necessary, and other accommodations necessary to allow emission testing; and
  - C. submit a written report to the Department within thirty (30) days from date of test completion.[06-096 CMR 115]
- (12) If the results of a stack test performed under circumstances representative of the facility's normal process and operating conditions indicate emissions in excess of the applicable standards, then:

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- A. within thirty (30) days following receipt of such test results, the licensee shall re-test the non-complying emission source under circumstances representative of the facility's normal process and operating conditions and in accordance with the Department's air emission compliance test protocol and 40 CFR Part 60 or other method approved or required by the Department; and
- B. the days of violation shall be presumed to include the date of stack test and each and every day of operation thereafter until compliance is demonstrated under normal and representative process and operating conditions, except to the extent that the facility can prove to the satisfaction of the Department that there were intervening days during which no violation occurred or that the violation was not continuing in nature; and
- C. the licensee may, upon the approval of the Department following the successful demonstration of compliance at alternative load conditions, operate under such alternative load conditions on an interim basis prior to a demonstration of compliance under normal and representative process and operating conditions.

[06-096 CMR 115]

- (13) Notwithstanding any other provisions in the State Implementation Plan approved by the EPA or Section 114(a) of the CAA, any credible evidence may be used for the purpose of establishing whether a person has violated or is in violation of any statute, regulation, or Part 70 license requirement. [06-096 CMR 115]
- (14) The licensee shall maintain records of malfunctions, failures, downtime, and any other similar change in operation of air pollution control systems or the emissions unit itself that would affect emission and that is not consistent with the terms and conditions of the air emission license. The licensee shall notify the Department within two (2) days or the next state working day, whichever is later, of such occasions where such changes result in an increase of emissions. The licensee shall report all excess emissions in the units of the applicable emission limitation. [06-096 CMR 115]
- (15) Upon written request from the Department, the licensee shall establish and maintain such records, make such reports, install, use and maintain such monitoring equipment, sample such emissions (in accordance with such methods, at such locations, at such intervals, and in such a manner as the Department shall prescribe), and provide other information as the Department may reasonably require to determine the licensee's compliance status. [06-096 CMR 115]

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## SPECIFIC CONDITIONS

### (16) Electric Generating System

- A. LBE shall consist of a combustion turbine generator along with a duct burner with a maximum heat input capacity of approximately 300 MMBtu/hr. [06-096 CMR 115]
- B. LBE is licensed to fire natural gas, #2 fuel oil, biodiesel and/or biodiesel blends in the combustion turbine and duct burner. The maximum sulfur content of the liquid fuel shall not exceed 0.05% by weight. LBE is limited to an annual #2 fuel oil, biodiesel, biodiesel blend consumption rate of 17,500,000 gallons. [06-096 CMR 115]
- C. Visible emissions from the exhaust stack serving the gas turbine and duct-fired HRSG shall not exceed 10% opacity, measured as 6 minute block averages, except for one 6 minute block average period per hour of not more than 27% opacity. This opacity limit shall not apply during the first four hours following the initiation of cold startup or planned shutdown, provided that operating records are available to demonstrate that the facility was being operated to minimize emissions. [06-096 CMR 115, BACT]
- D. Compliance with the opacity limit shall be demonstrated through use of a Continuous Opacity Monitor (COMs) which meets the requirements of 06-096 CMR 117 of the Department's regulations. [06-096 CMR 117]
- E. LBE shall operate the unit with water injection for liquid fuels, and either dry low NOx combustors or water injection for gas fuels and a Selective Catalytic Reduction (SCR) system to reduce NOx emissions. [06-096 CMR 115, BACT]
- F. The exhaust from the gas turbine system and duct burner shall be vented through a 100 foot above ground level stack. [06-096 CMR 115, BACT]
- G. Emissions from the LBE stack shall not exceed the following limits, except during startup, shutdown, and fuel transfer conditions. These limits apply both during duct burner firing, and when the duct burner is not being fired. The hourly mass emission limits when firing biodiesel or biodiesel blends shall not exceed 150% of the emission limits listed below for #2 fuel oil. The emission limits for liquid fuel apply if either the combustion turbine or the duct burner is firing liquid fuel. For any calendar day or portion thereof in which liquid fuel is fired in either the combustion turbine or duct burner, the 24-hour block

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average NOx emission limit for liquid fuel shall apply to that calendar day:  
 [06-096 CMR 115, BACT]

Pollutant	ppmvd	Averaging period	Natural Gas (lb/hr)	#2 Fuel Oil (lb/hr)	Control Technology
PM <sub>10</sub> *	--	--	19.8	35.8	Natural gas/low sulfur distillate/biodiesel
SO <sub>2</sub>	--	--	5.4	47.3	Natural gas/0.05% S fuel limit
NOx	4.5 @15% O <sub>2</sub> (gas) 6 @15% O <sub>2</sub> (gas) 15 @15% O <sub>2</sub> (liq)	30-day rolling 24-hour block 24-hour block	6.6 (24-hour block)	14.1 (24-hour block)	Water Injection or Dry Low NOx Technology, & SCR
CO	--		10.7	15.1	Oxidation Catalyst & Good Combustion Control
VOC **	--	--	9.9	13.7	Oxidation Catalyst & Good Combustion Control
NH <sub>3</sub>	20 @15% O <sub>2</sub> 5 @15% O <sub>2</sub>	24 hour avg 30-day rolling	--	--	Good Engineering Practices

\* as measured using EPA Method 201 or 201A for filterables and EPA Method 202 for condensables

\*\* Expressed as non-methane VOC, as measured using EPA Method 25A

H. Compliance with the PM<sub>10</sub> lb/hour emission limits shall be determined upon Department request through stack testing in accordance with 40 CFR Part 60, Appendix A, Method 5 and 40 CFR Part 51, Appendix M.  
 [06-096 CMR 115, BACT]

I. Compliance with the SO<sub>2</sub> lb/hour emission limit shall be demonstrated by recording the hourly fuel flow rate of natural gas and oil into the turbine and duct burner on a one (1) hour block average basis and by determining the fuel's sulfur content as required by 40 CFR 60 Subpart KKKK.  
 [40 CFR 60 Subpart KKKK]

J. Compliance with the NOx emission limit shall be demonstrated by the use of a continuous emission monitor (CEMS) meeting the performance specifications of 40 CFR Part 60, Appendix B and F, Part 75, Appendix A and B, and MEDEP 06-096 CMR 117, as applicable. LBE shall meet the monitoring requirements as specified in 40 CFR Part 60 Subpart KKKK. [06-096 CMR 115 & 117, 40 CFR Part 60 Subpart KKKK]

- K. Compliance with the ammonia ppmdv emission limits shall be demonstrated by the use of continuous emission monitors (CEMs). The monitor shall meet the criteria of the appropriate performance specification of 40 CFR Part 60 Appendix B&F, and Part 75, appendices A&B. [06-096 CMR 115, BACT]
- L. Compliance with the VOC lb/hour emission limit shall be demonstrated upon request of the Department through stack testing in accordance with 40 CFR Part 60, Appendix A, Method 25A. [06-096 CMR 115, BACT]
- M. Compliance with the CO lb/hour emission limit shall be demonstrated through stack testing in accordance with 40 CFR Part 60, Appendix A, Method 10. [06-096 CMR 115, BACT]

(17) Periodic Monitoring

Periodic monitoring shall consist of record keeping which includes sulfur content of liquid fuel, and continuous monitoring of NOx, ammonia and opacity. LBE shall operate monitors and record the following as specified for each parameter:

<b>Turbine and Duct Burner</b>	<b>Monitor</b>	<b>Record</b>
Natural gas flow rate	Continuously	1-hr block average
Liquid fuel flow rate	Continuously	1-hr block average

Continuously is defined as a minimum of two points in a one-hour period.  
[06-096 CMR 115]

(18) Continuous Emission Monitors (CEMS) and Monitoring:

- A. The exhaust system serving the combustion turbine and duct burner shall be equipped with continuous emission monitoring equipment for nitrogen oxides, ammonia, and diluent gas (oxygen or carbon dioxide).
- B. The continuous monitors must satisfy the applicable performance specifications in 40 CFR Part 60, Appendices B&F, Part 75, Appendices A&B, and 06-096 CMR 117 of the Department regulations.
- C. Performance specifications, monitor location, calibration and operating procedures and quality assurance procedures for each monitor must be submitted to the Bureau of Air Quality for review and approval at least 180 days prior to expected start-up.
- D. LBE shall notify the Bureau of Air Quality in writing of the date on which the initial performance testing of the CEMS begins at least 30 days prior to such a date.

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- E. All data shall be monitored and recorded continuously, in accordance with 06-096 CMR 117 of the Department regulations.
  - F. LBE shall maintain records for the gas turbine for:
    - i. Hours of operation, including startup, shutdown, and any other down time;
    - ii. Malfunctions of the air pollution control system; and
    - iii. Quantities of natural gas delivered to the facility on a monthly basis.
  - G. In the event that LBE uses a split scale NOx CEMS with a lower scale at 1-10 ppm and an upper scale at approximately 10-250 ppm, LBE shall be permitted to modify the calibration method in 40 CFR Part 60, Appendix B & F in order to calibrate their NOx CEMS across two scales, with only one point required to be calibrated in the lower end scale.  
[06-096 CMR 117]
- (19) This facility shall comply with the requirements of the Federal New Source Performance Standards 40 CFR Part 60, Subparts A (General provisions) and Subpart KKKK (Stationary Gas Turbines). LBE shall comply with the notification and recordkeeping requirements of 40 CFR Part 60.7.  
[40 CFR 60 A and Subpart KKKK]
- (20) Acid Rain Requirements: [40 CFR, Part 72]
- A. LBE shall comply with the applicable Federal acid rain program requirements codified in 40 CFR Parts 72, 73, 75, 77, and 78.
  - B. LBE shall obtain and hold in the EPA Allowance Management System, sufficient Acid Rain allowances for each ton of SO<sub>2</sub> emitted annually in accordance with the requirements of 40 CFR, Part 72, 73, 75, 77, and 78.
- (21) As an affected source under the Acid Rain Program, LBE is required by 06-096 CMR 140 of the Department's regulations to apply for and obtain a Part 70 license, even though LBE will be a non-major source. LBE will be required to submit an application for an initial Part 70 license within twelve months after initial startup of the plant. LBE's initial Part 70 license will also be considered their acid rain permit.
- (22) Turbine Startup, Shutdown, and Fuel Transfer
- A. LBE shall minimize emissions from the gas turbine to the maximum extent practicable during startup and shutdown, fuel transfer, under maintenance or adjustment conditions, during equipment cleaning conditions, and during initial gas turbine commissioning by following proper operating procedures to minimize the emission of air contaminants to the maximum extent practical.

1. Turbine startup shall be defined as that period of time from initiation of combustion turbine firing until the unit reaches steady state load operation. Steady state operation shall be reached when the combustion turbine reaches minimum load (60%) and the steam turbine is declared available for load changes. This period shall not exceed 60 minutes for a hot start, 180 minutes for a warm start, nor 240 minutes for a cold start. A hot start shall be defined as startup when the generating unit has been down for less than 2 hours. A warm start shall be defined as startup when the generating unit has been down for more for more than 2 hours and less than or equal to 48 hours. A cold start shall be defined as startup when the generating unit has been down for more than 48 hours. Unit shutdown shall be defined as that period of time from steady state operation to cessation of combustion turbine firing. This period shall not exceed 60 minutes.
2. Fuel transfer shall be defined as the process of switching the type of fuel that is being fired in the combustion turbine.
3. Initial turbine commissioning shall be defined as the period of time from initial turbine startup to the date of the initial performance test, but not later than 180 days after the initial startup.
4. The emission limitations of Condition (16) shall apply at all times, except during turbine startup/shutdown/fuel transfer conditions for the period of time from the turbine's first fire until the license is amended to incorporate emission limits for startup, shutdown, and fuel transfer conditions. Within twelve months from the initial performance testing required by Condition (24) the owner/operator shall propose to the Bureau of Air Quality, numerical emission limits to apply during turbine startup, shutdown, and fuel transfer conditions. Continuous emission monitoring and/or stack test data gathered during startups, shutdowns, and fuel transfers, or other methods approved by the Department, shall be used as the basis for these limits.

[06-096 CMR 115, BACT]

- (23) Ammonia will not be injected into the HRSG during start-up or shutdown unless the catalyst bed is at, or above, the manufacturer's specified minimum operation temperature. [06-096 CMR 115]
- (24) Performance Tests  
LBE shall conduct the initial PM and VOC performance tests per the procedures listed in paragraphs (16)H and (16)L, respectively, within 60 days after achieving

the maximum production rate at which the plant will be operated but not later than 180 days after the initial startup. All testing shall comply with all of the requirements of the DEP Compliance Test Protocol and with 40 CFR Part 60, as appropriate, or other methods approved by the Bureau of Air Quality. A representative of the DEP or Environmental Protection Agency (EPA) shall be given the opportunity to observe the compliance testing. [06-096 CMR 115]

(25) LBE shall perform stack testing for NOx, PM, CO, and VOC, within 60 days of startup, when operating on biodiesel and biodiesel blends to determine appropriate emission limits. [06-096 CMR 115]

(26) For Compliance Assurance, LBE shall comply with the following:  
The Bureau of Air Quality finds the following Compliance Assurance Plan to be reasonable and appropriate. [06-096 CMR 115]

A. Quarterly Reporting

1. The licensee shall submit a Quarterly Report to the Bureau of Air Quality within 30 days after the end of each calendar quarter, detailing the following, for the Control Equipment, Parameter Monitors, Continuous Emission Monitoring Systems (CEMS) required by this license:
  - a. All control equipment downtimes and malfunctions;
  - b. All CEMS downtimes and malfunctions;
  - c. All downtimes of the above specified parameter monitors;
  - d. All excess events of emission and operational limitations set by this Order, statute, state or federal regulation, as appropriate; and
  - e. A report certifying there were no excess emissions, if that is the case.
2. The following information shall be reported for each excess event:
  - a. Standard exceeded;
  - b. Date, time, and duration of excess event;
  - c. Maximum and average values of the excess event, reported in the units of the applicable standard, and copies of pertinent strip charts and print-outs when requested;
  - d. A description of what caused the excess event;
  - e. The strategy employed to minimize the excess event;
  - f. The strategy employed to prevent reoccurrence; and

B. Record-Keeping

1. For all of the equipment parameter monitoring and recording, required by this license, the licensee shall maintain records of the most current six year period and the records shall include:

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- a. Documentation which shows monitor operational status during all source operating time, including specifics for calibration and audits; and
  - b. A complete data set of all monitored parameters as specified in this license. All parameter records shall be made available to the Bureau of Air Quality upon request.
2. The CEMS required by this license shall be the primary means of demonstrating compliance with emission standards set by this Order, statute, state or federal regulation, as applicable. For all CEMS, the licensee shall maintain records of the most current six year period and the records shall include:
- a. Documentation that all CEMS are continuously accurate, reliable and operated in accordance with 06-096 CMR 117, 40 CFR part 51 appendix P and 40 CFR part 60 appendix B&F; and
  - b. Upon the written request by the Department, a report or other data indicative of compliance with the applicable emission standard for those periods when the CEMS were not in operation or produced invalid data. In the event the Bureau of Air Quality does not concur with the licensee's compliance determination, the licensee shall, upon the Bureau of Air Quality's request, provide additional data, and shall have the burden of demonstrating that the data is indicative of compliance with the applicable standard.

**(27) Annual Emission Statement**

In accordance with Emission Statements, 06-096 CMR 137 (last amended November 8, 2008), the licensee shall annually report to the Department the information necessary to accurately update the State's emission inventory by means of:

- 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.

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(28) LBE shall notify the Department within 48 hours and submit a report to the Department on a quarterly basis if a malfunction or breakdown in any component causes a violation of any emission standard (38 M.R.S.A. §605).

DONE AND DATED IN AUGUSTA, MAINE THIS *18<sup>th</sup>* DAY OF *August*, 2010.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: *James P. Brubaker*  
\_\_\_\_\_  
DAVID P. LITTELL, COMMISSIONER

**The term of this license shall be five (5) years from the signature date above.**

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: December 7, 2009

Date of application acceptance: December 21, 2009

Date filed with the Board of Environmental Protection:

This Order prepared by Edwin Cousins, Bureau of Air Quality.

