



DEPARTMENT OF ENVIRONMENTAL PROTECTION

ANGUS S. KING, JR.
GOVERNOR

EDWARD O. SULLIVAN
COMMISSIONER

Maine Energy Recovery Company)
York County)
Biddeford, Maine)
A-46-71-L-A)

Departmental
Findings of Fact and Order
Air Emission License
Amendment #4

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

I. REGISTRATION

A. Introduction

1. Maine Energy Recovery Company (Maine Energy) of Biddeford, Maine was issued Air Emission License renewal (A-46-71-B-R) on 23 September 1987 permitting the operation of two refuse derived fuel (RDF) boilers and electricity generation facility.
2. Air Emission License (A-46-71-B-R) was subsequently amended on 22 July 1989 (A-46-71-F-M), 25 April 1995 (A-46-71-K-A), and 27 March 1996 (A-46-71-M-M).
3. Maine Energy has requested an air emission license amendment to address Reasonable Available Control Technology (RACT) for Nitrogen Oxides (NOx), as required by Chapter 138 of the Maine Air Regulations.

B. Application Classification

The application for Maine Energy is considered to be an amendment to incorporate the NOx RACT requirements as required by Chapter 138, of the Maine Air Regulations.

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II. BEST PRACTICAL TREATMENT

A. Introduction

Maine Energy is in an attainment area for all USEPA designated criteria air pollutants, except for ozone which York county is designated as moderate nonattainment, and thus, is subject to the nonattainment requirements for ozone. Chapter 138 of the Maine Air Regulations requires that every major source of NOx apply RACT to their applicable NOx emissions.

Description of Process

Maine Energy processes municipal solid waste (MSW) and a variety of industrial wastes into refuse derived fuels (RDF). The waste processing system has a maximum capacity of 1,200 tons of MSW/day; however, the facility has an overall capacity of 600 tons/day of RDF based on fuel burning capacity.

Maine Energy operates two Babcock and Wilcox 150 million BTU/hour refuse derived fuel (RDF) boilers, rated to produce 210,000 lb/hr steam at 750°F, 650 psig. The facility has a total electrical generation capacity of 22 MW.

The two boilers fire RDF, wood, #2 fuel oil, and natural gas with fossil fuel firing limited to 10% of Maine Energy's annual capacity factor. RDF is fed to the boilers on a drag conveyor, and the fuel is combusted on a rotograte spreader stoker system. The boilers are balanced draft, water walled boilers equipped with economizers. The boilers are also equipped with a combustion optimization control package, and NOx emissions are monitored with a CEMS located in the common stack.

In addition, Maine Energy operates a standby fire pump, a standby emergency feed water pump, several small #2 oil fired space heaters, and a waste oil furnace.

B. RACT for NOx Emissions

The major NOx sources at Maine Energy are two identical RDF boilers. Maine Energy Recovery Company has several other minor combustion devices that produce and emit NOx: a standby fire pump, standby emergency feed water pump, several small #2 oil fired space heaters, and waste oil furnace. The standby fire pump and emergency feed water pump each operate less than 500 hours per year. The waste oil boiler and small #2 oil fired space heaters each have a potential to emit less than ten tons per year. Therefore, these units are exempt from Chapter 138. The evaluation of NOx control will focus only on emissions from the RDF boilers.

Periodic stack testing has been used to demonstrate compliance with Maine Energy's existing NOx emission limit of 0.476 lbs/MMBtu (established as a BACT limit). NOx monitoring was established in the fourth quarter of 1990. Though NOx was being monitored, monitoring data was not being used for compliance due to unresolved questions concerning the appropriate averaging time associated with the license limitation. The CEM used an in-situ technology measuring the parts per million by volume, but it did not provide correction to a dry basis.

On February 2, 1995, Maine Energy submitted an application to amend their air emission license to incorporate the requirements of Chapter 138 and impose the prescribed NOx emission limit of 180 ppm. Chapter 138 requires correction to 7% oxygen but is silent on the issue on correcting for water vapor. In-situ monitoring had indicated that without a correction for water vapor and with some improvements, the Chapter 138 limit was attainable. This was the basis for the initial RACT application.

Maine Energy commissioned a new CEMS in January 1996, which uses an extractive technology. The new system allows correction to a dry basis. This data demonstrates that the Chapter 138 emission limit is not achievable on a continuous basis when reported on a dry basis.

In December 1995, the USEPA published a new emission guideline for municipal waste combustors (MWC) promulgated at 40 CFR Part 60 Subpart Cb. The MWC guideline was developed to satisfy both the requirements in Section 111(d) and Section 129 of the Clean Air Act as amended in 1990 (CAA). The guideline is defined as reflective of maximum achievable control technology (MACT). Included in the guidelines are NOx limits for a range of combustion technologies and furnace types. All are reported on a dry basis.

The NOx RACT limit for RDF MSW incinerators as stated in Chapter 138 is 180 ppmv corrected to 7% O2. The Chapter 138 limit was established using Maine Energy's CEM data that was on a wet basis concentration. For monitoring purposes and consistency with MACT standards, Maine Energy performed a data analysis to derive a NOx ppmv limit corrected to 7% O2 on a dry basis equivalent to the wet basis limit in Chapter 138. The data analysis which used CEM data and stack characteristics measured during RATAs and stack tests has demonstrated that 180 ppmv NOx on a wet basis is equivalent to 240 ppmv NOx on a dry basis.

Based on the above, Maine Energy has submitted an alternative NOx RACT application as prescribed under Section 3(I) of Chapter 138 which details various options for the reduction of NOx emissions to the atmosphere. NOx RACT is proposed to be equivalent to the level found to represent MACT which is 230

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ppmv(dry) for the average of two or more units and compliance is determined on a 24-hour averaging period.

NOx Inventory

The significant NOx emitting equipment at Maine Energy consists of two 150 MMBtu/hr primary identical boilers constructed in 1984.

Total Maximum Potential and Actual NOx Emissions

Maximum Potential NOx emissions	Actual NOx Emissions
625 tons per year	555 tons per year

Maximum potential emissions from the facility are calculated based on existing air emission license limit of 0.476 lbs/MMBtu, at the maximum firing rate (150 MMBtu/hr), and operating 8760 hours per year. This results in maximum potential NOx emissions of 625 tons per year.

Actual NOx emissions are estimated from January 1996 continuous emissions monitoring data converted to lbs/hr using the exhaust gas characteristics measured during a 1994 stack test. The January 1996 average NOx concentration was 200.46 ppmv (dry and corrected to 7% O₂). Based on stack test exhaust gas characteristics, Maine Energy has an actual NOx emission rate of 141 lbs/hr. Based on a 1995 boiler availability of 89.9% and operating 8760 hours per year at 141 lbs NOx /hr, Maine Energy's actual NOx emissions were 555 tons per year.

Control Analysis

NOx is formed during the combustion of RDF. The nitrogen content of the fuel is relatively insignificant compared to the amount of NOx generated by the oxidation of atmospheric nitrogen. Alternative controls consist of combustion enhancements which prevent uneven distribution of air and fuel which result in hot spots and excessive NOx formation. Other alternatives consist of installation of add-on controls such as selective non-catalytic reduction (SNCR) or selective catalytic reduction (SCR). SCR was categorically rejected because of the potential for poisoning of the catalyst from trace metal emissions from waste combustion.

Many air pollutants from municipal waste combustors are interrelated; and this interrelation was considered in selecting the appropriate RACT and MACT standards.

Flue gas recirculation was considered as a control, but was rejected due to an associated increase in carbon monoxide (CO) emissions.

When the MACT standard was set, SNCR was found to be the best demonstrated technology for some of the mass burn types of municipal waste combustors. Maine Energy evaluated retrofitting the plant with SNCR and considered a possible 35% NOx reduction which corresponds to a 161.7 tons per year NOx reduction. High costs of installing SNCR, anticipated public concerns for potential ammonia odor resulting from ammonia slip during normal operation, and the hazards associated with the transport and on-site storage of ammonia eliminates SNCR from further consideration.

Furthermore, Maine Energy has demonstrated that they can meet the MACT NOx standard without any additional control technologies.

Requirements proposed at Maine Energy include operator training, developing a site specific operator training manual, and state or ASME operator certification. Additionally, the municipal solid waste (MSW) load level would be required to be measured in accordance with 40 CFR Part 60 and not exceed 110% of the maximum load level as demonstrated during the most recent dioxin/furan performance test. The maximum temperature to the inlet of the particulate control device would be measured and shall not exceed the temperature 17°C above the maximum temperature measured during the most recent dioxin/furan performance test.

Maine Energy installed a new stack mounted KVB extractive continuous emission monitoring system (CEMS) in January 1996. The system reports NOx concentrations on a dry volume basis as required by Subpart Cb and provides daily average NOx concentrations on a dry basis corrected to 7% O2. Data provided by Maine Energy demonstrates that 180 ppmv is not being achieved; however, the facility can meet the MACT standard value of 230 ppmv.

RACT Conclusion

The proposed alternative NOx RACT determination does not result in an increase in actual NOx emissions. Maine Energy has met the requirements of an alternative NOx RACT as specified in Chapter 138 of the Department's Regulations by meeting the requirements of 40 CFR Part 60 Subpart Cb. NOx RACT for Maine Energy is a NOx emission limit of 230 ppmv measured on a dry basis, corrected to 7% oxygen, and calculated as a 24 hour block arithmetic average for each unit operating alone and as an average when both units are in operation. Compliance will be demonstrated through the use of the stack mounted KVB continuous emissions monitoring system commissioned in January 1996.

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The CEMS calibration and quality assurance procedures conform with the requirements of Chapter 117.

III. EMISSION STANDARDS

A. NO_x RACT Limits

Maine Energy's two RDF boilers shall not exceed a NO_x emission limit of 230 parts per million by volume (ppmv) measured on a dry basis, corrected to 7% oxygen (O₂), based on a 24 hour block arithmetic average when any one boiler is operating and when both boilers are in operation. Maine Energy shall demonstrate compliance with the NO_x emission limits for the two RDF boilers through the use of a continuous emissions monitoring system (CEMS) that satisfies the requirements of Department Regulation Chapter 117.

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.

The Department hereby grants Air Emission License Amendment #A-46-71-L-A, subject to the conditions found in Air Emission License #A-46-71-B-R, in amendments #A-46-71-F-M, #A-46-71-K-A, and #A-46-71-M-M, and the following conditions:

The following are new conditions:

- (23) When any one RDF boiler is operating alone and when both RDF boilers are in operation, Maine Energy shall not exceed a NO_x emission limit of 230 parts per million by volume (ppmv) measured on a dry basis, corrected to 7% oxygen (O₂), based on a 24 hour block arithmetic average.
- (24) Maine Energy shall demonstrate compliance with the NO_x emission limits for the two RDF boilers through the use of a continuous emissions monitoring system (CEMS) mounted in the common stack that satisfies the requirements of Department Regulation Chapter 117.

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- (25) Maine Energy shall submit quarterly reports as required by Department Regulation Chapter 117.
- (26) The standby fire pump and emergency feed water pump shall each not exceed 500 hours per year of operation. Maine Energy shall maintain records of operation hours and shall keep these records on file for at least six years.
- (27) This amendment shall expire concurrently with Air Emission License #A-46-71-B-R.

DONE AND DATED IN AUGUSTA, MAINE THIS 12th DAY OF November, 1996.

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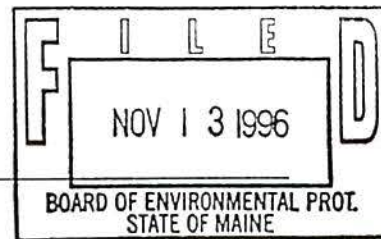
BY: James P. Brooks for
EDWARD O. SULLIVAN, COMMISSIONER

PLEASE NOTE THE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application 7 February, 1995

Date of application acceptance 16 February, 1995

Date filed with the Board of Environmental Protection _____



This Order prepared by Sarah R. Anderson, Bureau of Air Quality