MARYLAND DEPARTMENT OF THE ENVIRONMENT
AIR AND RADIATION MANAGEMENT ADMINISTRATION
1800 WASHINGTON BOULEVARD
BALTIMORE MARYLAND 21230

FINAL DETERMINATION OF A NON-ATTAINMENT NEW SOURCE REVIEW APPROVAL APPLICATION

FREDERICK COUNTY/CARROLL COUNTY RENEWABLE WASTE-TO-ENERGY FACILITY

NSR Approval NSR-2014-01

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I. INTRODUCTION

Major new or modified sources of air pollution to be located in areas of non-attainment are subject to Non-Attainment New Source Review (NA-NSR) regulations promulgated in the Code of Maryland Regulations (COMAR) 26.11.17. On February 15, 2011, the Northeast Maryland Waste Disposal Authority (NEA) submitted to the Maryland Department of the Environment ("Department") an application for a NA-NSR approval to construct a nominal 1,500-ton-per-day (tpd) waste-to energy project known as the Frederick/Carroll County Renewable Waste-to-Energy Facility (FCCRWTE). Wheelabrator Technologies, Inc. (WTI) has entered into a contract with NEA to develop, construct, and operate the facility.

Additional information was submitted as follows:

(a) Supplemental Air Quality Impact Analysis for 1- hour NO_2 and SO_2 Impacts received on August 25, 2011;

(b) Response to ARMA comments and corrected pages to the application received on September 16, 2011 and May 23, 2012;

(c) Class II Area Plume Visibility and Air Quality Analysis dated November 2011; and

(d) Revised Greenhouse Gas BACT determination received on May 23, 2012.

The Department deemed the NSR application complete on September 28, 2011. Maryland is authorized, as part of its State Implementation Plan, to issue NA-NSR approvals.

The Department has reviewed the application and has made a tentative determination that the proposed FCCRWTE is expected to comply with all applicable air quality control regulations. In accordance with the Environment Article, Section 1-604, Annotated Code of Maryland, the Department will schedule a public hearing and ask the public to comment on the application, the Department's tentative determination, the draft approval conditions, and other supporting documents. A notice will be published at least once in the legal section of a daily or weekly newspaper of general circulation in Frederick County.

If the Department has not received any comments adverse to the tentative determination, the Department will issue the Approval after the comment period expires. If the Department receives adverse comments, it will review them and will make a final determination as to whether to issue or deny the permit. A notice of final determination, if required, will be placed in a newspaper of general circulation in the area.

II. PROJECT DESCRIPTION

The project will be located on an 11-acre site in the McKinney Industrial Park (near the intersection of English Muffin Way and Buckeystown Pike) in Frederick County, Maryland and will serve the long term municipal solid waste (MSW) disposal needs of both Frederick and Carroll Counties (the Counties).

The FCCRWTE project will consist of two nominal 750 ton per day (tpd) municipal solid waste combustors (MWCs). The combustion gases will be sent to the vertical convection pass boilers and will be capable of producing approximately 51 megawatts (MW) gross (45 MW net) of electricity. FCCRWTE will also combust a small amount of wastewater treatment sludge (i.e., sewage sludge) and tires. Combustor burners will fire pipeline quality natural gas during startup and shutdown events, and to maintain minimum temperatures in the combustors.

The major air pollutant-emitting equipment and operations of the FCCRWTE consist of the following:

1. Two water-walled combustors feeding two vertical convection four-pass boilers;
2. Gas-fired startup/auxiliary burners integral to the combustors;
3. Reagent material-handling systems;
4. Flyash and bottom ash-handling and metals recovery systems;
5. One wet mechanical draft cooling tower; and
6. One emergency firewater pump diesel engine.

III. NON-ATTAINMENT NEW SOURCE REVIEW (NA-NSR)

The U.S. Environmental Protection Agency (EPA) has defined concentration-based National Ambient Air Quality Standards (NAAQS) for several pollutants, which are set at levels considered to be protective of the public health and welfare. Specifically, the NAAQS are defined for six "criteria" pollutants, including particulate matter (PM), sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen dioxide (NO_2), ozone, and lead (Pb). There are three forms of regulated particulate matter: total suspended solids (known as PM or TSP), particulate matter having a diameter less than 10 microns (PM10), and particulate matter with diameter less than 2.5 microns (PM2.5).

Air emission limitations and pollution control requirements are generally more stringent for sources located in areas that do not currently attain a NAAQS for a particular pollutant (known as "non-attainment" areas). The FCCRWTE project is located in Frederick County, which is designated as a moderate non-attainment area for ozone and non-attainment for PM2.5. If emissions of NO_x or VOCs (as ozone precursors) from the project are greater than 25 tons per year (tpy), then NA-NSR is

triggered for ozone. Similarly, if direct emissions of PM2.5 or its precursors (SO_2) are greater than 100 tpy, the project will trigger NA-NSR for PM2.5 and/or SO_2. NO_x emissions from FCCRWTE will exceed 25 tons per year and trigger NA-NSR review.

Potential emissions from new sources in non-attainment areas are evaluated through the Non-Attainment New Source Review (NA-NSR) permitting program under Code of Maryland Regulations (COMAR) 26.11.17. The goal of the NA-NSR program is to allow construction of new emission sources while ensuring that progress is made towards attainment of the NAAQS.

III-A. Potential Emissions of Criteria Pollutants

Table 1 summarizes the potential annual emissions of criteria pollutant emissions from the proposed FCCRWTE.

Table 1. Potential Annual Emissions - Criteria Pollutants

Emission Unit	NOx (tpy)	CO (tpy)	VOC (tpy)	SO_2 (tpy)	PM10 (tpy)	PM2.5 (tpy)	Pb (tpy)
Combustors	229.5	310.0	11.7	99.4	64.2	64.2	0.20
Material Handling Point Sources	N/A	N/A	N/A	N/A	2.3	2.3	N/A
Material Handling Fugitive Sources	N/A	N/A	N/A	N/A	1.03	0.15	N/A
Cooling Tower	N/A	N/A	N/A	N/A	0.52	0.0032	N/A
Firewater Pump Diesel Engine	0.37	0.24	0.021	<0.01	0.02	0.02	<0.01
TOTALS	229.8	310.7	11.8	99.4	68.1	66.7	0.20

III-B. Non-Attainment New Source Review (NA-NSR) Applicability Determination

Table 2 lists the potential annual emissions of VOCs, NO_x, PM2.5, and SO_2 and their NA-NSR applicability thresholds. As indicated, only NO_x emission exceeds its NA-NSR applicability threshold and is subject to NA-NSR review.

Table 2. Summary of NA-NSR Applicability Analysis for Proposed Project

Pollutant	Potential Emissions (tpy)	NA-NSR Thresholds (tpy)	NA-NSR Review?
NO_x	229.8	25	Yes
VOC	11.8	25	No
PM2.5	66.7	100	No
SO_2	99.4	100	No

IV. MAJOR NA-NSR REQUIREMENTS

Because the project is subject to NA-NSR review for NO_x emissions, FCCRWTE must comply with NA-NSR requirements specified in COMAR 26.11.17, including the following:

1. Implement a LAER level of air pollution control for NO_x;
2. Obtain emissions reductions (offsets) for regulated pollutants at a ratio of 1.3:1;
3. Certify that all other sources in Maryland owned by FCCRWTE are in compliance with all applicable requirements of the Clean Air Act; and
4. In accordance with COMAR 26.11.17.03B(6), conduct "An analysis of alternative sites, sizes, production processes, and environmental control techniques that demonstrates that benefits of the proposed source significantly outweigh the environmental and social costs imposed as a result of its location, construction or modification."

V. LOWEST ACHIEVABLE EMISSIONS RATE (LAER) REQUIREMENTS

LAER is defined in COMAR 26.11.17.01B(15) as:

(a) For any emissions unit, the more stringent rate of emissions based on the following:

(i) The most stringent emissions limitation which is contained in the implementation plan of any state for the class or category of stationary source, unless the owner or operator of the proposed stationary source demonstrates that these limitations are not achievable; or

(ii) The most stringent emissions limitation which is achieved in practice by the class or category of stationary sources, with this limitation, when applied to a modification, meaning the lowest achievable emissions rate for the new or modified emissions units within the stationary source.

(b) The application of this definition does not permit a proposed new or modified stationary source to emit any pollutant in excess of the amount allowable under 40 CFR 60.

V-A. LAER for Municipal Waste Combustors

NO_x emissions from MWC units can be reduced by three methods: 1) reducing fuel NO_x by lowering the nitrogen content in fuel through source separation, where feasible, 2) reducing "thermal NO_x" by managing the combustion conditions to minimize NO_x formation, and 3) applying add-on control technology to remove NO_x present in combustion flue gas stream.

Because most constituents of solid waste contain nitrogen, source separation of nitrogen-bearing constituents of solid waste is generally not a feasible means for achieving NO_x emissions abatement.

The generation of NO_x emissions in the combustion process can be minimized by MWC unit design and operating practices referred to as Good Combustion Practices (GCP). GCP for NO_x control entail ensuring that combustion occurs at optimized temperatures and with optimized levels of oxygen during combustion to keep NO_x emissions low, while concurrently preventing localized hot spots and pockets of high oxygen levels that can result in excessive production of NO_x. GCP alone, however, is not sufficient to meet LAER requirements for MWCs. Further control is achievable with combustion modifications and add-on controls.

The most effective combustion modification to reduce thermal NO_x includes two-stage combustion and flue gas recirculation (FGR). The two-stage combustion is to introduce primary and secondary combustion air separately into the combustion chamber to optimize combustion temperature. In FGR, a portion of the cooled flue gas is re-circulated back to the MWC unit to replace part of the MWC's unit's secondary air supply. By diluting the secondary air with re-circulated flue gas, the net oxygen content of the secondary air is lowered. Reducing the oxygen content lowers the peak flame temperature during combustion, suppressing the production of thermal NO_x.

With regards to add-on controls, both Selective Catalytic Reduction (SCR) and regenerative SCR (RSCR) are technically feasible for MWC units and represent the most stringent NO_x control technology for either a Refuse Derived Fuel (RDF) fired or a mass burn waste-to-energy facility. FCCRWTE is proposing SCR as well as the use of process steam reheat of the exhaust flue gas to increase the temperature to the optimal SCR operating temperature.

In summary, the FCCRWTE's proposed control technology including the following mechanisms meet the LAER requirements:

1. SCR (with process steam reheat);
2. Flue gas recirculation and two-stage combustion;
3. Water-cooled combustion grate; and
4. Combustion air optimization (as GCP).

The New Source Performance Standard (NSPS) Subpart Eb MWC emission limit for NO_x is 150 ppmvd corrected to 7% oxygen, 24 hour average. The FCCRWTE proposed NO_x LAER emission limit for the MWC units is 45 ppmvd (24-hour block average) corrected to 7% oxygen and the use of a NO_x continuous emission monitoring system for compliance determination. This level of control is identical to the Energy Answers Fairfield Renewable Energy Project (EAFREP) and more restrictive than the Palm Beach Renewable Energy Facility No.2 (PBREF2) which established a NO_x emission limitation of 50 ppmvd corrected to 7% oxygen, 24 hour average. The Department is satisfied that the 45 ppmvd level of control represents LAER.

V-B LAER for Firewater Pump Diesel Engine

The FCCRWTE's proposed control technology for NO_x emissions from the emergency firewater pump diesel engine includes compliance with the NSPS Subpart IIII emission limits for a 2009 model year or later and a cap on annual hours of operation (excluding emergencies) of no more than 100 hours. The applicable design emission limit is 3.0 g/bhp-hr, inclusive of NO_x and non-methane hydrocarbons (NMHC).

V-C Summary of LAER Requirements

Table 3 summaries the LAER requirements for NO_x emissions from the MWC unit and the emergency Firewater Pump Diesel engine.

Table 3 Summary of LAER Requirements

Emission Unit	**Control Technology**	**Proposed NO_x LAER Limit (Averaging Period)**	**Compliance Method**
MWC Units	Selective Catalytic Reduction (SCR), Flue gas re-circulation (FGR), Two-stage Combustion, Water-cooled combustion grate, and other Combustion air optimization (GCP)	45 ppmvd corrected to 7-percent oxygen (24-hour block average) with a NO_x CEM system	CEMS
Emergency Firewater Pump Diesel Engine	Compliance with NSPS Subpart IIII; limits on hours of operation to less than 100 hours per year (excluding emergencies);	3.0 g/bhp-hr including NO_x and non-methane hydrocarbons (NMHC) by design	Diesel Engine vendor certification

VI. EMISSION REDUCTION CREDITS (ERCs)

Emission reduction credits (ERCs) obtained to offset new emissions in a non-attainment area must meet two important objectives:

1. Ensure reasonable progress towards attainment of the National Ambient Air Quality Standards (NAAQS) – The offset ratio must be greater than 1.0; and

2. Provide a positive air quality benefit - emissions credits must come from an area equal to or higher.

COMAR 26.11.17.03B(3) establishes an offset ratio for sources in Frederick County of 1.3:1 for NO_x emissions. COMAR 26.11.17.04D establishes the following requirements for location of ERCs:

(1) Generally, ERCs are acceptable if obtained from within the same area as the new or modified emissions unit. The Department may allow the owner or operator to obtain VOC or NO_x emission reductions from other areas if:

   (a) The other area has an equal or higher nonattainment classification than the area in which the emissions unit is located; and

   (b) Emissions of the particular pollutant from the other area have been demonstrated to contribute to a violation of the National Ambient Air Quality Standard in the area in which the new emission unit is located.

(2) The Department shall give preference to ERCs from emissions units located as close to the proposed emissions unit site as possible.

FCCRWTE has potential NO_x emissions of 229.8 tons per year; therefore, NO_x emission reduction credits in the amount of 298.7 tons will be required.

VII. STATE-WIDE COMPLIANCE CERTIFICATION

COMAR 26.11.17.03B(1) requires that "the applicant certifies that all existing major stationary sources owned or operated by the applicant, or any entity controlling, controlled by, or under common control with the applicant, in the State are in compliance with all applicable emission limitations or are in compliance with an approved federally enforceable plan for compliance." On March 29, 2012, MDE-ARMA received documentation from the NEA certifying that two other sources owned and operated by NEA (the Montgomery County Resource Recovery Facility in Dickerson, MD and the Harford Waste to Energy facility located in Joppa, MD) are in compliance with all applicable emission regulations.

VIII. ALTERNATE SITE ANALYSIS

COMAR 26.11.17.04B(5) requires that "an analysis of alternate sites, sizes, production processes, and environmental control techniques for a proposed source demonstrates that benefits of the proposed source significantly outweigh the environmental and social costs imposed as a result of its location, construction, or modification."

The Frederick County Board of Commissioners (FCBC) evaluated 11 alternative sites for the project and gave careful consideration to the following 4 candidate sites:

- Potomac Edison (off MD 28)
- Eastalco (off Manor Woods Road)
- Tamko (off English Muffin Road)
- McKinney site (end of Metropolitan Court)

Based on access to electric transmission lines, potable water (from Frederick County) and non-potable water (from Ballenger Creek WWTP), existing infrastructure, land use compatibility (i.e. existing industrial development), environmental suitability and zoning, the McKinney site was selected as the most viable location for the project.

The FCBC also considered alternative technologies for MSW management. Those technologies included the following:

- Long hauling waste out of the county.
- The commercial viability of alternative waste to energy technologies such as mass burn, waste to ethanol, gasification, etc.
- A renewable waste to energy facility.
- A MSW composting facility

The FCBC analysis of the technology options concluded that a 1500 ton per day regional waste to energy facility would result in the lowest cost to Frederick and Carroll counties over a 20-year planning period. Furthermore, the FCBC summarized benefits of the project as follows:

- Elimination of the need to landfill MSW
- Transforming the MSW into a new and reliable energy source
- Increased construction and indirect employment during construction phase
- Local increase in tax revenue as a result of increased income, property, and sales taxes.
- An air quality benefit assuming that the electric generating capacity of the project will displace older and higher polluting electric generating stations.

IX. FINAL DETERMINATION

Based on the above analyses, the Department has concluded that the proposed FCCRWTE project would comply with all Federal and State Clean Air Act requirements and has made a final determination to issue the NA-NSR Approval.

Enclosed with the final determination is a copy of the final NA-NSR Approval conditions.