C.T. MALE ASSOCIATES
Engineering, Surveying, Architecture, Landscape Architecture & Geology, D.P.C.

50 Century Hill Drive, Latham, NY 12110
518.786.7400 FAX 518.786.7299 www.ctmale.com

April 28, 2022

Mr. Tim Abrams, Assistant Engineer
NYSDEC Region 5, Division of Air
232 Golf Course Road
Warrensburg, New York 12885

Re: Air Permit Modification Request
Air Title V Facility Permit ID No.: 5-5344-00001/00016
Wheelabrator Hudson Falls LLC, Village of Hudson Falls, NY Facility
C.T. Male Project No.: 19.9051

Dear Mr. Abrams:

On behalf of Wheelabrator Hudson Falls LLC (Wheelabrator), C.T. Male Associates Engineering, Surveying, Architecture, Landscape Architecture & Geology, D.P.C. (C.T. Male) has prepared the attached permit modification application relative to complying with the requirements of 6 NYCRR Part 219-10, NOx RACT. The facility's existing Air Title V Permit will remain otherwise unchanged with respect to all other conditions unrelated to NOx. Wheelabrator most recently submitted a Final NOx RACT Analysis in December 2021 to meet the requirements of NOx RACT for its Municipal Waste Incineration Units, and this modification will be the mechanism to incorporate the information into the facility's air permit. A copy of the NOx RACT Analysis is attached to the Permit Modification Application.

With respect to the current Air Title V Permit, Conditions 25 and 72 regulate operations with respect to NOx limits on MSW combustion. The application document includes additional requirements to modify the MAP limit and the alternative Annual NOx limit and 24-hour short term NOx limit. As no other changes to the permit are necessary at this time, this application includes only those modified permit conditions relative to the NOx limitations. Wheelabrator has submitted their 2021 Emission Statement within the past month documenting annual emissions from the facility and can provide additional emissions information if required.

If you have any questions or require additional information, please contact this office at (518) 786-7400 or via email at j.farron@ctmale.com or j.marx@ctmale.com. As with the previous correspondence, the facility contact is Robert Brynes, Senior Manager, Environmental Compliance, who can be reached at (518) 747-2390 Extension 217 or via email at rbrynes@win-waste.com.

Sincerely,

C.T. MALE ASSOCIATES

Joseph A. Farron, Jr.
Project Environmental Engineer

Reviewed and approved by:

Jeffrey A. Marx, P.E.
Managing Environmental Engineer

c: Maurice Holcomb, Robert Brynes, Tim Porter

Attachment A

Air Permit Application Forms

New York State Department of Environmental Conservation
Air Permit Application

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

DEC ID	Application ID	Application Type
5-5344-00001	5-5344-00001/00016	State Facility ✗ Title V

Section I - Certification

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons directly responsible for gathering the information required to complete this application, I believe the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Responsible Official MAURICE C HOLCOMB	Title GENERAL MANAGER
Signature Maurice C Holcomb	Date 4/28/2022

Professional Engineer Certification

I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments as they pertain to the practice of engineering. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Professional Engineer	NYS License No.
Signature	Date

Section II - Identification Information

Type of Permit Action Requested

New | Renewal | Significant Modification | Administrative Amendment | ✗ Minor Modification

Application for the construction of a new facility | Application involves the construction of new emission unit(s)

Facility Information

Name WHEELABRATOR HUDSON FALLS LLC

Location Address 93 RIVER ST

City / Town / ✓ Village HUDSON FALLS | Zip 12839

Owner/Firm Information

Business Taxpayer ID: 721541910

Name WHEELABRATOR HUDSON FALLS LLC

Street Address 93 RIVER ST

City HUDSON FALLS | State/Province NY | Country US | Zip 12839

Owner Classification: Federal | State | Municipal | ✗ Corporation/Partnership | Individual

Owner/Firm Contact Information

Name MAURICE C HOLCOMB	Phone 5187472390
E-mail Address MHOLCOMB@WIN-WASTE.COM	Fax
Affiliation WHEELABRATOR HUDSON FALLS LLC	Title GENERAL MANAGER
Street Address 93 RIVER ST	
City HUDSON FALLS / State/Province NY / Country US	Zip 12839

Facility Contact Information

Name MAURICE C HOLCOMB	Phone 5187472390
E-mail Address MHOLCOMB@WIN-WASTE.COM	Fax
Affiliation WHEELABRATOR HUDSON FALLS LLC	Title GENERAL MANAGER
Street Address 93 RIVER ST	
City HUDSON FALLS / State/Province NY / Country US	Zip 12839

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

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Project Description ☐ Continuation Sheet(s)

The permit modfication entails incorporating new conditions relative to demonstration of NOx RACT for the facility. Wheelabrator has submitted a RACT demonstration confirming the current NOx control technology employed at the facility is RACT given the inherently low NOx emissions that are already being achieved and that the cost of further NOx reductions greatly exceeds NYDEC's established RACT implementation policy. Wheelabrator Hudson Falls is committing to an alternative annual NOx limit of 165 ppmv, dry corrected to 7% oxygen and 24-hour short term limit of 185 ppmv, dry corrected to 7% oxygen for each MWC unit and annual MAP limit of 275 tons/year, 12-month rolling average for the facility. These lower limits will reduce the facility's potential to emit and ensure that the NOx control technology employed at the facility controls future NOx emissions consistent with the requirements of RACT.

Section III - Facility Information

Facility Classification

☐ Hospital ☐ Residential ☐ Educational/Institutional ☐ Commercial ☒ Industrial ☐ Utility

Affected States (Title V Applications Only)

☒ Vermont ☐ Massachusetts ☐ Rhode Island ☐ Pennsylvania Tribal Land: _____
☐ New Hampshire ☐ Connecticut ☐ New Jersey ☐ Ohio Tribal Land: _____

SIC Code(s)			NAICS Code(s)			
4953			562213			

Facility Description ☐ Continuation Sheet(s)

Compliance Statements (Title V Applications Only)

I certify that as of the date of this application the facility is in compliance with all applicable requirements. ☒ Yes ☐ No

If one or more emission units at the facility are not in compliance with all applicable requirements at the time of signing this application (the 'NO' box must be checked), the noncomplying units must be identified in the "Compliance Plan" block on page 8 of this form along with the compliance plan information required. For all emission units at the facility that are operating in compliance with all applicable requirements, complete the following:

☒ This facility will continue to be operated and maintained in such a manner as to assure compliance for the duration of the permit, except those emission units referenced in the compliance plan portion of this application.

☒ For all emission units subject to any applicable requirements that will become effective during the term of the permit, this facility will meet such requirements on a timely basis.

☒ Compliance certification reports will be submitted at least once per year. Each report will certify compliance status with respect to each applicable requirement, and the method used to determine the status.

Facility Applicable Federal Requirements ☐ Continuation Sheet(s)

Title	Type	Part	Subpart	Section	Subdivision	Paragraph	Subparagraph	Clause	Subclause

Facility State Only Requirements ☐ Continuation Sheet(s)

Title	Type	Part	Subpart	Section	Subdivision	Paragraph	Subparagraph	Clause	Subclause

DEC ID
5 - 5 3 4 4 - 0 0 0 0 1

Facility Compliance Certification

☐ Continuation Sheet(s)

Rule Citation

Title	Type	Part	Subpart	Section	Subdivision	Paragraph	Subparagraph	Clause	Subclause

Applicable Federal Requirement _ State Only Requirement	Capping	CAS Number	Contaminant Name

Monitoring Information

Work Practice Involving Specific Operations | Ambient Air Monitoring | Record Keeping/Maintenance Procedures

Compliance Activity Description

Work Practice Type Code	Process Material		Reference Test Method
	Code	Description	

Monitored Parameter		Manufacturer's Name/Model Number
Code	Description	

Limit		Limit Units	
Upper	Lower	Code	Description

Averaging Method		Monitoring Frequency		Reporting Requirements	
Code	Description	Code	Description	Code	Description

Facility Emissions Summary

☐ Continuation Sheet(s)

CAS Number	Contaminant Name	Potential to Emit (tons/yr)	Actual Emissions (pounds/yr)
0NY075 - 00 - 5	PM-10		
0NY750 - 02 - 5	PM-2.5		
007446 - 09 - 5	Sulfur Dioxide		
0NY210 - 00 - 0	Oxides of Nitrogen		
000630 - 08 - 0	Carbon Monoxide		
007439 - 92 - 1	Lead (elemental)		
0NY998 - 00 - 0	Total Volatile Organic Compounds		
0NY100 - 00 - 0	Total Hazardous Air Pollutants		
0NY750 - 00 - 0	Carbon Dioxide Equivalents		

New York State Department of Environmental Conservation
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Section IV - Emission Unit Information

Emission Unit Description	☐ Continuation Sheet(s)
Emission Unit	-

Building Information				☐ Continuation Sheet(s)
Building ID	Building Name	Length (ft)	Width (ft)	Orientation

Emission Unit	Emission Unit Emissions Summary			☐ Continuation Sheet(s)
-				
CAS Number	Contaminant Name			
ERP (lbs/yr)	Potential to Emit		Actual Emissions	
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)
CAS Number	Contaminant Name			
ERP (lbs/yr)	Potential to Emit		Actual Emissions	
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)
CAS Number	Contaminant Name			
ERP (lbs/yr)	Potential to Emit		Actual Emissions	
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)
CAS Number	Contaminant Name			
ERP (lbs/yr)	Potential to Emit		Actual Emissions	
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)

New York State Department of Environmental Conservation
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NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

DEC ID												
5	-	5	3	4	4	-	0	0	0	0	1	

Emission Point Information

☐ Continuation Sheet(s)

Emission Point						
Ground Elevation (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp. (°F)	Cross Section Length (in)	Cross Section Width (in)
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line (ft)	Date of Removal

Emission Point						
Ground Elevation (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp. (°F)	Cross Section Length (in)	Cross Section Width (in)
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line (ft)	Date of Removal

Emission Point						
Ground Elevation (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp. (°F)	Cross Section Length (in)	Cross Section Width (in)
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line (ft)	Date of Removal

Emission Source/Control Information

☐ Continuation Sheet(s)

Emission Source ID	Emission Source Type	Date of Construction	Date of Operation	Date of Removal	Control Type Code	Control Type Description	Manufacturer's Name/Model Number
Design Capacity	Design Capacity Units Code	Design Capacity Units Description		Waste Feed Code	Waste Feed Description	Waste Type Code	Waste Type Description

Emission Source ID	Emission Source Type	Date of Construction	Date of Operation	Date of Removal	Control Type Code	Control Type Description	Manufacturer's Name/Model Number
Design Capacity	Design Capacity Units Code	Design Capacity Units Description		Waste Feed Code	Waste Feed Description	Waste Type Code	Waste Type Description

Emission Source ID	Emission Source Type	Date of Construction	Date of Operation	Date of Removal	Control Type Code	Control Type Description	Manufacturer's Name/Model Number
Design Capacity	Design Capacity Units Code	Design Capacity Units Description		Waste Feed Code	Waste Feed Description	Waste Type Code	Waste Type Description

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

DEC ID
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Process Information ☐ Continuation Sheet(s)

Emission Unit	-		Process	

Process Description

Source Classification Code (SCC)	Total Throughput		Throughput Quantity Units	
	Quantity/Hr	Quantity/Yr	Code	Description

☐ Confidential ☐ Operating at Maximum Capacity	Operating Schedule		Building	Floor/Location
	Hours/Day	Days/Year		

Emission Point Identifier(s)

Emission Source/Control Identifier(s)

Emission Unit	-		Process	

Process Description

Source Classification Code (SCC)	Total Throughput		Throughput Quantity Units	
	Quantity/Hr	Quantity/Yr	Code	Description

☐ Confidential ☐ Operating at Maximum Capacity	Operating Schedule		Building	Floor/Location
	Hours/Day	Days/Year		

Emission Point Identifier(s)

Emission Source/Control Identifier(s)

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Process Emissions Summary ☐ Continuation Sheet(s)

Emission Unit	-					Process	
CAS Number	Contaminant Name	% Thruput	% Capture	% Control	ERP (lbs/hr)	ERP How Determined	
Potential to Emit			Standard Units	Potential to Emit How Determined	Actual Emissions		
(lbs/hr)	(lbs/yr)	(standard units)			(lbs/hr)	(lbs/yr)	
Emission Unit	-					Process	
CAS Number	Contaminant Name	% Thruput	% Capture	% Control	ERP (lbs/hr)	ERP How Determined	
Potential to Emit			Standard Units	Potential to Emit How Determined	Actual Emissions		
(lbs/hr)	(lbs/yr)	(standard units)			(lbs/hr)	(lbs/yr)	
Emission Unit	-					Process	
CAS Number	Contaminant Name	% Thruput	% Capture	% Control	ERP (lbs/hr)	ERP How Determined	
Potential to Emit			Standard Units	Potential to Emit How Determined	Actual Emissions		
(lbs/hr)	(lbs/yr)	(standard units)			(lbs/hr)	(lbs/yr)	

Emission Source Emissions Summary ☐ Continuation Sheet(s)

Emission Source						Process	
CAS Number	Contaminant Name	% Thruput	% Capture	% Control	ERP (lbs/hr)	ERP How Determined	
Potential to Emit			Standard Units	Potential to Emit How Determined	Actual Emissions		
(lbs/hr)	(lbs/yr)	(standard units)			(lbs/hr)	(lbs/yr)	
Emission Source						Process	
CAS Number	Contaminant Name	% Thruput	% Capture	% Control	ERP (lbs/hr)	ERP How Determined	
Potential to Emit			Standard Units	Potential to Emit How Determined	Actual Emissions		
(lbs/hr)	(lbs/yr)	(standard units)			(lbs/hr)	(lbs/yr)	
Emission Source						Process	
CAS Number	Contaminant Name	% Thruput	% Capture	% Control	ERP (lbs/hr)	ERP How Determined	
Potential to Emit			Standard Units	Potential to Emit How Determined	Actual Emissions		
(lbs/hr)	(lbs/yr)	(standard units)			(lbs/hr)	(lbs/yr)	

DEC ID
5 - 5 3 4 4 - 0 0 0 0 1

Emission Unit	Emission Point	Process	Emission Source	Emission Unit Applicable Federal Requirements							Continuation Sheet(s)		
				Title	Type	Part	Subpart	Section	Subdiv.	Parag.	Subparag.	Cl.	Subcl.

Emission Unit	Emission Point	Process	Emission Source	Emission Unit State Only Requirements							Continuation Sheet(s)		
				Title	Type	Part	Subpart	Section	Subdiv.	Parag.	Subparag.	Cl.	Subcl.

Emission Unit Compliance Certification — ✗ Continuation Sheet(s)

Rule Citation

Title	Type	Part	Subpart	Section	Subdivision	Paragraph	Subparagraph	Clause	Subclause
6	NYCRR	231	2						

✗ Applicable Federal Requirement | State Only Requirement | Capping

Emission Unit	Emission Point	Process	Emission Source	CAS Number	Contaminant Name
U00001 / U00002				0NY210 - 00 - 0	Oxides of Nitrogen

Monitoring Information

Continuous Emission Monitoring	Monitoring of a Process or Control Device Parameters as a Surrogate
Intermittent Emission Testing	Work Practice Involving Specific Operations
Ambient Air Monitoring	✗ Record Keeping/Maintenance Procedures

Compliance Activity Description

The maximum annual potential (MAP) for NOx is 275 tons per year combined for the two MWC units, and is based on a 12 month rolling average. To demonstrate compliance with the 275 tons/year MAP limit a continuous stack gas flow monitor will be installed on each MWC unit. This annual limit was modified from the previous limit as part of the NOx RACT demonstration. The facility will comply with an alternative annual NOx limit of 165 ppmv, dry corrected to 7% oxygen and 24-hour short term limit of 185 ppmv, dry corrected to 7% oxygen.

Work Practice Type Code	Process Material		Reference Test Method
	Code	Description	

Monitored Parameter		Manufacturer's Name/Model Number
Code	Description	

Limit		Limit Units	
Upper	Lower	Code	Description
275		38	275 tons NOx per year

Averaging Method		Monitoring Frequency		Reporting Requirements	
Code	Description	Code	Description	Code	Description
17	Annual Max. Rolled Monthly	01	Continuous	14	Semi-Annually (Calendar)

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

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Determination of Non-Applicability (Title V Applications Only) ☐ Continuation Sheet(s)

Rule Citation

Title	Type	Part	Subpart	Section	Subdivision	Paragraph	Subparagraph	Clause	Subclause

Emission Unit	Emission Point	Process	Emission Source	Applicable Federal Requirement State Only Requirement

Non-Applicability Description

Rule Citation

Title	Type	Part	Subpart	Section	Subdivision	Paragraph	Subparagraph	Clause	Subclause

Emission Unit	Emission Point	Process	Emission Source	☐ Applicable Federal Requirement ☐ State Only Requirement

Non- Applicability Description

Compliance Plan ☐ Continuation Sheet(s)

For any emission units which are not in compliance at the time of permit application, the applicant shall complete the following:

Consent Order		Certified progress reports are to be submitted every 6 months beginning / /

Emission Unit	Process	Emission Source	Applicable Federal Requirement									
			Title	Type	Part	Subpart	Section	Subdiv.	Parag.	Subparag.	Clause	Subcl.

Remedial Measures and Intermediate Milestones	R/I	Date Scheduled

New York State Department of Environmental Conservation
Air Permit Application

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

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Request for Emission Reduction Credits

☐ Continuation Sheet(s)

Emission Source

Emission Reduction Description

Contaminant Emission Reduction Data

Baseline Period ____/____/_____ to ____/____/_____

CAS Number	Contaminant Name	Reduction Date	Reduction Method	ERC (lbs/yr) Netting	ERC (lbs/yr) Offset

Facility to Use Future Reduction

Name

Application ID - - /

Location Address

City/ Town / Village | State | Zip

Use of Emission Reduction Credits

☐ Continuation Sheet(s)

Emission Source

Proposed Project Description

Contaminant Emissions Increase Data

CAS Number	Contaminant Name	Project Emission Potential (lbs/yr)

Statement of Compliance

All facilities under the ownership of this "owner/firm" are operating in compliance with all applicable requirements and state regulations including any compliance certification requirements under Section 114(a)(3) of the Clean Air Act Amendments of 1990, or are meeting the schedule of a consent order.

Source of Emission Reduction Credit - Facility

Name

Permit ID - - /

Location Address

City/ Town / Village | State | Zip

Emission Source	CAS Number	Contaminant Name	ERC (lbs/yr) Netting	ERC (lbs/yr) Offset

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Supporting Documentation and Attachments	
Required Supporting Documentation	Date of Document
List of Exempt Activities (attach form)	
Plot Plan	
Process Flow Diagram	
Methods Used to Determine Compliance (attach form)	
Emissions Calculations	
Optional Supporting Documentation	Date of Document
Air Quality Model	
Confidentiality Justification	
Ambient Air Quality Monitoring Plan or Reports	
Stack Test Protocol	
Stack Test Report	
Continuous Emissions Monitoring Plan	
Lowest Achievable Emission Rate (LAER) Demonstration	
Best Available Control Technology (BACT) Demonstration	
x Reasonably Available Control Technology (RACT) Demonstration	12/14/2021
Toxic Impact Assessment (TIA)	
Environmental Rating Demonstration	
Operational Flexibility Protocol/Description of Alternate Operating Scenarios	
Title IV Permit Application	
Emission Reduction Credit (ERC) Quantification (attach form)	
Baseline Period Demonstration	
Use of Emission Reduction Credits (attach form)	
Analysis of Contemporaneous Emissions Increase/Decrease	
Other Supporting Documentation	Date of Document

DEC ID
5-534400001

Emission Unit	Emission Point	Process	Emission Source	Emission Unit Applicable Federal Requirements										☐ Continuation Sheet(s)
				Title	Type	Part	Subpart	Section	Subdiv.	Parag.	Subparag.	Cl.	Subcl.	

Emission Unit	Emission Point	Process	Emission Source	Emission Unit State Only Requirements										☐ Continuation Sheet(s)
				Title	Type	Part	Subpart	Section	Subdiv.	Parag.	Subparag.	Cl.	Subcl.	

Emission Unit Compliance Certification ☐ Continuation Sheet(s)

Rule Citation

Title	Type	Part	Subpart	Section	Subdivision	Paragraph	Subparagraph	Clause	Subclause
6	NYCRR	219	10						

x Applicable Federal Requirement x State Only Requirement Capping

Emission Unit	Emission Point	Process	Emission Source	CAS Number	Contaminant Name
U-00001 / U-00002				0NY210-00-0	Oxides of Nitrogen

Monitoring Information

x Continuous Emission Monitoring	Monitoring of a Process or Control Device Parameters as a Surrogate
Intermittent Emission Testing	Work Practice Involving Specific Operations
Ambient Air Monitoring	Record Keeping/Maintenance Procedures

Compliance Activity Description

Each affected mass burn waterwall MWC unit is required to meet an emission concentration limit for NOx not to exceed 165 parts per million by volume, corrected to 7 percent oxygen (dry basis). Compliance with this limits is based on a 12 month rolling average. To demonstrate compliance with this requirement the owner or operator of the facility shall install, calibrate, maintain and operate a continuous emissions monitor for NOx according to a QA/QC plan approved by the Department.

Work Practice Type Code	Process Material		Reference Test Method
	Code	Description	
			Thermo Environmental Instruments, Model 42H

Monitored Parameter		Manufacturer's Name/Model Number
Code	Description	
23	Concentration	

Limit		Limit Units	
Upper	Lower	Code	Description
165		274	165 parts per million (dry, corrected to 7% O2)

Averaging Method		Monitoring Frequency		Reporting Requirements	
Code	Description	Code	Description	Code	Description
17	Annual Maximum Rolled Monthly	01	Continuous	15	Semi-Annually (Calendar)

DEC ID
- -

Emission Unit	Emission Point	Process	Emission Source	Emission Unit Applicable Federal Requirements							☐ Continuation Sheet(s)		
				Title	Type	Part	Subpart	Section	Subdiv.	Parag.	Subparag.	Cl.	Subcl.

Emission Unit	Emission Point	Process	Emission Source	Emission Unit State Only Requirements							☐ Continuation Sheet(s)		
				Title	Type	Part	Subpart	Section	Subdiv.	Parag.	Subparag.	Cl.	Subcl.

Emission Unit Compliance Certification ☐ Continuation Sheet(s)

Rule Citation

Title	Type	Part	Subpart	Section	Subdivision	Paragraph	Subparagraph	Clause	Subclause
6	NYCRR	219	10						

x Applicable Federal Requirement x State Only Requirement Capping

Emission Unit	Emission Point	Process	Emission Source	CAS Number	Contaminant Name
U-00001 / U-00002				0NY210-00-0	Oxides of Nitrogen

Monitoring Information

x Continuous Emission Monitoring	Monitoring of a Process or Control Device Parameters as a Surrogate
Intermittent Emission Testing	Work Practice Involving Specific Operations
Ambient Air Monitoring	Record Keeping/Maintenance Procedures

Compliance Activity Description

Each affected mass burn waterwall MWC unit is required to meet an emission concentration limit for NOx not to exceed 185 parts per million by volume, corrected to 7 percent oxygen (dry basis). Compliance with this limits is based on a 24-hour daily average. To demonstrate compliance with this requirement the owner or operator of the facility shall install, calibrate, maintain and operate a continuous emissions monitor for NOx according to a QA/QC plan approved by the Department. The use of the natural gas burner will be allowed on an as needed basis to assist in meeting the 185 ppm/24-hour daily limit.

Work Practice Type Code	Process Material		Reference Test Method
	Code	Description	
			Thermo Environmental Instruments, Model 42H

Monitored Parameter		Manufacturer's Name/Model Number
Code	Description	
23	Concentration	

Limit		Limit Units	
Upper	Lower	Code	Description
185		274	185 parts per million (dry, corrected to 7% O2)

Averaging Method		Monitoring Frequency		Reporting Requirements	
Code	Description	Code	Description	Code	Description
39	24 hour daily average (arithmetic mean)	01	Continuous	15	Semi-Annually (Calendar)

Attachment B

NOx RACT Analysis (12/14/2021)

C.T. MALE ASSOCIATES
Engineering, Surveying, Architecture, Landscape Architecture & Geology, D.P.C.

50 Century Hill Drive, Latham, NY 12110
518.786.7400 FAX 518.786.7299 www.ctmale.com

December 14, 2021

Mr. Kevin Wood, P.E.
Regional Air Pollution Control Engineer
New York State Department of Environmental Conservation Region 5
232 Golf Course Road
Warrensburg, New York 12885

Re: Wheelabrator Hudson Falls NO_X RACT
NYSDEC Permit ID 5-5344-00001/00016
C.T. Male Project No. 19.9051
Final NOX RACT Analysis Submittal

Dear Mr. Wood:

C.T. Male Associates Engineering, Surveying, Architecture, Landscape Architecture & Geology, D.P.C. (C.T. Male) is submitting this correspondence on behalf of Wheelabrator Hudson Falls LLC (Wheelabrator). This document and attachments are being submitted in accordance with t the requirements of 6 NYCRR Part 219-10. This final analysis includes information from our June 30, 2021 NOx RACT submittal, responses to NYSDEC's comments on that submittal provided on August 23, 2021 and additional information and data analysis requested by NYSDEC to complete the review of the NOx RACT analysis for the Wheelabrator Hudson Falls facility.

6 NYCRR Part 219-10 Requirements

6 NYCRR Part 219-10, Reasonably Available Control Technology (RACT) for Oxides of Nitrogen (NOx) at Municipal and Private Solid Waste Incineration Units includes the following limitations:

a. Per Table 1 - Emissions of NOx on a 24-hour arithmetic average basis, excluding periods of start-up, shutdown, and malfunction will be limited to 150 ppmv, dry corrected to 7% oxygen (mass burn waterwall combustion technology); and

b. Per Table 2 - Emissions of NOx on an annual average basis, excluding periods of start-up, shutdown, and malfunction will be limited to 150 ppmv, dry corrected to 7% oxygen (mass burn waterwall combustion technology).

6 NYCRR Part 219-10.2 (d) requires that the owner or operator of a facility subject to the requirements of the Subpart submit to the Department by June 30, 2021 either a complete application for a permit that incorporates the requirements of the Subpart or a

RACT analysis that explains why the control technology at the facility currently employs should be considered RACT for that emission source. This final letter submittal explains why the NOx control technology currently employed at the Wheelabrator facility should be considered RACT based on a cost analysis conducted in accordance with NYSDEC program policy. Further, additional data analysis indicates that lower NOx limits can be achieved with the existing control technology and as such alternative NOx limits are proposed.

Description of Facility NOx Control Technology

The current NOx control technology employed at the Wheelabrator facility consists of low excess air/modified staged combustion controls which minimize NOx formation during waste combustion while simultaneously maintaining good combustion efficiency. Such combustion-based NOx control minimizes NOx formation by limiting excess air (oxygen) in the primary combustion zone or pyrolysis zone at the grate level which minimizes conversion of nitrogen in the waste to NOx. Further secondary air is injected at two different furnace elevations (approximately 7 ft apart) above the grates to gradually complete combustion while reducing peak flame temperature minimizing thermal NOx formation from nitrogen in the combustion air. The Foster Wheeler boiler/Detroit stoker grate design combined with the automatic combustion control scheme have proven to be very effective in controlling NOx emissions as demonstrated by the low annual average NOx concentrations for the previous three calendar years. As shown in the table below average NOx concentrations ranged from approximately 149 to 166 ppmv, dry corrected to 7% oxygen, well below the facility's current NOx permit limit of 205 ppmv, dry corrected to 7% oxygen (Conditions 25 and 72 of the Air Title V Permit).

Year	Unit 1 Average	Unit 2 Average
2018	149 ppmv dry corrected to 7% O_2	166 ppmv dry corrected to 7% O_2
2019	158 ppmv dry corrected to 7% O_2	161 ppmv dry corrected to 7% O_2
2020	157 ppmv dry corrected to 7% O_2	158 ppmv dry corrected to 7% O_2

Review of Alternative NOx Control Technologies

Wheelabrator is familiar with various types of NOx control technologies and did not identify technically feasible NOx control alternatives other than Selective Non-Catalytic Reduction (SNCR)-based and Selective Catalytic Reduction (SCR)-based NOx control systems that have been successfully demonstrated on MWCs. Of these two technologies only SNCR has been successfully retrofitted on a mass-burn waterwall municipal waste combustor (MWC) to meet the USEPA large MWC MACT standards and further optimized to meet NOx RACT requirements. SNCR based NOx control systems have proven year after year to be highly effective, reliable, and technically

feasible for reducing NOx emissions in MWC applications. SCR is considered Lowest Achievable Emission Rate (LAER)/Best Available Control Technology (BACT) NOx control for new MWCs under the PSD/NSR program and would not be considered RACT given SCR's significantly higher capital and operating cost compared to SNCR that would put SCR cost effectiveness well beyond the RACT threshold as a practical matter.

Further, a search of USEPA's RACT/BACT/LAER Clearinghouse (RBLC) for NOx controls determined to be RACT for MWC permits issued in the past 20 years identified only two (2) applications of NOx controls to MWC facilities which were determined to be RACT. These facilities are:

1. RBLC ID: VA-0329 - Covanta Alexandria/Arlington Inc., Arlington, VA. This facility has three (3) Keeler/Dorr-Oliver municipal waste combustion (MWC) units; water wall boilers with integrated reciprocating grate stokers. The NOx control method is listed as: furnace design, proper operation, good combustion practices, ammonia injection (SNCR), and proprietary low NOX combustion system.

2. RBLC ID: VA-0330 - Covanta Fairfax Inc., Fairfax, VA. This facility has four (4) municipal waste combustors (MWC), identical Ogden-Martin equipped with Martin-Stoker boiler system with integrated reciprocating grate stokers and water walls. The NOx control method is listed as: furnace design, proper operation, ammonia injection (SNCR), and proprietary low NOX combustion system.

In summary of the RBLC data for the previous twenty (20) years, only two (2) cases of RACT for MSW combustors were determined, both consisting of SNCR systems.

Three (3) additional alternative NOx control technologies identified by NYSDEC were evaluated including Flue Gas Recirculation (FGR), Natural Gas Injection (NGI) and Baghouse with catalytic bags but were each ruled out. Detailed information on these alternative technologies is provided in Attachment A.

Cost Effectiveness of Technically Feasible Control Technologies

Proposals from 2 vendors that supply SNCR based NOx control systems; Fuel Tech (FT) and Hitachi Zosen Inova (HZI) were used in the final RACT cost analysis. Wheelabrator limited the search to SNCR system suppliers who have a proven track record. FT has provided urea based SNCR systems at eleven (11) of the Wheelabrator MWC plants as

required to meet the USEPA NSPS/MACT limits beginning in 1994 including the Wheelabrator Westchester MWC plant in Peekskill, NY. Each of these SNCR systems were further modified/optimized to meet 150 ppmv, dry corrected to 7% oxygen NOx RACT based limits in CT, NH, NJ, MD, MA and PA, and in the next year at the Wheelabrator Westchester MWC plant. The other vendor, HZI, has extensive experience in providing aqueous ammonia based SNCR systems at multiple massburn MWC plants in Europe and around the world. HZI will be retrofitting an advanced aqueous ammonia based SNCR system at the Wheelabrator Baltimore MWC plant that will be fully operational in December 2023. From Wheelabrator's experience, given their proven track record, these were the best companies who could provide the most cost effective SNCR systems for Hudson Falls. Additional details on the cost analysis include:

- 20 years of useful life expectancy was used for calculating capital costs.
- Price quotes from both vendors reflected duplicate/shared services between vendors and plant including cost of engineering & design, commissioning, construction, equipment purchases as would be expected to minimize expenditures in any capital project.
- The SNCR system equipment installation and plant integration costs were purposely omitted from each vendor's scope as this could be performed by the plant using their own local vendors/suppliers as well as own plant personnel at lower cost.
- Both vendors' systems provide common reagent storage tanks and reagent circulation systems within the design. Both SNCR systems do not require reagent preparation as reagent is used in unaltered from what is delivered to the plant.

The final NOx RACT cost analysis is included in Attachment B.

RACT Cost Effectiveness Threshold

The technical requirements of the NYSDEC issued Program Policy DAR-20: Economic and Technical Analysis for Reasonably Available Control Technology (RACT) Networks was reviewed and used to provide guidance on establishing the current facility NOx control technology as RACT. Based on this document, the NYSDEC established a cost effectiveness threshold of $3,000 per ton of NOx removed in 1994. Escalating the original 1994 RACT cost effectiveness threshold to 2021 using the U.S. Bureau of Labor Statistics CPI Inflation Calculator results in a current RACT cost effectiveness threshold of approximately $5,475 per ton of NOx removed. The document further explains that: "*An emission source of VOC or NOx will not be required to*

implement any emission reduction or control strategy that is more costly than the established threshold adjusted over time for inflation".

RACT Economic Analysis

To achieve the NOx RACT of 150 ppmv, dry corrected to 7% oxygen, the facility would need to design, engineer, procure, and install a Selective Non-Catalytic Reduction (SNCR) NOx control system. The table below summarizes the economic analysis for the SNCR NOx control system based on the final NOx RACT cost analysis detailed in Attachment B.

	PTE NOx ppmv (dry corrected to 7% Oxygen)	165	160
	Stack Flow- dscf/min7%O2 (2018)	28,002	28,002
	PTE NOx (2 units)- TV permit (tons)	290.0	281.2
	Annual NOx at 150 ppm-(tons)	263.6	263.6
	NOx Reduction (tons)	26	18
Fuel Tech (FT)	**Total Annualized Cost**	**$ 236,602**	**$ 236,602**
	Cost Effectiveness($/ton)	**$8,976**	**$13,464**
Hitachi Zosen Inova (HZI)	**Total Annualized Cost**	**$ 235,676**	**$ 235,676**
	Cost Effectiveness($/ton)	**$8,941**	**$13,411**
	DAR -20 Cost Threshold ($/ton)	**$5,475**	

The cost effectiveness was calculated based on reducing NOx concentrations down to 150 ppmv, dry corrected to 7% oxygen from a proposed annual alternative NOx limit of 165 ppmv, dry corrected to 7% oxygen and from current NOx levels of 160 ppmv, dry corrected to 7% oxygen which represents the average NOx concentration for both combustors over the previous 2-3 years. The annual potential to emit (PTE) values in the above table are based on worst case historical gas flow from 2018 annual stack testing (28,002 dscf/min). The 2018 stack gas flow is 11% greater than the gas flow used to establish maximum annual potential emission in the Title V operating permit (25,167 dscf/min). As indicated in the above table above, the costs for reducing NOx emissions to 150 ppmv, dry corrected to 7% oxygen are well above the cost effectiveness threshold established following the NYSDEC's policy document DAR-20: Economic and Technical Analysis for Reasonably Available Control Technology (RACT) Networks.

Proposed Alternative NOx RACT Limits

Based on the October 8, 2021 data analysis submitted to NYDEC, and follow-up discussions between NYDEC and Wheelabrator Hudson Falls, the following alternative NOx limits are proposed:

- MWC unit limit of 165 ppmv, dry corrected to 7% oxygen based on 12 month rolling average;
- MWC unit limit of 185 ppmv, dry corrected to 7% oxygen based on 24-hour daily average excluding startup/shutdown and malfunction periods; and
- Maximum Annual Potential (MAP) limit of 275 tons/year combined for the two MWC units based on 12 month rolling average.

To demonstrate compliance with the 275 tons/year MAP limit a continuous stack gas flow monitor will be installed on each MWC unit.

In addition, the use of the natural gas burner will be allowed as may be needed from time to time to assist in meeting the 185 ppm/24-hour daily limit.

Alternative NOx RACT Summary

In summary, the current NOx control technology employed at the facility should be considered RACT given the inherently low NOx emissions that are already being achieved and that the cost of further NOx reductions greatly exceeds NYDEC's established RACT implementation policy. Additionally, Wheelabrator Hudson Falls is committing to an alternative annual NOx limit of 165 ppmv, dry corrected to 7% oxygen and 24- hour short term limit of 185 ppmv, dry corrected to 7% oxygen for each MWC unit and annual MAP limit of 275 tons/year, 12-month rolling average for the facility. These lower limits will reduce the facility's potential to emit and ensure that the NOx control technology employed at the facility controls future NOx emissions consistent with the requirements of RACT.

Should you have any questions or require additional information, please feel free to contact this office at (518) 786-7400 or Bob Brynes of Wheelabrator at (518) 747-2390 extension 217 at your convenience.

Sincerely,
C.T. MALE ASSOCIATES

Joseph A. Farron, Jr.
Project Environmental Engineer

Reviewed and approved by:

Jeffrey A. Marx, P.E.
Managing Environmental Engineer

Attachments

c: Maurice Holcombe, Robert Brynes, Tim Porter

Attachment A

Additional NOx RACT Technology Feasibility Analysis

Attachment A- Additional NOx RACT Technology Feasibility Analysis

Flue Gas Recirculation (FGR):

In FGR a portion of clean combustion flue gas is extracted and recirculated from the ID fan inlet duct after air pollution control train and is re-injected back into the furnace through the secondary air (SA) system. The recirculated flue gas replaces a portion of the secondary air flow, reducing O_2 concentration in the combustion zone while maintaining the SA gas flow volume and velocity needed for good turbulence and mixing of SA and flue gas in the furnace. The addition of FGR reduces NO_x generation by lowering combustion zone O2 and suppressing flame temperature. The negative aspect of FGR however is the potential for an increase in CO emissions from lower O2 concentrations in the combustion zone.

From a technical and practical perspective FGR was not considered given the already low NOx emissions inherent to the Hudson Falls MWC furnace design and combustion control. As described in the June 2021 RACT proposal, the Hudson Falls MWCs equipped with Foster-Wheeler boilers and Detroit Stoker reciprocating grates have secondary air (SA) systems with two fully interlaced SA injection levels with 7 feet vertical separation between them. This additional SA stage extends the combustion zone helping to further reduce peak flame temperature and incrementally increases available O2 to help minimize NOx formation while ensuring good CO control. Baseline NOx levels in massburn waterwall/reciprocating grate MWCs are generally in the 240-300 ppm7% range using low excess air/single staged combustion. Expected FGR NOx reduction is approximately 20-25% from baseline NOx levels putting expected FGR NOx concentrations in the 165-225 ppm7% range. Average NOx concentrations for the Hudson Falls MWC units are already at or below the expected NOx levels that could be attained with FGR. As such installation of FGR would likely provide little or no additional NOx reduction and would not be a viable option for achieving lower NOx levels at the facility.

Natural Gas Injection (NGI)

NGI was never identified as a technically feasible commercially available NOx control option and has never been retrofitted on a MWC to our knowledge. Further NGI was not identified as a RACT based control technology in the USEPA RACT/BACT/LAER clearing house. NGI basically involves the injection of natural gas in the combustion zone to create reducing conditions that convert NOx formed in combustion zone to CO, N2 and water. Short duration tests of NGI were conducted in the past but the technology was never adequately developed and demonstrated to be considered ready for commercial applications. (*USEPA Project Summary NOx Control Technologies Applicable to Municipal Waste Combustion, EPA/600/SR-94/208, March 1995*). Additionally, NGI would reduce the waste processing capacity of the facility as the heat released from the eventual combustion of natural gas, would displace the heat released from MSW combustion. A reduction in waste processing capacity would adversely impact facility economics. Based on the above, NGI would not be considered technically feasible for NOx RACT control option.

Baghouse with Catalytic Bags:

A Pulse Jet Fabric Filter (PJFF) or baghouse equipped with catalytic filter bags with ammonia or urea injection operates similarly to "traditional" Selective Catalytic Reduction (SCR) NOx control system. A catalytic filter bag is comprised of a PTFE membrane bag on the outside layer for particulate removal with SCR catalyst embedded fabric on the inside. As with SCR minimum operating temperatures for catalytic filter bags range from 356°F to 430°F but is highly dependent on flue gas constituents. The most significant challenge to applying catalytic bags on MWCs is the high operating temperature needed for the catalytic NOx reduction reaction to occur and the presence of SO2 in the flue gas.

Optimum temperature range for SO_2 and HCl removal is 150°C to 180°C (275°F to 350°F) for the spray dryer absorber (SDA) acid gas control technology installed at Hudson Falls which is too low for catalytic bags to be effective for NOx control. Further, at these lower SDA operating temperatures, catalyst activity will be reduced quickly from ammonium bisulfate formation and deposition from SO2 in the flue gas combining with ammonia. Increasing SDA operating temperature to meet the catalytic filter bag temperature requirement greatly reduces SO_2 removal capability and the ability to meet SO2/HCl limits. Additionally, as the USEPA has indicated in evaluating mercury control in MWCs, when flue gas temperatures approach and exceed 350°F, the effectiveness of powdered activated carbon (PAC) is reduced

rapidly. An increase in baghouse temperature from 300°F to 350°F during one study reduced mercury removal from approximately 90% to 10 to 20%.

Finally, the cost of replacing the existing ESPs with pulse jet baghouses has been estimated at approximately $6.9 million in 2018 dollars (estimate from baghouse supplier). This estimate included removing the ESPs and installing 2 new baghouses. The estimate did not include facility costs for engineering and construction to integrate the baghouses into the facility. The cost of catalytic bags would be additional as would installation of an ammonia injection system to supply ammonia required for the catalytic reduction reaction.

Attachment B

Wheelabrator Hudson Falls NOx RACT Cost Summary

Attachment B- Wheelabrator Hudson Falls NOx RACT Cost Summary

Cost analysis is based on recent proposal from Hitachi Zosen Inova (HZI, July 2021) for 19% aqueous ammonia (NH3) based SNCR system and Fuel Tech (FT) April 2018 proposal for urea based SNCR system. Fuel Tech 2018 proposal cost was not escalated from 2018 to 2021 basis to be conservative.

Scope of Work:

SNCR System Components (Common components except as noted)

- Double wall ammonia storage tank (HZI)
- Heated 50% urea tank with heated recirculation module (FT)
- Recirculation pumping system to supply reagent to metering/distribution modules (common to both MWC units)
- Reagent metering control modules (2)
- Reagent distribution modules (2)
- Reagent injectors
    - HZI, 3 injectors per MWC, 6 total
    - FT, 4 injectors per MWC, 8 total
- Instrumentation
- Engineering
- Testing/commissioning

Installation/Services Provided by Plant-not included in vendor scope of work

- Mechanical and/or electrical installation of supplied equipment
- Integration into plant control, mechanical and electrical system
- Electrical design for power and control wiring
- Reagent tank foundation
- Civil engineering and civil works
- Power supply cable and wiring
- Planning and permitting
- Local sales taxes
- LOTO (lockout-tagout)
- Bent furnace tubes and wall boxes for injectors

	PTE NOx ppmv (dry corrected to 7% Oxygen)	165	160
	Stack Flow- dscf/min7%O2 (2018)	28,002	28,002
	PTE NOx (2 units)- TV permit (tons)	290.0	281.2
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	NOx Reduction (tons)	26	18
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	DAR -20 Cost Threshold ($/ton)	**$5,475**	

Capital Cost	**SNCR Vendor**		**Basis**
	HZI	**FT**	
SNCR Reagent	**19% NH3**	**50% urea**	
Equipment Cost	$1,269,000	$1,150,000	Vendor Proposals
Furnace Wall Boxes for Injectors	$12,000	$16,000	HZI 6 injectors, FT 8 injectors ($2,000/box)
Installation Cost	$ 317,250	$ 287,500	Estimate 25% of Equipment
Startup Testing/Commissioning	Included	Included	
Total Installed Cost	**$ 1,598,250**	**$ 1,453,500**	
5% Contingency	**$ 79,913**	**$ 72,675**	
Total Capital Cost	**$ 1,678,163**	**$ 1,526,175**	
Interest Rate	4.5%	4.5%	
Period Months	240	240	20 years per NYDEC Guidance
Amount Capitalized	$ 1,678,163	$ 1,526,175	
Annualized Capital Cost	**$127,403**	**$115,864**	
Annual Operating Cost			**Basis**
Operating Days	365	365	
Reagent Usage (gallons/hour)	5.6	3.8	From Vendor Proposals
Reagent Cost $/gal	$0.86	$1.14	NH3/Urea supplier
Reagent Annual Cost	$ 42,188	$ 37,948	
Electrical Utility Costs (estimate)	$ 25,000	$ 40,000	compressed air, pumps, electrical
Weekly Maintenance Hours	4	6	FT more complex system
Maintenance Hourly Cost	$ 45	$ 45	blended rate (E and I Tech and Mechanic)
Annual Maintenance Labor Total	$ 9,360	$ 14,040	FT more complex system
Annual Equipment Cost	$ 31,725	$ 28,750	2.5% of equipment cost
Annual Operating Cost	**$ 108,273**	**$ 120,738**	
Total Annualized Cost	**$235,676**	**$236,602**	