

Municipal Waste Combustor Report Overview and Results January 19, 2022

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Stakeholder Meeting



OZONE TRANSPORT COMMISSION

List of Acronyms

ASNCR – advanced selective non-catalytic reduction

BACT – best available control technology

FGR – flue gas recirculation

OTR – ozone transport region

RACT – reasonably available control technology

SNCR – selective non-catalytic reduction

Background on MWC Study

- Ozone Transport Region continues to experience ozone nonattainment.
- Study purpose was to evaluate MWC contribution to ozone precursors and potential for further emissions reductions.
- Evaluate MWC NO_x inventory for the OTC states:
 - Significant contributor of ozone precursors that impact overburdened communities.
- Evaluate technical feasibility and costs of additional NO_x controls.
- Make recommendations to the Commission for use in a potential memorandum of understanding (MOU).

MWC Study Method

- Each state compiled a list of MWCs with their characteristics (size, technology, emission controls, design, permit or RACT limits).
- Converted permit limits to mass to estimate tons of NOx per year.
- Compiled literature on additional NOx controls:
 - Engineering Firms (Trinity Consulting, Babcock Environmental);
 - Control technology analyses (BACT and RACT analyses);
 - MWC facility permits;
 - Articles – North American Waste to Energy, others.
- Determined feasible level of additional control.
- Calculated potential tons reduced.
- Estimated costs for additional controls.

Summary of OTR MWC Units and NOx Emissions

State	Number of Large Units	Number of Small Units	Annual Tons of NOx Emissions - Large Units (2018)	Annual Tons of NOx Emissions - Small Units (2018)
Connecticut	12	0	2,226	0
Maine	4	2	670	278
Maryland	6	0	1,435	0
Massachusetts	11	6	4,754	173
New Hampshire	2	0	344	0
New Jersey	11	0	2,044	0
New York	13	5	3,998	456
Pennsylvania	19	0	3,531	0
Virginia	7	0	2,276	0
Total	90	13	21,278	906

Potential Annual NOx Reductions

Type of unit	2023 Projected NOx Emissions (ton/yr)	Potential 2023 NOx Reduction (ton/yr) Assuming 105 ppmvd	Percent Reduction from 2023 Projected NOx Emissions
Large MWC	22,992	7,290	32%
Small MWC	1,006	Not estimated	Not estimated
Total	23,998	7,290	30%

Potential 2023 NOx reductions (tons/yr) assume the implementation of a 30-day averaging limit for NOx of 105 ppmvd

Cost of Installing Low NOx Technology on a Covanta MWC with SNCR

	SNCR (Base)	Low NOx – Workgroup	Low NOx
Capital Costs (\$)	-	\$1,564,242	\$1,564,242
Cost Reduction for Assuming 110 ppmvd (\$)		\$92,079	
Annual Operating Costs (\$)	-	\$401,243	\$493,322
Annualized Capital Costs (\$)	-	\$178,938	\$178,938
Projected Lifetime (yr)	-	20	20
Interest Rate (%)	-	7%	7%
Total Yearly Costs (\$)	-	\$580,181	\$672,260
Base Case NOx (ppmvd)	180	180	180
Controlled NOx (ppmvd)	180	110	90*
Estimated NOx Reduction Factor	-	0.39	0.50
Estimated NOx Reduction (%)	-	38.89	50
NOx Emission (ton/yr)	465.6	465.6	465.6
Projected Controlled NOx Emissions (tons/yr)	465.6	284.5	232.8
Emission Reduction (ton/yr)	-	181.1	232.8
Cost Effectiveness (\$/ton)	\$0.00	\$3,204	\$2,888

*annual average

Cost of Installing Technologies on a Wheelabrator MWC with SNCR

	Optimized SNCR	ASNCR	FGR-SNCR	FGR-ASNCR
Capital Costs (\$)	\$85,200	\$8,665,162	\$5,829,591	\$12,993,524
Annual Operating Costs (\$)	\$695,000	\$995,000	\$815,000	\$1,035,000
Annualized Capital Costs (\$)	\$8,042	\$817,930	\$550,272	\$1,226,497
Projected Lifetime (yr)	20	20	20	20
Interest Rates (%)	7%	7%	7%	7%
Total Yearly Costs (\$)	\$703,042	\$1,812,9300	\$1,365,272	\$2,261,497
Base Case NOx (ppmvd)	150	150	150	150
Controlled NOx (ppmvd)	135	110*	120	105
Estimated NOx Reduction Factor	0.10	0.27	0.20	0.30
Estimated NOx Reduction (%)	10.0	26.7	20.0	30.0
Current NOx Emission (ton/yr)	1,104	1,104	1,104	1,104
Projected Controlled NOx Emissions (tons/yr)	993.38	809.42	883.01	772.63
Emission Reduction (ton/yr)	110.38	294.34	220.75	331.13
Cost Effectiveness (\$/ton)	\$6,370	\$6,159	\$6,185	\$6,830

*Assumes a 24-hour averaging period

Technically Feasible Control Strategies

- Covanta Low NOx Technology for Covanta MWC designs:
 - A proprietary low NOx combustion system (LNTM) developed by Covanta.
- Advanced Selective Non-Catalytic Reduction “ASNCR” retrofit for Wheelabrator MWC designs.

Report Summary

- MWC pilot report:
 - ~100 MWCs in the OTR, ~60 outside the OTR;
 - >20,000 tons of NO_x in OTR annually;
 - New OTR limits could reduce ~7,300 tons of NO_x annually;
 - **Workgroup recommends additional NO_x limits (110 ppmvd 24-hour and 105 ppmvd 30-day averaging periods);**
 - Example costs (\$/ton of additional NO_x reduced): \$2,900 to \$6,800/ton.



Photo of New Hampshire MWC

Next Steps

- Collect and review comments from MWC stakeholders:
 - We welcome additional comments, information, and questions;
 - Additional information or comments should be sent by January 28th to OTC;
 - Additional information sent by this date will be included in the written summary of the stakeholder meetings.
- Distribute written summary of comments to stakeholders.
- Plenary stakeholder web meeting (TBD).

Stakeholder Questions and Comments

- Now we'll hear from you with your questions and comments.

Thank You

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