May 11, 2018

Via e-mail
George (Tad) Aburn
Director
Air & Radiation Administrations
Maryland Department of the Environment
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RE: Maryland Rulemaking for Limits for Nitrogen Oxides Emissions from Large Municipal Waste Combustors

Dear Mr. Aburn:

The Environmental Integrity Project (“EIP”) and the Chesapeake Bay Foundation (“CBF”) (collectively “Commenters”) respectfully submit these comments on the new regulation limiting emissions of nitrogen oxides (“NOx”) from large municipal waste combustors (“MWCs” or “incinerators”) that the Maryland Department of the Environment (“MDE”) has been considering. MDE started holding public stakeholder meetings in August 2016 on this new regulation and, according to the information presented at the December 11, 2017 meeting of MDE’s advisory board on air regulations – the Air Quality Control Advisory Council (“AQCAC”) - MDE intends to formally issue a proposed rule for public comment in the Maryland Register in May of 2018.1

Introduction

Commenters appreciate the time that MDE’s staff has put into this rulemaking and the relatively transparent nature of the public stakeholder process that MDE has held as it considered the rule. During public stakeholder meetings, MDE has provided significant information to interested stakeholders about the legal standards involved, the affected facilities, the emission limits that the agency has considered at different stages of the process, and the basis for those limits. MDE has also made important information, including stakeholder presentations and audio recordings of stakeholder meetings, accessible to the public on its website. In addition, we

appreciate the hourly continuous emissions monitoring system (“CEMS”) and operational data that MDE has started to make available on its website\(^2\) pursuant to the formal recommendation made by AQCAC in December that such data was important for public scrutiny of this rule and should be easily accessible.\(^3\) Commenters consider it particularly critical for MDE to continue to make this data available on a quarterly basis going forward. We note, however, that MDE could have been more transparent by sharing key documents with stakeholders without requiring formal records requests. In particular, the report on the 2017 optimization study at the Wheelabrator/BRESCO facility was sent by Wheelabrator to MDE on July 31, 2017, and Mr. Tim Porter of Wheelabrator stated in his email transmitting the report to MDE: “[y]ou can distribute these as you see fit.” Commenters did not receive this critical document until December 13, 2017,\(^4\) when we received it in response to a Public Information Act (“PIA”) request submitted on November 1, 2017.\(^5\)

Commenters have significant concerns regarding the high NOx emissions from the Wheelabrator Baltimore/BRESCO incinerator in Baltimore City. As we have expressed to MDE numerous times during this proceeding, Commenters believe that substantially more can be done to reduce NOx from this facility than is required under the draft revisions to COMAR 26.11.08 dated November 17, 2017 that were shared by MDE with stakeholders in November 2017 as part of the agenda for the December 11, 2017 AQCAC meeting (hereinafter “Nov. 2017 Draft Rule”). We think that Wheelabrator should be required to meet a 24-hour NOx limit that is much lower than 150 parts per million by volume dry @ 7% O2 (hereinafter “ppm”).\(^6\) We expressed this position at the December 11, 2017 AQCAC meeting, during which Commenters and other groups repeatedly requested that MDE add a lower presumptive emissions limit for the BRESCO facility to the draft rule. We are writing to share more information regarding these concerns, as further supported by the attached report of Dr. Ranajit Sahu, who has reached several salient conclusions after reviewing information that we obtained following the December 11, 2017 AQCAC meeting, including the 2017 1-hour CEMS data.\(^7\)

In addition, as described in more detail below, we think that further edits are needed to the text of the Nov. 2017 Draft Rule sections that relate to the feasibility study to be completed in 2020. More specificity should be provided in the rule relating to the analyses to be conducted by Wheelabrator, and Commenters have previously shared our views regarding several of the changes that we consider important.\(^8\) Finally, Commenters consider it critical that ammonia slip be measured at the BRESCO incinerator via the use of ammonia CEMS, as expressed in

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\(^2\) MDE, Air & Radiation Administration, Research and Special Studies, Wheelabrator Annual CEM Data Reports, at [http://mde.maryland.gov/programs/Air/Pages/ARAResearch.aspx](http://mde.maryland.gov/programs/Air/Pages/ARAResearch.aspx).


\(^4\) Had Commenters received this document and the hourly CEMS data earlier, it would have allowed us to request a lower emissions limit earlier.

\(^5\) PIA request tracking #03049.

\(^6\) CBF has expressed support in the past for a 150 ppm limit as RACT. However, based on the new information and the analysis set forth in Dr. Sahu’s report, CBF now believes that a lower limit is warranted.


\(^8\) See Commenters’ October 6, 2017 comments. Commenters also attempted to share the specific changes that we consider necessary to the feasibility study section of the Nov. 2017 Draft Rule at the December 11, 2017 AQCAC meeting.
comments already submitted by EIP and CBF both jointly and separately. 9 This is of particular importance given information and statements set forth in the optimization study performed in June 2017 by Fuel Tech, Inc. 10

If MDE disagrees with any of the conclusions set forth in this letter, including our methodology for calculating annual NOx emissions from the Wheelabrator incinerator using different potential short-term limits, we respectfully request that the agency inform us of this as soon as possible. We expect to share these conclusions with others and to include them in our comments during the formal public comment period and hearing on the proposed rule, and we want our comments to be as complete as possible.

I. Further NOx Reductions are Achievable at BRESCO.

For the BRESCO incinerator, MDE has proposed to set a 150 ppm limit on a 24-hour average, which takes effect in 2019, and a 145 ppm limit on a 30-day average, which takes effect in 2020. Commenters recognize that this represents a more aggressive standard when compared with Reasonably Available Control Technology (“RACT”) standards currently in effect or proposed in other states. However, we note that New York State has recently announced that it is considering a 150 ppm limit on a 24-hour basis for its incinerators 11 and MDE acknowledged at the December 11, 2017 AQCAC meeting that Virginia is considering a 110 ppm 24-hour limit and a 90 ppm daily limit on an annual average for the two Covanta-operated incinerators located there. 12 In addition, all of these limits allow far greater emissions than the NOx limit required for new incinerators in Maryland, which is 45 ppm on a 24-hour basis.

Commenters believe that Wheelabrator can greatly reduce its NOx emissions and reduce the health burden of its pollution on Baltimoreans. MDE clearly has the legal authority to require additional reductions at this very large source of NOx emissions and it should exercise this authority to reduce the human health and environmental impacts of ozone levels that exceed federal standards. EPA has stated that “a state has discretion to require beyond-RACT reductions from any source, and has an obligation to demonstrate attainment as expeditiously as practicable. Thus, states may require [volatile organic compound (“VOC”)] and NOX reductions that are ‘beyond RACT’ if such reductions are needed . . . to provide for timely attainment of the ozone NAAQS.” 13

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9 See Commenters’ May 9, 2017 separate comment letters and October 6, 2017 joint comments.
10 Bisnett, M. “NOx Optimization Project Wheelabrator Baltimore Inc.” Fuel Tech Project 459S, June 5-9, 2017 (hereinafter “June 2017 Fuel Tech Study”), at p. 5. Attached hereto as Attachment B. The page numbers of this report, which ends at 22 of 31, would make the version of the report that we obtained appear incomplete. However, we have reviewed emails between MDE and Wheelabrator, received in response to a PIA request, that show that the version ending in page 22 is the complete version.
11 New York State Department of Environmental Conservation letter to stakeholders, March 26, 2018. Attached hereto as Attachment C.
12 MDE December 11, 2017 AQCAC meeting audio recording (26:12) at http://mdewin76.mde.state.md.us/MDEMeetings/ARMA_Audio_Files/AQCAC_12_11_17.MP4.
A. Wheelabrator should be required to install the most effective pollution controls available for NOx.

Dr. Sahu has concluded that he sees “no technical impediments to the implementation of the [most effective] NOx-reducing technologies, such as SCR (or hybrid SNCR/SCR), in the appropriate locations along the gas paths at each of the [Wheelabrator Baltimore] boilers.”\(^{14}\) Dr. Sahu has reviewed numerous materials relating to the Wheelabrator Baltimore incinerator,\(^{15}\) including the reports for both optimization studies performed at the facility (one in 2016 and one in 2017), the 1-hour averaged NOx CEMS data collected at the three boilers during 2017,\(^{16}\) and the Wheelabrator NOx RACT PowerPoint presentation made at the January 2017 stakeholder meeting.

Thus, any objection to using the most effective NOx pollution controls available at BRESCO appears to be solely financial. This is a particularly troubling position when taken by a company that, according to the Baltimore Sun, has been rewarded approximately $10 million over the past six years for being a renewable, and ostensibly green and environmentally friendly, source of energy in Maryland.\(^{17}\) In the case of hybrid SNCR/SCR, the financial concerns are reduced as this technology is typically much less expensive than SCR. Commenters note that we have no record of Wheelabrator ever addressing our recommendation that it analyze the feasibility of using hybrid SNCR/SCR or Regenerative Selective Catalytic Reduction (“RSCR”), the technology that would have been installed on the proposed Energy Answers incinerator in Baltimore City and was touted in project materials as more cost-effective than SCR while achieving an 80% reduction efficiency.

As Dr. Sahu notes in his report, installation of SCR would likely allow Wheelabrator to achieve levels around 50 ppm on a 24-hour average at BRESCO, assuming roughly 75% NOx reduction efficiency, which he notes is a lenient target for this technology.\(^{18}\) This would cut approximately 803 tons of NOx per year from the incinerator’s 2016 annual emissions, reducing the annual number from 1141 tons to 338 tons.\(^{19}\)

Commenters understand that it is possible that SCR or a similar technology (hybrid SCR/SNCR or RSCR) will be required because of the feasibility study required under the Nov. 2017 Draft Rule. However, we continue to feel strongly that a presumptive limit should be included in the rule requiring that BRESCO achieve SCR-level reductions of NOx and requiring a demonstration by Wheelabrator that it cannot meet this limit if the company wishes to avoid it.

\(^{14}\) May 2018 Sahu Report, p. 10.
\(^{16}\) May 2018 Sahu Report, p. 1.
\(^{18}\) May 2018 Sahu Report, p. 10.
\(^{19}\) Potential NOx emission reductions were calculated by applying the proportion of average 24-hour concentrations (50 ppm to 169 ppm in 2016) to the 2016 annual NOx emissions of 1141 tons, effectively calculating the emission rate assuming effluent stack flow and oxygen percentage remain constant.
B. Wheelabrator can achieve NOx limits lower than those proposed simply by using its current pollution controls.

In addition, Dr. Sahu concludes, based on his review of 2017 1-hour CEMS data and the 2017 Fuel Tech Report, that Wheelabrator can meet NOx limits lower than the 150 ppm and 145 ppm limits proposed using its existing control technology, solely through further optimization of those controls.20 Specifically, Dr. Sahu states in his report that Wheelabrator can achieve a 24-hour limit of 135 ppm on a 24-hour basis and 130 ppm on a 30-day basis as demonstrated by the hourly CEMS data during the optimization tests and the failure to use more effective testing approaches during the optimization runs.21 Adoption of a 135 ppm limit on a 24-hour basis would reduce 230 tons of NOx per year from the incinerator, using 2016 annual emissions as a baseline, reducing annual emissions to 911 tons.22

We understand that MDE is planning to formally publish a rule for public comment relatively soon. However, given Maryland’s action against the U.S. EPA under Clean Air Act Section 126 seeking an order that requires coal plants in other states to run their controls more effectively, we do not understand why MDE is not requiring Wheelabrator to run its existing controls in the most effective way possible.23 Requiring the most reduced emissions rate for this source category would be consistent with Maryland’s statements in its Clean Air Act 126 and 176a Petitions.

C. Wheelabrator has not maintained the same emissions reductions that it achieved during optimization testing in the following months.

Even given Wheelabrator’s failure to use approaches during optimization that would likely have reduced its NOx levels even further during those tests, CEMS data shows that Wheelabrator did not maintain the NOx reductions achieved during optimization in the following months.24 This is likely because it had no legal incentive to do so as the limits in MDE’s draft rule have not yet taken effect. Commenters find it troubling that Wheelabrator has not elected to voluntarily maintain the lower levels of NOx that it has shown it can achieve at the BRESCO incinerator, especially, as stated above, since it is treated as a source of environmentally friendly energy under the state’s Renewable Portfolio Standard.

As described in Dr. Sahu’s report and shown in the tables below - reproduced, using a slightly altered form, from Dr. Sahu’s report - NOx emissions increased again at each unit following the optimization tests. For unit 2, Wheelabrator achieved an hourly average of 148.1 ppm during optimization testing and its NOx levels increased to an hourly average of 165.1 ppm after the optimization tests (though this was lower than pre-optimization average of 168.6 ppm). For unit 3, NOx levels of 144.9 ppm were achieved during testing but increased to 165.1 ppm in the following months. Again, however, this was lower than pre-optimization levels, which measured at 167.6 ppm. Finally, at unit 1, optimization testing achieved levels of 147.1 ppm and

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20 May 2018 Sahu Report, pp. 3-8
21 Id. at 8.
22 Potential NOx emissions reductions were calculated using the same methodology as described in note 19, supra.
23 As stated above, Commenters could have raised this earlier in the stakeholder process had we received the 2017 Fuel Tech Report earlier and hourly CEMS data earlier.
levels increased in the following months to 164.8 ppm, which was actually higher than pre-optimization levels of 158.1 ppm.

**Unit 1**

<table>
<thead>
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<th>Time Period Relative to Optimization Test</th>
<th>Dates</th>
<th>NOx emissions in ppm (average hourly)</th>
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<tbody>
<tr>
<td>Before Optimization</td>
<td>January 1 - June 6, 2017</td>
<td>158.1</td>
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<tr>
<td>During Optimization</td>
<td>June 7, June 12-14, June 20-29, 2017</td>
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<td>June 30 - December 31, 2017</td>
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**Unit 2**

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<td>Before Optimization</td>
<td>January 1 - June 7, 2017</td>
<td>168.6</td>
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<tr>
<td>During Optimization</td>
<td>June 8, June 12-14, June 20-29, 2017</td>
<td>148.1</td>
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<td>After Optimization</td>
<td>June 30 - December 31, 2017</td>
<td>165.1</td>
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**Unit 3**

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<th>NOx emissions in ppm (average hourly)</th>
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</thead>
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<tr>
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<td>January 1 - June 5, 2017</td>
<td>167.6</td>
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<tr>
<td>During Optimization</td>
<td>June 6, June 12-14, June 20-29, 2017</td>
<td>144.9</td>
</tr>
<tr>
<td>After Optimization</td>
<td>June 30 - December 31, 2017</td>
<td>165.1</td>
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</tbody>
</table>

**II. MDE Should Revise the Feasibility Study Requirements of the Nov. 2017 Draft Rule.**

Commenters also have concerns regarding the lack of specificity included within the feasibility study section of the Nov. 2017 Draft Rule (proposed COMAR 26.11.08.10E). As the future NOx limit will be contingent upon the required feasibility analysis, it is essential to include as much specificity as possible to ensure that a full range of alternatives and process parameters are explored within the study. This includes both specifying which technologies should be included within state of the art NOx control technologies at the minimum, as well as specifying details on existing facility operations that will serve as the basis of the study.

Below are the changes to Nov. 2017 Draft Rule that Commenters consider necessary regarding the feasibility study. Commenters’ edits show insertions in bold and deletions in strike-out.

25 Commenters’ edits also incorporate the revision that was formally recommended by AQCAC at its December 11, 2017 meeting. According to the final meeting minutes, that edit is as follows:

Mr. Schoen read the proposed text that could be inserted into the regulation feasibility study requirements: “The feasibility analysis described in paragraph E included analysis of multiple controls and construction measures to achieve various levels of NOx emissions including levels comparable to those of a new source.”
(a) A written narrative and schematics detailing existing facility operations, boiler design, NOx control technologies, baseline NOx emission performance, temperature profiling and flow modeling, and gas sampling of the exhaust stream;

(b) A written narrative and schematics detailing state of the art NOx control technologies for achieving additional NOx emission reductions from existing MWCs in consideration of the current boiler configuration at Wheelabrator Baltimore, Inc. including analysis of multiple controls and construction measures to achieve various levels of NOx emissions including levels comparable to those [required of] a new source. This analysis must include, at the minimum, selective catalytic reduction (SCR), hybrid selective non-catalytic reduction (SNCR/SCR), and combustion and injection optimization functionally equivalent to the Covanta Low-NOx system;

(c) A technical feasibility analysis of whether each state of the art control technology identified under §E(1)(b) could be implemented at the Wheelabrator Baltimore Inc. facility;

III. Commenters Consider It Critical that MDE Require Installation of Ammonia CEMS at BRESCO.

Lastly, Commenters have ongoing concerns regarding the apparent failure to monitor ammonia slip at the facility. As stated within the June 2017 Fuel Tech Study, “ammonia slip needs to be determined given its importance in determining the effectiveness of the SNCR process.” Ammonia slip is a key parameter to measure as an indicator of whether the urea is being released into the ideal temperature range and is given adequate residence time to react for SNCR systems. Although the facility does not currently have a concentration-based ammonia slip limit within its Title V/Part 70 permit, Wheelabrator has acknowledged that ammonia slip is a key design parameter for the facility to determine its ability to meet NOx emission limits without resulting in visible emissions.

Commenters have seen no evidence that the facility has been routinely and continuously monitoring ammonia with CEMS or that MDE has received annual ammonia slip CEMS data from the facility. The 2017 hourly CEMS data made available by MDE pursuant to AQCAC’s recommendation does not include ammonia slip, which strongly indicates that hourly ammonia slip data is not currently monitored and reported. Additionally, during the 2017 optimization study, Fuel Tech measured ammonia slip using a modified EPA wet extraction method taking samples prior to the spray dryer absorbers, indicating that existing data from process monitors or ammonia CEMS were not available as an option. Commenters are also concerned about the

AQCAC 12/11/17 minutes, p. 5.
26 The bracketed text is not included in the text edit as described in the AQCAC meeting minutes, but Commenters believe this addition it is critical and is consistent with the discussion among the AQCAC members, which included reference to a NOx limit that has been required for new large MWCs in Maryland under the Lowest Achievable Emissions Reduction (LAER) standard.
27 June 2017 Fuel Tech Study, p. 5.
29 June 2017 Fuel Tech Study, p. 5.
absence of a limit for ammonia slip in the Nov. 2017 Draft Rule, especially as Connecticut includes such a limit in its incinerator NOx RACT regulations. EIP also provided examples in its May 9, 2017 comments of similar Wheelabrator incinerators in other states that are subject to a NOx limit of 150 ppm on a 24-hour basis and an ammonia slip limit of 20 ppm.

Ammonia slip measurement is critical for ongoing optimization, for the feasibility study of alternatives, and is an essential part of maintaining efficient operations in the future if any combination of SNCR or SCR is chosen as the control technology. Given its importance in monitoring the success of control technology, there appears to be no reason for MDE not to require use of ammonia CEMS at the incinerator and no reason for not requiring an ammonia slip limit. MDE should revise the Nov. 2017 Draft Rule to include an ammonia slip limit of no higher than 20 ppm and should require that ammonia CEMS be installed to monitor ammonia slip, as also discussed in EIP and CBF’s October 6, 2017 comments, EIP’s May 9, 2017 comments, and the May 2017 Sahu Report.

Thank you for considering our comments.

Sincerely,

[Signature]

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