

ATTACHMENT F

City's letter to SAPCB and Director Paylor, "PM_{2.5} Ambient Air Quality Impact Analysis and Particulate Matter CEMS, Mirant Potomac River Generating Station, Alexandria, Virginia", January 14, 2008



DEPARTMENT OF TRANSPORTATION AND ENVIRONMENTAL SERVICES
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January 14, 2008

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State Air Pollution Control Board
629 East Main Street
Richmond, Virginia 23219

David K. Paylor, Director
Virginia Department of Environmental Quality
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**Re: PM_{2.5} Ambient Air Quality Impact Analysis and Particulate Matter CEMS
Mirant Potomac River Generating Station, Alexandria, Virginia**

Honorable Board Members and Director Paylor:

Alexandria first requested of the SAPCB and VDEQ in 2004 that PRGS's operation be constrained by permitted emission limits that protect the PM_{2.5} NAAQS. Now, four years later, these statutory requirements remain unfulfilled. The PRGS's ambient PM_{2.5} impacts must be analyzed with consideration of the PM_{2.5} NAAQS as part of pending permits.

The City of Alexandria ("Alexandria") is writing to present to you detailed information on (i) standard modeling procedures that other states such as New Jersey, New York and Connecticut, use to determine PM_{2.5} permit emission limits; (ii) PM CEMS installations in the US and their use for PM compliance purposes; and (iii) Alexandria's modeling results using these standard modeling procedures, that overwhelmingly demonstrate the need for a stringent PM_{2.5} limit for Mirant Potomac River Generating Station ("PRGS"). Based on this information, Alexandria requests that the State Air Pollution Control Board ("SAPCB") and Virginia Department of Environmental Quality ("VDEQ") use the same standard modeling procedures to determine the PM_{2.5} emission limit for PRGS that will

comply with the PM_{2.5} National Ambient Air Quality Standards (NAAQS) and protect public health.

VDEQ is currently preparing a State Operating Permit ("SOP") for PRGS in its current five-stack configuration, as well as accepting public comment on a SOP for this facility in a proposed two-stack configuration. As you are well aware, 9 VAC 5-80-1180 standards and conditions for granting permits, applies to both of these permit proceedings, i.e., that:

"no permit shall be granted pursuant to this article unless it is shown to the satisfaction of the board that...the source shall be designed, built and equipped to operate without preventing or interfering with the attainment or maintenance of any applicable ambient air quality standard and without causing or exacerbating a violation of any applicable ambient air quality standard..."

It is only within an air quality modeling simulation, as differentiated from the practice of air monitoring, that an applicant can demonstrate that their source will not cause or contribute to a violation of an ambient air quality standard (AAQS), under all potential worst-case conditions and in all areas to which the public has access. This letter presents written policy documents describing ambient air quality modeling procedures that other states are using, and provides examples of permit applications and draft permits that respond to those source permitting requirements to establish PM_{2.5} emissions limits that protect the PM_{2.5} NAAQS.

The federal Guideline on Air Quality Models, 40 CFR Part 51, Appendix W, prescribes procedures for air quality modeling to respond to the "need for consistency in the application of air quality models for regulatory purposes."¹ Mirant's current analysis correctly includes both the filterable and condensable components of PM₁₀ within an ambient air quality analysis that applies a Guideline-approved model, i.e., AERMOD, and procedures to evaluate the maximum potential impacts of PM₁₀ against the PM₁₀ NAAQS.

However, for PM_{2.5}, also made up of filterable and condensable components, Mirant does not provide any such impact analysis. VDEQ has asserted that the PM₁₀ compliance demonstration wholly satisfies PM_{2.5} NAAQS compliance, an approach that VDEQ maintains is supported by draft guidance (currently in the public comment phase) and described in a U.S. EPA memorandum titled "Implementation of New Source Review Requirements in PM-2.5 Nonattainment Areas," (April, 2005),² i.e., the "Page memorandum." However, the Page memorandum defines an approach that is only relevant to a different type of permit proceeding, i.e., New Source Review ("NSR"), which does not apply to the current SOP proceeding for PRGS. Furthermore, the policy discussed in this memorandum is deficient and outdated because it regulates one pollutant

¹ "Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions; Final Rule," Federal Register, November 9, 2005. Available at http://www.epa.gov/scram001/guidance/guide/appw_05.pdf.

² Stephen D. Page, Office of Air Quality Planning and Standards, U.S. EPA, April, 2005.

through review of another that has distinctly different health effects and therefore different health-based exposure criteria. In 1997, when the PM_{2.5} standard was first promulgated, and in 2006 when it was significantly tightened, U.S. EPA was responding to the large body of scientific evidence distinguishing the health effects of fine particulate matter (also described as inhalable) from those of coarse particulate matter (also described as thoracic).³ Even when the Page memorandum was drafted in 2005, it lacked the support of any analysis specifically evaluating its efficacy for protecting the PM_{2.5} NAAQS.⁴ Now, in 2008, with the recent significant tightening of the PM_{2.5} standard, the approach only moves further from accomplishing protection of the PM_{2.5} NAAQS.

Additionally, the PRGS is requesting a SOP while the Page memorandum applies to NSR proceedings. However, even if one were to accept that this draft NSR guidance applies in this non-NSR proceeding, Alexandria believes VDEQ has misinterpreted the Page memorandum. The Page memorandum unequivocally states that in a PM_{2.5} nonattainment area, a PM₁₀ nonattainment area program applies.⁵ As you are aware, a nonattainment area NSR triggers requirements for the applicant to obtain offsets through emission reductions from or retirement of other nearby sources, apply lowest achievable emission rate ("LAER") control technology, and demonstrate that the source will not contribute to the non-attainment status of the region or create a new projected PM_{2.5} non-attainment area to meet the latter criteria, the applicant can show that the source's impacts fall below the significant impact levels ("SIL").⁶ Not only does Mirant ignore LAER or offset requirements, its ambient air quality modeling analysis only includes an evaluation against the full PM₁₀ NAAQS, instead of the PM₁₀ SIL. This misinterpretation of the PM₁₀-as-surrogate approach allows Mirant, with deleterious effect as the results below show, to treat the nonattainment area as though it were attainment.

³ This distinction has been iterated within the recent promulgation of the Clean Air Fine Particle Implementation Rule which "notif[ies] sources that...EPA will no longer accept the use of PM₁₀ emission information as surrogate for PM_{2.5} emissions information given that both pollutants are regulated by a National Ambient Air Quality Standard and therefore are considered regulated air pollutants." See "Clean Air Fine Particle Implementation Rule," 40 CFR Part 51, Federal Register, April 25, 2007.

⁴ Correspondence with Lynne Hutchinson, Office of Air Quality Planning and Standards, U.S. EPA, December 20, 2007. In a request for records relating to public comment on the Page memorandum and for documentation of analysis used in determining if this guidance would provide sufficient protection of the PM_{2.5} NAAQS, Ms. Hutchinson replied that U.S. EPA "did not request comment before issuing this guidance" and also "did not conduct additional studies or analysis in prepar[ing] this document...[i]nstead we relied on existing scientific evidence of the composition of PM_{2.5} and PM₁₀ emissions."

⁵ See page 2 of Page memorandum, under "What applies in PM_{2.5} nonattainment areas?" The memorandum states that "using the surrogate PM-2.5 nonattainment major NSR program, States should assume that a major stationary source's PM-10 emissions represent PM-2.5 emissions and regulate these using either Appendix S or the State's SIP-approved nonattainment major NSR program for PM-10."

⁶ "40 CFR Parts 51 and 52 Prevention of Significant Deterioration (PSD) for Particulate Matter Less Than 2.5 Micrometers (PM_{2.5})—Increments, Significant Impact Levels (SILs) and Significant Monitoring Concentration (SMC); Proposed Rule, Federal Register, Friday, September 21, 2007. Section VI, Significant Impact Levels, states that "[w]here a PSD source may have an impact on an adjacent nonattainment area, the PSD source must still demonstrate that it will not cause or contribute to a violation of the NAAQS in the adjacent area. This demonstration may be made by showing that the emissions from the PSD source alone are below the significant impact levels..."

Other States Require Standard Modeling to Establish PM_{2.5} Permit Limits

In stark contrast to VDEQ's assertion regarding PM_{2.5} modeling that "it would be extremely difficult for any source to show compliance using the modeling techniques applied for other criteria pollutants,"⁷ several other states which also have PM_{2.5} nonattainment regions have developed policies, and have issued permits to facilities under these policies, that require the application of standard modeling techniques for determining the source's PM_{2.5} emission limits that are protective of PM_{2.5} NAAQS. Moreover, VDEQ's failure to apply these available modeling techniques on the basis of inconvenience not only represents a dereliction of their duty to protect NAAQS, it also ignores the fact that emission reductions, such as those achieved by installation of pollution controls, are often required to meet NAAQS. Alexandria's analysis, presented later in this letter, shows the emission rates required to meet PM_{2.5} NAAQS, which can be achieved by installation of state-of-the-art pollution controls, such as baghouses.

New York, New Jersey and Connecticut have developed policies by which applicants use standard modeling techniques to propose permitted PM_{2.5} emission limits that will not cause or contribute to an exceedance of the PM_{2.5} NAAQS. The following guidance documents delineate their recommended modeling approaches and are attached to this letter for your perusal.

1. Attachment A: "Revised Interim PM-2.5 (Fine Particulate) Permitting and Modeling Procedures," State of New Jersey, Department of Environmental Protection, Division of Air Quality.
2. Attachment B: "CP-33 Assessing and Mitigation Impacts of Fine Particulate Matter Emissions," New York State Department of Environmental Conservation, DEC Policy.⁸
3. Attachment C: "DAR-10 / NYSDEC Guidelines on Dispersion Modeling Procedures for Air Quality Impact Analysis."⁹ Attachment E of this document states that in PM_{2.5} nonattainment areas "there are two basic modeling requirements... 1) demonstration of insignificant impacts, and 2) a net air quality benefits analysis." See also Table 1 of this document titled "EPA Recommended Modeling Procedures for Terrain Setting, Pollutants, Source Types, and

⁷ "Virginia Department of Environmental Quality (DEQ) Technical Review of the Air Quality Analyses in Support of the Merged Stack (2-Stack) Comprehensive State Operating Permit for the Mirant—Potomac River Generating Station (PRGS)," Mike Kiss, Coordinator – Air Quality Assessments Groups to Terry Darton, Air Permit Manager, Northern Regional Office, December 21, 2007.

⁸ http://www.dec.ny.gov/docs/air_pdf/cp_33.pdf

⁹ http://www.dec.ny.gov/docs/air_pdf/dar10.pdf

Dispersion Conditions” that lists AERMOD and ISC3¹⁰ as preferred refined models for direct emissions of PM_{2.5}.

4. Attachment D: “CT DEP Interim PM_{2.5} New Source Review Modeling Policy and Procedures.”

Included below are several examples of applications describing the exact procedures employed in simulating PM_{2.5} emissions (filterable plus condensable) within AERMOD to assess PM_{2.5} impacts against the PM_{2.5} NAAQS. Note that in the case of the analysis to assess PM_{2.5} impacts from the proposed Kimberly-Clark Corporation’s combined heat and power project prepared by TRC, AERMOD was used to demonstrate that the “proposed operation of the Project will produce insignificant impacts that will not interfere with the attainment and maintenance of compliance with the ...NAAQS.” Several permits are also included that show the corresponding PM_{2.5} emission limits.

1. Attachments E-1 and E-2: “Modeling Report in Support of the Kimberly-Clark Corporation – New Milford Mill Combined Heat and Power Project,” Prepared by TRC, Windsor, Connecticut, July, 2007.
2. Attachment E-3: “New Source Review Permit to Construct and Operate a Stationary Source,” Draft, Kimberly-Clark Corporation, July, 2007 (copy of final permit has been requested).
3. Attachment F: “Plainfield Renewable Energy LLC, Application for Air Permit to Construct and Operate, CT DEP Application No. 200602226, Revised PM_{2.5} Emission Rates and NAAQS Compliance Demonstration,” July 23, 2007, with draft air permit attached (copy of final permit has been requested).
4. Attachment G: Air Quality Impact Analysis, December 7, 2006, Plainfield Renewable Energy Project, In Support of CTDEP Application no. 200602226, Prepared by M.I. Holzmann & Associates, LLC, December, 2006.

Alexandria requests the SAPCB and VDEQ to require a full PM_{2.5} compliance demonstration from Mirant PRGS that uses the same (or similar) technical procedures that other states have found to be sound and supportable, for the purposes of establishing PM_{2.5}-NAAQS-protective emission limitations for all of the scenarios for which PRGS requests operation.

PM_{2.5} Impacts for PRGS Using the AERMOD Approach of Other States

Alexandria has applied the same approach used in these other states, and with Mirant’s own modeling files, using AERMOD for several of the requested operational scenarios to

¹⁰ NYSDEC notes in this table that after 12/9/06 ISC3 is no longer acceptable and that AERMOD is the acceptable model. As of 12/9/06, the 1-year grandfathering period for ISC3 expired so that AERMOD, which replaced ISC3, is the preferred regulatory model under 40 CFR 51, Appendix W.

determine how PM_{2.5} impacts from the PRGS compare to the PM_{2.5} NAAQS.¹¹ Results for one of the worst-case operational scenarios are shown below.

PRGS's Modeled Primary PM_{2.5} Impacts (Stacks Only)

Modeled Scenario	Stack Configuration	Maximum 8 th -high 24-Hr Impact (µg/m ³) ^(a)	Monitored Background ^(b) (µg/m ³)	Total Impact (µg/m ³)	24-Hr NAAQS (µg/m ³)
3 Base Boilers 3, 4 & 5 at min load, 24 hours/day	Existing 5-stack	24.5	34.1	58.6	35

- (a) For five years of modeling, assuming PM_{2.5} emissions are equal to the rate allowed by the 5-stack SOP, i.e., 0.055 lb/MMBtu. The listed impact is the highest of the 3-year averages of eighth-highest (98th percentile) AERMOD result derived using Mirant's modeling files posted on VDEQ's ftp site with no change, except to allow the calculation of the 8th highest impacts.
- (b) Three-year average of the 8th highest daily observation for years 2004 – 2006 from VDEQ's Aurora Hills monitor. Yearly data provided by Mr. Michael Kiss of VDEQ.

These results show that even without consideration of the impacts from (1) fugitive PM_{2.5} emissions from the PRGS's coal and ash handling operations; (2) the effect of secondary PM_{2.5} formation due to precursor emissions from PRGS (which is expected to contribute a relatively small impact at close-in receptors); and (3) PM_{2.5} emissions from other nearby interacting sources that were evaluated in the PM₁₀ impacts analysis, the predicted PM_{2.5} impacts far exceed the PM_{2.5} NAAQS.¹²

The table below shows the calculated PM_{2.5} emission rates at which the PRGS's stacks would not cause or contribute to an exceedance of the NAAQS, i.e., the impacts at these emission rates would be below the PM_{2.5} SIL proposed by U.S. EPA (September 21, 2007). AERMOD results for PM_{2.5} indicate that compliance with the 24-hour NAAQS will substantially assure compliance with the annual NAAQS. Alexandria requests the SAPCB and VDEQ to require a complete analysis of all operating scenarios and fugitive sources for the purpose of stipulating PM_{2.5} emission limits in the SOP that are protective of the PM_{2.5} NAAQS.

¹¹ Procedures used in applying Mirant's AERMOD files to determine the facility's impacts for these operational scenarios was described in the document "Procedures Applied in Determining PRGS's Maximum PM_{2.5} Impacts for only Limited Scenarios," attached in an email relayed by M. Barrett to M. Kiss on October 26, 2007.

¹² Note that PM_{2.5} monitoring results for the period of November, 2006 to July, 2007 show several days where measured impacts exceeded the 24-hour level of the PM_{2.5} VAAQS while concurrently exceeding regionally monitored levels.

Calculated Stack PM_{2.5} Emission Limits Necessary for NAAQS Compliance

Proposed SOP Limit (lb/MMBtu)	Modeled PM _{2.5} Impact at Proposed SOP Limit ^(a) (µg/m ³)	US EPA's Proposed PM _{2.5} SILs (µg/m ³)	Calculated PM _{2.5} Limit for Impacts to be Below SIL (lb/MMBtu)
0.055	24.5	5.0	0.011
		4.0	0.009
		1.2	0.003

(a) Results for "3 Base" case, assuming Boilers 3, 4 and 5 running at minimum load for 24 hours per day, i.e., one of the worst-case scenarios. All scenarios should be evaluated for a complete analysis.

PM CEMs Are Necessary for Compliance Assurance and Can be Implemented Now

While an air quality ambient impacts analysis using standard modeling techniques can determine PM₁₀ and PM_{2.5} emission limitations that are NAAQS-protective for the PRGS, a means of continuously monitoring compliance with the stipulated emission limitations must be installed and operated by the facility. The continuous opacity monitors that are currently used by PRGS are insufficient to assure such compliance. Not only is the proposed 20% / 30% window of allowed opacity (in Paragraph 32, Visible Emission Limit of the draft five-stack SOP) far too relaxed given the ability of PRGS's control equipment to maintain a historical opacity average of less than 7%,¹³ such a relaxed window allows continuous emissions of particulate matter at levels on the order of twice the proposed permitted rate.¹⁴ As such, compliance with the opacity limits will not assure compliance with the mass emission limits.

While current PM continuous emission monitors (CEMs) can measure only total filterable particulate matter, through semi-annual stack testing PRGS can establish and verify a relationship between total particulate matter and its sub-components that, in turn, could be relied upon to monitor continuous compliance with PM₁₀ and PM_{2.5} emission limits. PM CEMs are in use now at numerous electrical generating and manufacturing facilities for compliance purposes, as listed below.

¹³ "Po River Opacity 6 min Avgs 2006 - 2005," relayed to Alexandria by D. Cramer, May, 2007.

¹⁴ Results of measured particulate emissions in pound per million Btu versus opacity, as reported in and "Current Knowledge of Particulate Matter (PM) Continuous Emission Monitoring," EPA-454/R-00-039, September, 2000.

Partial List of Sources Currently Using PM CEMS

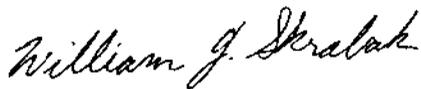
Source	PM CEMS Installation Date	PM CEMS Technology
Tampa Electric - Big Bend Unit 4	Feb 2002	Beta Attenuation
Dominion Generation - Mt. Storm Units 1 & 2	Jul 2004	Beta Attenuation
We Energies - Oak Creek Units 5 & 6	Jan 2005	Beta Attenuation
We Energies - Pleasant Prairie Units 1 & 2	Sep 2006	Beta Attenuation
Western Kentucky Energy - Henderson Unit 2	Aug 2005	Beta Attenuation
Western Kentucky Energy - Henderson Unit 1	Feb 2007	Beta Attenuation
Kentucky Utilities Company- Ghent Station		Light Scatter
Kentucky Utilities Company- Mill Creek Station		Light Scatter
Minnkota Power Coop - M.R. Young Unit 2	Jul 2007	Beta Attenuation
DOE Oak Ridge TSCA Incinerator	Dec 2004	Beta Attenuation
Rayonier Pulp Mill - Recovery Boiler	Apr 2003	Beta Attenuation
Kennecott Utah Copper - Primary Smelter	Dec 2005	Beta Attenuation
Sunoco Refinery - FCCU/CO Boiler Stack	Apr 2007	Beta Attenuation

Alexandria requests the SAPCB and VDEQ to stipulate that Mirant PRGS implement and operate PM CEMs on each of the stacks within a reasonable time frame, i.e., three to six months, from the date of permit issuance.

Alexandria urges the Board and VDEQ to exercise their duties in stipulating a scientifically sound approach as other states have done to determine a proper PM_{2.5} permit emission limit for PRGS that will comply with the PM_{2.5} NAAQS and protect public health.

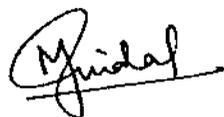
Should you have any questions or comments, please do not hesitate to contact William Skrabak at (703) 519-3400, ext. 163.

Sincerely,

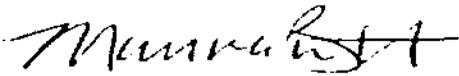


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