

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

In the Matter of:

AMENDMENTS TO 35 ILL. ADM.
CODE PARTS 201, 202, AND 212

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R2023-018(A)
(Rulemaking – Air)

NOTICE OF FILING

To: Attached Service List

PLEASE TAKE NOTICE that today I have electronically filed with the Office of the Clerk of the Illinois Pollution Control Board the **PREFILED DIRECT TESTIMONY OF STEPHEN K. NORFLEET** and a **CERTIFICATE OF SERVICE**, which are attached and copies of which are herewith served upon you.

Dated: March 15, 2024

Respectfully submitted,

Dynegy Midwest Generation, LLC;
Illinois Power Generating Company; and
Kincaid Generation, LLC

Midwest Generation, LLC

/s/ Samuel A. Rasche
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CERTIFICATE OF SERVICE

I, the undersigned, certify that on this 15th Day of March, 2024:

I have electronically served true and correct copies of the Prefiled Direct Testimony of Stephen K. Norfleet by electronically filing with the Clerk of the Illinois Pollution Control Board and by e-mail upon each person listed in the attached service list.

My e-mail address is sam.rasche@afslaw.com.

The number of pages in the e-mail transmission is 14.

The e-mail transmission took place before 5:00 p.m.

/s/ Samuel A. Rasche

Samuel A. Rasche

Dated: March 15, 2024

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In the Matter of:

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PREFILED DIRECT TESTIMONY OF STEPHEN K. NORFLEET

3. In support of the Joint Proposal, I have prepared and am incorporating into my testimony the Supplemental Technical Support Document, attached as Exhibit A to this testimony. The Supplemental Technical Support Document was also submitted as an exhibit to the Companies' Second Comment in Response to Illinois Environmental Protection Agency's Comments.

4. This concludes my testimony.

Dated: March 15, 2024

EXHIBIT A



AGORA ENVIRONMENTAL CONSULTING

SUPPLEMENTAL TECHNICAL SUPPORT DOCUMENT

for

STATEMENT OF REASONS OF DYNEGY AND MIDWEST GENERATION

In the matter of:

AMENDMENTS TO 35 ILL. ADM. CODE PARTS 201, 202, AND 212

R2023-018A

March 8, 2023

**Stephen K. Norfleet. P.E.
Agora Environmental Consulting**

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I. Summary

Dynegy Midwest Generation, LLC, Illinois Power Generating Company, and Kincaid Generation, LLC (collectively, “Dynegy”), and Midwest Generation, LLC (“MWG”) (together with Dynegy, the “Companies”) asked Agora Environmental Consulting (“Agora”) to evaluate the impact of the alternative emission limitations (“AELs”) that they are proposing to address opacity during Startup, Malfunction, and Breakdown (“SMB”) in light of the Illinois Pollution Control Board’s (“IPCB’s”) decision to remove provisions that allow operation during SMB from the Illinois Administrative Code (“IAC”). In a Technical Support Document (“TSD”) filed on August 7, 2023, Agora Environmental Consulting showed that AELs that the Companies are proposing will provide a large margin of compliance with applicable SIP emission limitations and not result in an increase in allowable emissions of any pollutant. This supplemental TSD provides details of analysis done to address specific questions raised by the Illinois Environmental Protection Agency (IEPA) during its review of the initial TSD.

II. Background

The analysis presented in the August 7, 2023 TSD relied on unit-specific particulate matter (PM) and opacity correlations. For each unit, the PM correlations were developed based on recent available stack test data collected between 2018 and 2022, augmented, in the cases of Newton Unit 1 and Powerton Units 5 and 6, by similar PM test data collected in 2016 to develop the respective Compliance Assurance Monitoring (“CAM”) plans. For each unit/stack, the reference method data reflected a range of PM and opacity values that represented typical operation as well as, in some cases, elevated emissions with the units operating at or near the opacity limit. The correlations showed that PM would remain well below the applicable SIP emission limitation provided that the average opacity remained below the applicable opacity limitation. However, during a stack test, it is impossible to replicate the full range of emissions that might occur during SMB events, and the data used in the correlation, thus, only reflected a portion of range of PM emissions.

During discussions of the correlation results, IEPA asked if PM continuous emissions monitoring system (CEMS) data was available to provide an indication of whether the correlations would remain representative when the opacity is above the limit, and the Companies asked Agora Environmental Consulting to analyze the available PM CEMS data to provide a response to IEPA’s request. While not installed on all the affected units that Agora assessed in the initial TSD, PM CEMS are installed and operated at the Kincaid Power Station (“Kincaid”) and Powerton Generating Station (“Powerton”)¹ in accordance with federally enforceable Consent

¹ PM CEMS are also operated at the Baldwin Energy Complex (“Baldwin”); however, those boilers have not

Decree requirements. At each of these facilities, the respective company installed the PM CEMS on the common stack shared by two units (i.e., on Kincaid Units 1 and 2 and on Powerton Units 5 and 6) and certified the equipment in accordance with EPA Performance Specification 11.

III. Analysis/Potential Impact

For Kincaid and Powerton, Figures 1 and 2 show extended versions of the PM and opacity correlations presented in the initial TSD super-imposed with PM CEMS and opacity data representing all one-minute operating periods in 2022 when the opacity exceeded 30%. Since the opacity standards are assessed on a six-minute basis, the one-minute incidents, standing alone, do not reflect opacity exceedances. Similarly, the one-minute PM values do not reflect PM exceedances, including because the SIP PM standards are expressed as hourly standards, and compliance is determined using Reference Method 5 stack tests, which require an average of at least three hours of data.² The one-minute PM data simply represent the PM CEMS responses during these brief periods when the opacity response exceeded 30%. By their nature, the one-minute data reflect short-term, transient events and illustrate a large degree of variability due to the variety of conditions that the events represent, drift associated with the measurements, and potential other uncertainties. Notwithstanding the variability, the data on average show good agreement with the PM correlation results based on the reference method data.

For the initial TSD, Agora developed separate correlations based on the standard Method 5 and MATS-Method 5 data (shown in the figures in orange and blue, respectively) and, to be conservative, used the higher of the two correlations for the analysis. Those original correlations are juxtaposed in Figures 1 and 2 with a new “extended correlation,” shown in green, based on the one-minute PM CEMS data during operating periods when the opacity was above 30%. The green points in Figures 1 and 2 represent the one-minute data used to develop the extended correlations with only the one-minute values with PM concentrations below 0.02 lb/MMBtu excluded as outliers (shown in yellow).

Kincaid’s PM CEMS results are illustrated in Figure 1, which shows not only excellent agreement with both the Method 5 and MATS Method 5 correlations, but also reasonable agreement between those test-based results and the projected correlation at higher opacities based on the one-minute PM CEMS data. For Powerton (illustrated by Figure 2), the 2016 CAM test results diverge from the more recent MATS Method 5 test data, but the earlier CAM tests were performed prior to completion of the installation of dry sorbent injection systems and electrostatic precipitator upgrades. Testing performed subsequent to installation of those

exceeded the applicable opacity standard. So, little or no one-minute data are available to provide a meaningful estimate of the emissions at higher levels.

² The PM CEMS are not used to demonstrate compliance with applicable PM standards.

systems and upgrades reflects a lower ratio of PM:Opacity, as represented by the lower sloped line on the correlation graph. As expected, the new extended correlation based on the PM CEMS data for opacity values above 30% more closely aligns with the more recent MATS related data.

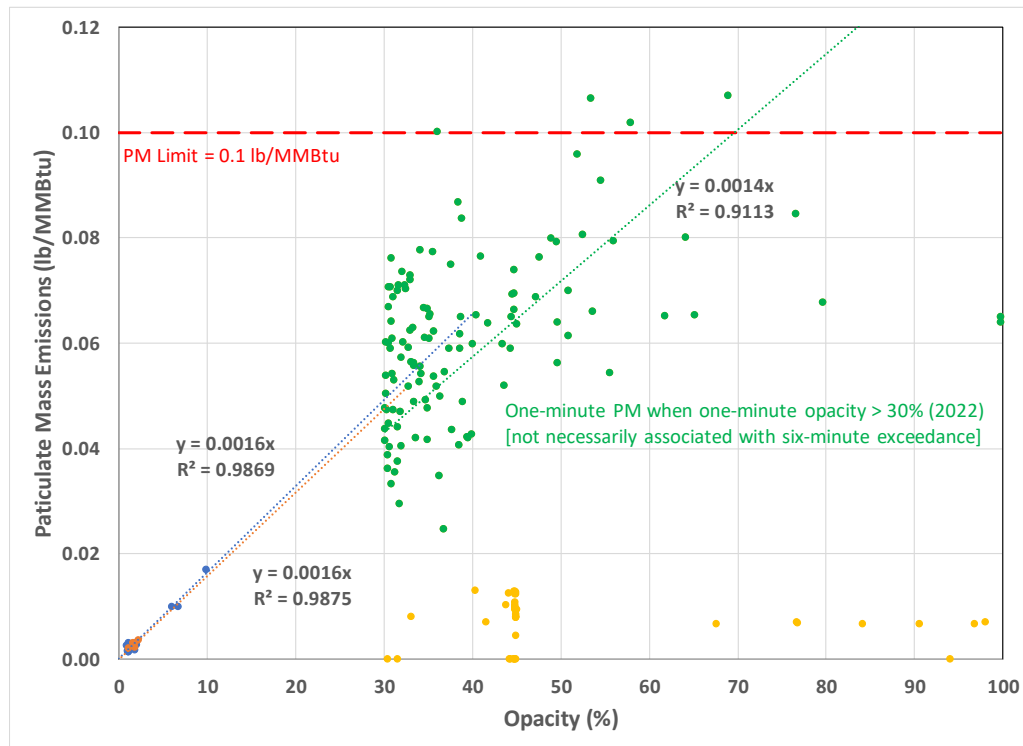


Figure 1. 2022 Kincaid One-Minute Opacity and PM CEMS Data (Opacity > 30%)

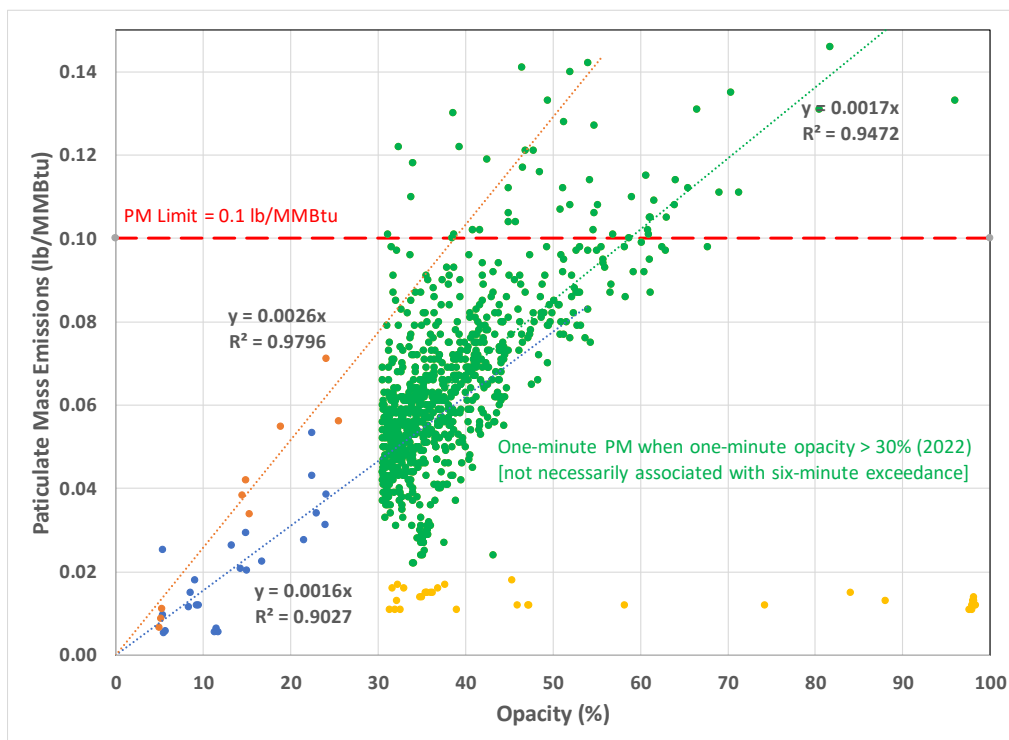


Figure 2. 2022 Powerton One-Minute Opacity and PM CEMS Data (Opacity > 30%)

Notwithstanding the high degree of scatter in the one-minute data, the PM CEMS data suggest that, on average, the correlations developed based on the reference method data at lower opacities will continue to provide a reasonable approximation of PM emissions at higher opacity levels. Because the same roughly linear relationship holds true at higher opacities, short-term variability in opacity will not disproportionately elevate the PM emissions over any given averaging period. As indicated in the initial TSD, correlations show that compliance with the PM limits will be maintained when the AELs are applied, provided that the average opacity during the applicable averaging period is below the respective opacity standard. Because the relationship is roughly linear, any periods when the opacity may have been above the standard (with proportionately higher PM) would be offset by periods when the opacity was below the standard (with proportionately lower PM), so long as the one-hour (for Baldwin) or three-hour (for other stations) average opacity does not exceed the applicable opacity standard. In other words, these correlations predict that PM emissions would be the same irrespective of whether six-minute opacity values are steady or fluctuate above and below the applicable limits, so long as the average opacity meets the applicable AEL. This means that such short-term variability in opacity would have no impact on 24-hour or annual national ambient air quality standards, and would have no impact on compliance with the state PM limitations. Notably, the AELs would not provide any exclusion to compliance with the state PM limitations.³

³ The initial TSD provided examples of how the AELs would be applied using the then proposed rule language based

IV. Conclusions

The figures provide additional information supporting the conclusions in the initial TSD. While the one-minute PM CEMS data is highly variable during high opacity events, the trends in the PM CEMS data suggest that the previously developed correlations will, on average, provide reasonable estimations of the PM emissions at different opacity levels. Furthermore, in both cases where PM CEMS data were available, the PM correlations used in the analysis were higher than the “extended correlations,” suggesting a potential level of conservatism in the final analysis. Coupled with the original analysis, the results shows that the Companies’ proposed AELs will provide a large margin of compliance with applicable Illinois SIP PM standards and will raise no concerns with respect to “attainment and reasonable further progress” or compliance with other CAA requirements under CAA §110(l).

the average opacity from the current six-minute period and the immediately preceding 174 minutes. Agora understands that, for simplicity, IEPA has proposed revising the AEL language to be based on the use of the opacity of the three-hour period (or one-hour period for Baldwin) beginning with the six-minute period in excess of the applicable standard. The change will have no bearing on the findings since the correlation results are independent of the averaging time across which the approach may be applied.