



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

ELECTRONIC MAIL
DELIVERY RECEIPT REQUESTED

David V. Hillesheim
Manager, Environmental Services – Air Quality and Plant Environmental
Xcel Energy
david.v.hillesheim@xcelenergy.com

RE: Revised Petition for Alternative Operational Limits for Continuous Compliance
Demonstration under 40 C.F.R. Part 63, Subpart YYYY
Xcel Energy's High Bridge Generating Plant, Units 7 and 8

Dear Mr. Hillesheim:

The U.S. Environmental Protection Agency has received and reviewed a revised petition dated July 12, 2023, and supplemental documentation, from Xcel Energy (Xcel or you), located in St. Paul, Minnesota. The petition requests the use of total oxides of nitrogen (NOx) concentrations for satisfying operating limits to demonstrate compliance with the formaldehyde emissions limitation for lean premix gas-fired combustion turbines under 40 C.F.R. §63.6125(b) at Xcel's High Bridge gas-fired power plant in St. Paul, Minnesota. In summary, EPA approves your petition to use NOx emissions as an operating limit under the regulations at 40 C.F.R. Part 63, Subpart YYYY.

Regulatory Background

40 C.F.R. Part 63 Subpart YYYY, National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines (Subpart YYYY) establishes national emission limitations and operating limitations for hazardous air pollutants (HAP) emissions from stationary combustion turbines located at major stationary sources of HAP emissions, and requirements to demonstrate initial and continuous compliance with the emission and operating limitations.

40 C.F.R. § 63.6095(a)(3) requires the owner or operator of a new or reconstructed lean premix gas-fired stationary combustion turbine or a diffusion flame gas-fired stationary combustion turbine that started up on or before March 9, 2022, to comply with the emissions limitations and operating limitations of Subpart YYYY no later than March 9, 2022.

40 C.F.R. § 63.6100 requires that each new or reconstructed lean premix gas-fired stationary combustion turbine must comply with the emission limitations and operating limitations in Table

1 and Table 2 of Subpart YYYY. Table 1 provides that each new or reconstructed lean premix gas-fired stationary combustion turbine must comply with an emission limit of 91 ppbv formaldehyde or less at 15% O₂, except during turbine startup. The period for turbine startup is subject to the limits specified at 40 C.F.R. § 63.6175. Table 2 requires each stationary combustion turbine that is required to comply with the formaldehyde emissions limitation and is not using an oxidation catalyst to maintain any operating limitations approved by the Administrator.

40 C.F.R. § 63.6120(e) states that if your stationary combustion turbine is not equipped with an oxidation catalyst, you must petition the Administrator for operating limitations that you will monitor to demonstrate compliance with the formaldehyde emission limitation in Table 1. You must measure these operating parameters during the initial performance test and continuously monitor thereafter. 40 C.F.R. § 63.6120(f) provides the specific information that must be included in a petition to the Administrator for approval of additional operating limitations to demonstrate compliance with the formaldehyde emission limitation in Table 1.

40 C.F.R. § 63.6125(b) requires that owners or operators of a stationary combustion turbine that is required to comply with the formaldehyde emission limitation and not using an oxidation catalyst must continuously monitor any parameters specified in the approved petition to comply with operating limitations specified in Table 2 and as specified in Table 5 of the Subpart.

All terms used in this letter have their ordinary meaning unless such terms are defined in the Clean Air Act, 42 U.S.C. §§ 7401 et seq., or Subpart YYYY, in which case they have the meaning ascribed to them in those authorities.

Xcel's Petition

Xcel owns and operates two combined-cycle gas-fired lean premix stationary combustion turbines identified as Units 7 and 8 at the High Bridge facility in St. Paul, MN. The turbines were constructed after January 14, 2003, are not equipped with oxidation catalysts, and are “affected sources” under Subpart YYYY; therefore, the compliance deadline was March 9, 2022.

Xcel submitted its petition under 40 C.F.R. § 63.6120(e) for justifying the required information under 40 C.F.R. § 63.6120(f)(1) through (5). Xcel requests that EPA accept monitoring of NO_x emissions between the combustion turbine outlet and selective catalytic reduction (SCR) control inlet as a parameter to meet the Subpart YYYY monitoring requirements for lean premix combustion equipped gas-fired turbines, instead of utilizing oxidation catalysts.

Xcel claims that “ensuring the NO_x emissions are within their established tolerances provides assurance that formaldehyde emissions are in compliance with the Quad Y 91 ppb at 15% O₂ standard.” Xcel also cited a superseded EPA memo regarding lean premix combustion.

EPA's Analysis

The petition addresses the required information described in 40 C.F.R. § 63.6120(f)(1) through (5), as summarized below. EPA makes the following determinations regarding the lean premixed gas-fired combustion turbines under Subpart YYYYY, which are operating without an oxidation catalyst, and are subject to emission and operating limitations.

Based on the information provided by Xcel, EPA makes the following findings:

(1) Xcel has clearly explained its proposal to monitor and record the SCR inlet NO_x parameter, the turbines' lean pre-mix mode of operation, and stack O₂ concentration.

(2) Xcel's discussion of the relationship between NO_x concentrations and formaldehyde emissions, and how limitations on these parameters will serve to limit formaldehyde emissions, was insufficient in itself to support the requested parameters. The fact that a gas turbine is lean premix does not guarantee that it will meet the 91 ppbvd formaldehyde standard. Emissions testing at the High Bridge facility on August 16-17, 2022, showed formaldehyde emissions below 91 ppbvd, but was conducted at inlet NO_x conditions only on the lower part of the range of SCR inlet NO_x concentrations observed that year. Emissions testing at the High Bridge facility on May 23-24, 2023, showed formaldehyde emissions well below 91 ppbvd at higher inlet NO_x conditions. Because the test results confirm that turbine operations at certain ranges of inlet NO_x concentrations can meet the 91 ppbvd formaldehyde standard, EPA finds that turbine operations may operate up to the inlet NO_x values specified below in (3).

(3) Xcel has provided information on the combustion control systems at the High Bridge facility. Xcel has agreed to SCR inlet NO_x concentration maximums of:

High Bridge Unit 7: 35.0 ppm @ 15% O₂ on a 4-hour rolling average
High Bridge Unit 8: 38.6 ppm @ 15% O₂ on a 4-hour rolling average

(4) The measurement methods and instruments used to monitor these parameters, and their relative accuracy and precisions, described in Xcel's petition are adequate. Xcel has agreed to conduct an annual relative accuracy test audit (RATA) of the inlet NO_x monitor and stack O₂ monitor on each unit, to keep inlet and stack O₂ measurements within 1% of each other, and other criteria specified in the petition.

(5) The frequency and methods of recalibration specified in Xcel's revised petition, supplemental documentation, and email communications, are adequate.

EPA therefore approves Xcel's July 12, 2023 petition for operating and monitoring limits at the High Bridge facility under Subpart YYYYY. This approval is based on the information submitted to EPA by the company. Should Xcel change the operating conditions of the turbine to an operation which is different than the operating conditions represented in this approval such that formaldehyde emissions increase because of the change, Xcel must submit a revised petition to

address the change(s).

We have coordinated this determination with the Office of Enforcement and Compliance Assurance (OECA) and the Office of Air Quality Planning and Standards (OAQPS). If you have any further questions, please contact Jacob Herbers of my staff at Herbers.Jacob@epa.gov.

Sincerely,

**MICHAEL
HARRIS**

Digitally signed by
MICHAEL HARRIS
Date: 2023.07.27
09:17:18 -05'00'

Michael D. Harris
Division Director
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cc: Rachel Studanski, Manager
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