



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 4  
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ATLANTA, GEORGIA 30303-8960

June 12, 2023

Mr. Jeff Turlington  
Sr. Environmental Analyst  
Entergy Services, LLC  
2107 Research Forest Drive  
The Woodlands, Texas 77382

Dear Mr. Turlington:

This is in response to your letter dated October 5, 2022, requesting a revision to your approved continuous monitoring system (CMS) plan, issued by the U.S. Environmental Protection Agency (EPA) on August 30, 2022, for Title 40, Code of Federal Regulation (C.F.R.), Part 63, Subpart YYYYY - National Emission Standards for Hazardous Air Pollutants (NESHAP) for Stationary Combustion Turbines, as it applies to one combustion turbine operated at Entergy Services, LLC (Entergy), Choctaw County Generating Plant, in French Camp, Mississippi. In the letter, you requested to use a gross power output of 82 megawatts (MW) as the low-load operating limit and remove specific conditions (iii) and (x) from “The EPA’s Determination for Entergy’s CMS Plan Petition” in the approved CMS plan issued by the EPA on August 30, 2022, which requires Entergy to conduct the formaldehyde emission standard compliance demonstration testing at low load operation and calculate the four-hour rolling average gross power output to establish the operation limit at the low load operation. The revision request was based on the results from the initial formaldehyde emission standard compliance demonstration testing that occurred on August 10, 2022, and August 11, 2022. The EPA requested additional information from you on February 15, 2023, April 11, 2023, and May 3, 2023, and received information on February 15, 2023, April 11, 2023, and May 5, 2023.

Based on our review of all available information, your proposed revision is acceptable, subject to specific requirements. Details regarding the CMS plan and the basis for our determination are provided in the remainder of this letter.

**Description of Combustion Turbine Unit Emission Point AA-001**

Emission Point AA-001 includes a combustion turbine generator (CTG1) and a heat recovery steam generator (HRSG) and may operate with supplemental duct burners when in combined cycle mode. CTG1 is a lean premix gas-fired General Electric (GE) Model 7FB combustion turbine which is equipped with a Dry Low NOx (DLN) combustion system and has a maximum power output limit of 208 MW. Based on the information provided by Entergy, the unit is only operated in combined cycle mode. Because the turbine was reconstructed in 2017 (after January 14, 2003), it is categorized as a new affected source under Subpart YYYYY. The unit is not equipped with an oxidation catalyst to control emissions of formaldehyde.

## **Description of Entergy's CMS Petition and Revision Petition**

Entergy proposes to use the combustion turbine gross power output measured in MW as the operating parameter to demonstrate compliance with the formaldehyde emission standard. The four-hour rolling average of the gross power output will be calculated, monitored, and recorded. Additionally, Entergy proposes to monitor the turbine system's lean premix mode which is indicated as "NORMOPHR" status in StackVision (per previous communication with the EPA). The lean-premix mode of operation ensures good combustion practices are being achieved during operation of the turbine.

Entergy proposes to conduct the initial and subsequent annual formaldehyde emission standard compliance demonstration testing by performing four one-hour test runs at the high load condition (defined as 100 percent plus or minus 10 percent of the achievable operating load range) and the low load condition (expected to be about 50 to 60 percent of the achievable operating load range). Entergy will continuously monitor turbine power output and lean premix mode indication during the testing events. Results from the testing events will be used to establish the operating limits to indicate compliance with the formaldehyde emission standard during non-testing periods.

After the initial formaldehyde emission standard compliance demonstration testing, Entergy proposes to continuously monitor and record the lean premix mode indication and four-hour rolling average of turbine power output to ensure compliance with the formaldehyde emission standard. Entergy will use a Schweitzer Engineering Laboratories (SEL) meter (model SEL-735) to monitor the turbine power output. Entergy has identified the relevant operation and maintenance procedures for the power output meter, which describes the recommended operation and maintenance procedures, and the meter's verification procedures. SEL, the manufacturer of the power output meter, verified that the instrument is factory-calibrated and does not require yearly calibration, only periodic accuracy verification. On-site meter verification, using a test block and portable test station, reduces meter downtime and technician meter verification time to approximately less than 20 minutes.

On August 10, 2022, and August 11, 2022, Entergy conducted the initial formaldehyde emission standard compliance demonstration testing at the exhaust stack of Emission Point AA-001. Three 80-minute test runs were conducted at the low load and high load conditions, respectively. Per communication with Entergy, the company will continue to conduct four 1-hour test runs at high load conditions in future testing events. Based on the initial testing results for the low load condition, Entergy requested to remove specific conditions (iii) and (x) from "The EPA's Determination for Entergy's CMS Plan Petition" in the approved CMS plan issued by EPA on August 30, 2022, which requires Entergy to conduct the formaldehyde emission standard compliance demonstration testing at low load and calculate the four-hour rolling average gross power output to establish the operation limit at the low load. Entergy also requested to use a gross power output of 82 MW as the low load operating limit and suggested that any operation above 82 MW will provide a reasonable assurance of compliance with the formaldehyde emission standard. Entergy stated that the unit rarely operates at low load other than during startup and shutdown. The operating time at mid to high load (138 MW to 208 MW) for the unit was 96 percent for year 2020, 88 percent for year 2021, and 91 percent for year 2022 from January to September.

## **EPA's Review of Subpart YYYY Standards and CMS Petition Requirements**

Under 40 C.F.R. § 63.6085, owners and operators are subject to Subpart YYYY if they own or operate a stationary combustion turbine located at a major source of hazardous air pollutant (HAP) emissions. Under 40 C.F.R. § 63.6090(a)(2), a stationary combustion turbine is a new source if construction

commenced after January 14, 2003. Under 40 C.F.R. § 63.6095(a)(3), new lean premix gas-fired stationary combustion turbines which started operation on or before March 9, 2022, must comply with the emissions limitations and operating limitations in Subpart YYYYY no later than March 9, 2022. Under 40 C.F.R. § 63.6100, each new lean premix gas-fired stationary combustion turbine must comply with the emission limitations and operating limitations in Table 1 and Table 2 of Subpart YYYYY, respectively. Regarding the emissions standard, Table 1 of Subpart YYYYY limits the concentration of formaldehyde to 91 parts-per-billion by volume, dry basis (ppbvd), or less, at 15-percent oxygen (O<sub>2</sub>) for new lean premix gas-fired stationary combustion turbines, except during the period of turbine startup excluded by the rule (*e.g.*, first hour of startup for single cycle operation and first three hours of startup for combined cycle operation). Table 2 of Subpart YYYYY requires owners/operators to maintain the turbines within operating limitations approved by the EPA Administrator to continuously demonstrate compliance with the emission limit during non-testing periods.

Under 40 C.F.R. § 63.6105(a), after September 8, 2020, owners/operators must comply with the applicable emission limitations, operating limitations, and other requirements of Subpart YYYYY. Under 40 C.F.R. § 63.6105(c), after September 8, 2020, owners/operators must always operate and maintain any affected source in a manner consistent with safety and good air pollution control practices for minimizing emissions.

Under 40 C.F.R. § 63.6110(a), owners/operators must conduct the initial performance tests, or other initial compliance demonstrations in Table 4 to Subpart YYYYY that apply, within 180 calendar days after the compliance date specified (*e.g.*, by September 8, 2022) for affected source stationary combustion turbines according to the provisions in 40 C.F.R. § 63.7(a)(2), unless a historical test may be accepted according to the provisions of 40 C.F.R. § 63.6110(b). Under 40 C.F.R. § 63.6115, subsequent performance tests must be performed on an annual basis as specified in Table 3 to Subpart YYYYY.

Under 40 C.F.R. § 63.6125(b), for a stationary combustion turbine not using an oxidation catalyst to comply with the formaldehyde emission limit, owners/operators must continuously monitor any parameters specified in a petition approved by the Administrator to comply with the operating limitations in Table 2 to Subpart YYYYY, as specified in Table 5 to Subpart YYYYY.

Under 40 C.F.R. § 63.6120(f), for a stationary combustion turbine not equipped with an oxidation catalyst, owners/operators may petition the Administrator for approval of operating limitations to demonstrate compliance with the formaldehyde emission limitation during non-testing periods. In these cases, the petition must include:

- (1) Identification of the specific parameters you propose to use as additional operating limitations;
- (2) A discussion of the relationship between these parameters and HAP emissions, identifying how HAP emissions change with changes in these parameters and how limitations on these parameters will serve to limit HAP emissions;
- (3) A discussion of how you will establish the upper and/or lower values for these parameters which will establish the limits on these parameters in the operating limitations;
- (4) A discussion identifying the methods you will use to measure and the instruments you will use to monitor these parameters, as well as the relative accuracy and precision of these methods and instruments; and
- (5) A discussion identifying the frequency and methods for recalibrating the instruments you will use for monitoring these parameters.

Under 40 C.F.R. § 63.6125(e), after September 8, 2020, for owners/operators using a CMS to indicate compliance with the formaldehyde emissions standard during non-testing periods, a CMS quality control program must be developed and implemented which includes written procedures for the CMS according to 40 C.F.R. § 63.8(d)(1-2). Additionally, a program of corrective action should be included in the plan required under 40 C.F.R. § 63.8(d)(2).

Under 40 C.F.R. § 63.6135(a), except for monitor malfunctions, associated repairs, and required applicable quality assurance or quality control activities, owners/operators must always conduct all parametric monitoring when the stationary combustion turbine is operating.

Under 40 C.F.R. § 63.6120(e), when a CMS petition is required to be submitted to the Administrator, owners/operators must not conduct the initial performance test until after the petition is approved or disapproved by the Administrator.

### **The EPA's Determination for Entergy's CMS Plan Revision Petition**

In the approval letter dated August 30, 2022, specific conditions (iii) and (x) required Entergy to conduct the formaldehyde emission standard compliance demonstration testing at low load and calculate the four-hour rolling average of gross power output to establish the operation limit at low load condition. This was necessary to ensure that the operation of the combustion turbine could meet the formaldehyde emission limit while operating at the low load, given the fact that the EPA lacked sufficient testing results evidence for the operation of the GE Model 7FB combustion turbine at the low load.

The EPA has reviewed the results from the initial formaldehyde emission standard compliance demonstration testing submitted by Entergy. During the three runs at high load, gross power output ranged from 171 to 174 MW with an average of 173 MW, which is considered 100 percent load relative to temperature and humidity. During the three runs at low load, power output ranged from 81 to 84 MW with an average load of 83 MW, which is considered 48 percent load relative to temperature and humidity. The average formaldehyde concentration from each run ranged from 35.24 to 36.95 ppbv for the runs at the low load condition, and 34.58 to 35.23 ppbv for the runs at the high load condition. Formaldehyde concentrations were corrected to 15-percent O<sub>2</sub>, dry basis. The lean premix indication ("NORMOPHR" status in StackVision) was indicated during all testing runs.

The results from the initial formaldehyde emission standard compliance demonstration testing at the exhaust of Emission Point AA-001 indicate that when the combustion turbine operates in the lean premix mode, the formaldehyde concentration varies little when the power output is above 82 MW. The average formaldehyde concentrations were below 50 percent of the standard during the testing runs at both low load and high load conditions. Based on supporting and available information, including other testing reports we have received for GE Model 7FB turbines, Entergy's request to use a gross power output of 82 MW as the operating limit at low load condition and test only at the high load condition for subsequent annual compliance demonstration testing is acceptable.

Based on all available information, the following CMS plan is acceptable to the EPA:

- i.) To demonstrate compliance with the formaldehyde emission standard, Entergy must conduct annual compliance demonstration testing in combined cycle mode using procedures of 40 C.F.R. § 63.6120 at high load, defined as 100 percent plus or minus 10 percent.

- ii.) Gross power output and lean premix indication (“NORMOPHR” status in StackVision) must be continuously monitored and recorded at least once every 15 minutes during the formaldehyde emission standard compliance demonstration testing, and continuously thereafter, to successfully demonstrate compliance with the formaldehyde emission standard promulgated in 40 C.F.R. § 63.6100 and Table 1 to Subpart YYYY. An hourly averaged gross power output shall be determined by using all readings taken at least once every 15 minutes during a normal-operation hour.
- iii.) For the formaldehyde emission standard compliance demonstration testing event, four separate test runs for each testing event must be conducted. Each test run must last at least 1 hour. The four-hour average gross power output shall be determined by computing the four-hour average using all hourly averaged readings taken during the testing event.
- iv.) Following the formaldehyde emission compliance demonstration testing, the four-hour rolling average gross power output must be continuously monitored and recorded to serve as an indication of compliance status with the formaldehyde emission standard. The four-hour rolling average gross power output shall be determined by computing the four-hour average using all hourly averaged readings for the current hour and preceding three hours of operation.
- v.) During normal operation, the turbine must be operated at or above a gross power output of 82 MW in the lean premix mode to ensure compliance with this approval. The lean premix indication must be continuously monitored and recorded at least once every 15 minutes.
- vi.) Data collected during periods of startup (*e.g.*, before achieving a gross power output of 82 MW), shutdown, or malfunction may not be included in the four-hour average for the formaldehyde emission compliance demonstration testing and four-hour rolling averages used to indicate compliance with the formaldehyde emission standard. Startup time must not extend longer than the time specified by the manufacturer’s standard operating procedure for startups. Startups must be conducted, to the extent possible, in a manner consistent with ensuring that safety and good air pollution control practices for minimizing emissions are followed.
- vii.) Entergy must verify the gross power output meter’s accuracy once annually according to the manufacturer’s recommended procedures and maintain records of the annual verifications for inspection purposes.

The EPA’s approval of the Entergy’s CMS plan is based on information provided in Entergy’s CMS plan submission and research conducted by the EPA. Should Entergy 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, Entergy must submit a revised CMS plan petition to address the change(s).

Nothing in this CMS plan approval excludes the EPA from reopening this CMS plan approval to adjust its conditions, if needed, for enhancement of emission standard compliance assurance. If Entergy discovers an additional parameter (or additional parameters), which indicates additional parametric monitoring operating limits are necessary to assure compliance with the formaldehyde emission standard, Entergy must submit a revised CMS plan petition to the EPA to revise the CMS plan and incorporate the additional operating limit(s) based on the discovery. Finally, if Entergy recognizes an opportunity to revise the CMS plan based on other CMS plan approvals issued by the EPA, or new information obtained by Entergy which may reduce the burden of tasks necessary for compliance assurance but still effectively assure compliance with the formaldehyde emission standard, Entergy may file a petition to the EPA referencing that information to revise this CMS plan.

Please note that our approval does not alter Entergy’s obligations to meet all other applicable NESHAP, including, but not limited to, the following NESHAP general provisions:

- The requirement to maintain and operate affected facilities and associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions, per 40 C.F.R. § 63.6, and
- The prohibition against concealing emissions which would otherwise constitute a violation of an applicable standard, including the use of gaseous diluents to achieve compliance with a standard which is based on the concentration of a pollutant in the gases discharged to the atmosphere, per 40 C.F.R. § 63.4.

This CMS petition approval was coordinated with the EPA’s Office of Enforcement and Compliance Assurance and Office of Air Quality Planning and Standards. If you have any questions about this CMS petition conditional approval, please contact Henian Zhang at (404) 562-8123, or by email at [zhang.henian@epa.gov](mailto:zhang.henian@epa.gov).

Sincerely,

**ANTHONY  
TONEY**

Digitally signed by  
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Caroline Y. Freeman  
Director  
Air and Radiation Division

cc: Robert Scinta, EPA OECA  
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