



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
5 POST OFFICE SQUARE, SUITE 100
BOSTON, MASSACHUSETTS 02109-3912

Dated by Electronic Signature below

Erich Uhlan
Director, Facilities and Services
Pratt & Whitney
1 Aircraft Road
Middletown, CT 06457

Re: Petition for Operating Limitations under 40 C.F.R. Part 63, Subpart YYYY - National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines

Dear Mr. Uhlan:

As you know, Pratt & Whitney (“P&W”) is subject to the National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines, found at 40 CFR Part 63, Subpart YYYY (“Subpart YYYY”). On June 10, 2022, P&W submitted to the U.S. Environmental Protection Agency (“EPA”) a petition entitled “40 CFR Part 63 Subpart YYYY – Petition of Operating Limitations” (“the Petition”). The Petition concerns the 7.5 MW stationary combustion turbine (Model Number: Taurus 70-10301S; Serial Number: TG06926) that is not equipped with an oxidation catalyst, located at 1 Aircraft Road, Middletown, Connecticut (“the Facility”). P&W submitted the Petition in accordance with the requirements found at 40 CFR § 63.6120(e) and (f). On June 30, 2022, EPA sent P&W a letter requesting additional information. On July 19, 2022, P&W provided additional information via email to support the request and on August 26, 2022, P&W provided a final version of the Petition via email.

A. The Petition

The Petition describes that the method of controlling formaldehyde emissions is SoLoNO_x mode, which is a lean premix combustion technology used to control the fuel to air mixture that is used to lower combustion temperatures in order to limit NO_x emissions.

The Petition states that after initial startup the stationary combustion turbine located at the Facility remains in startup mode until it reaches a unit load of approximately 55% for natural gas, and 65% for ultra-low sulfur diesel (“ULSD”). At this load, the stationary combustion turbine enters SoLoNO_x mode, assuming the inlet air temperature is above 0 °F.

The Petition proposes to use the following operating parameters to demonstrate compliance with Subpart YYYY:

- Fuel Type;
- Inlet Air Temperature (°F), direct measurement;
- Power Output (KW), direct measurement; and
- Unit Load (%), calculated value.

The Petition describes that the Unit Load, expressed as a percent of full load, is a calculated value based on the power output and the maximum power output at full load (Operating Power / Power at Full Load). The Petition also describes that the maximum output power is a function of the inlet air temperature and an elevation correction factor. The Petition describes that Appendix 1 to the Petition contains the data curves that describe this relationship.

The petition describes that the stationary combustion turbine located at the Facility is operated on both natural gas and ULSD. The Petition also describes that initial performance testing of the turbine conducted on August 4, August 5, and August 11, 2022, produced the results documented in Table 1 (Note that the formaldehyde limit of concentration from Table 1 to Subpart YYYY, for a lean premix gas-fired stationary combustion turbine, a lean premix oil-fired stationary combustion turbine, a diffusion flame gas-fired stationary combustion turbine, or a diffusion flame oil-fired stationary combustion turbine, is equal to or less than 91 ppbvd at 15-percent O₂, except during turbine startup).

Table 1: Results of performance testing of the combustion turbine located at the Facility, conducted in August 2022.

Fuel Type	Natural Gas		ULSD	
Inlet Air Temperature (°F)	67	68	71	68
Power Output (KW)	3,853	6,728	4,103	6,326
Unit Load (%)	55.0	96.3	64.7	97.0
Formaldehyde (ppbvd @ 15% O ₂)	20.2	15.7	14.2	11.3

The Petition proposes the following operating limitations:

- A minimum Unit Load of 55% when operating on natural gas (based on the results described in Table 1);
- A minimum Unit Load of 64.7% when operating on ULSD (based on the results described in Table 1);
- A minimum Inlet Air Temperature of 0 °F (Manufacturer’s SoLoNO_x mode requirement).

B. EPA Determination

EPA has determined that the Petition meets the requirements of 40 CFR § 63.6120(f)(1) through (5) and approves the use of the operating limitations described above, provided the following conditions are met:

1. Operating Parameters

At all times that the stationary combustion turbine is operating, P&W must:

- Monitor the Inlet Air Temperature (°F) to the turbine in accordance with the requirements described in the Petition.
- Monitor the Power Output (KW) of the turbine in accordance with the requirements described in the Petition.
- Calculate the Maximum Power Output (KW) based on the Inlet Air Temperature and the relationship described in Engine Performance Curve included in Appendix 1 to the Petition.
- Calculate the Unit load using the following equation:

$$\text{Unit Load (\%)} = 100 \times \text{Power Output ((KW)} / \text{Maximum Power Output (KW)}$$

- Record the fuel type being used, the Inlet Air Temperature (°F), the Power Output (KW), the Maximum Power Output (KW) and the Unit Load (%) in a data acquisition system. P&W must also maintain 4-hour rolling averages for all recorded operating parameters for the purposes of demonstration compliance with the operating limitations (Note P&W is not required to use the data recorded during turbine startup¹ in the calculations of the 4-hour rolling average values).

2. Operating limitations

P&W must maintain:

- A Unit Load of no less than 55%, based on a rolling 4-hour average, when the stationary combustion turbine is operating on natural gas and is in non-startup mode;
- A Unit Load of no less than 64.7%, based on a rolling 4-hour average, when the stationary combustion turbine is operating on ULSD and is in non-startup mode; and
- An Air Inlet Temperature of no less than 0 °F, based on a rolling 4-hour average, when the stationary combustion turbine is operating in non-startup mode.

¹ The startup conditions applicable to this petition are described in 40 CFR § 63.6175

3. Maintenance Requirements

P&W must maintain all sensors and sensor systems associated with the operating parameters described in the Petition in accordance with the requirements described in the Petition. P&W must maintain the necessary spare parts on-site to ensure any faulty equipment and instrumentation is able to be repaired as expeditiously as possible.

4. Record Keeping and Reporting Requirements

P&W must maintain all records described in B.1. of this approval in such a manner that they can be readily accessed and are suitable for inspection according to 40 CFR § 63.10(b)(1). As specified in § 63.10(b)(1), P&W must keep each record for 5 years following the date of each occurrence. P&W must retain applicable records of the most recent 2 years on site. Records for the remaining 3 years may be retained off site.

Any exceedance of the operating limitations described in B.2. of this approval is considered a deviation for the purposes of meeting the record keeping requirements described in 40 CFR § 63.6155(a)(7) and reporting requirements described in 40 CFR §§ 63.6140(b) and 63.6150.

With this approval, the operating parameters and operating limitations described within will be the applicable method of determining compliance with the standards and monitoring requirements of Subpart YYYY. This approval is subject to amendment or revocation based on subsequent information becoming available. This approval of the proposed alternative operating limitations does not alter P&W's obligation to comply with all other applicable requirements associated with Subparts A and YYYY.

If you have any questions regarding EPA's conditional approval of P&W's Petition for Operating Limitations, please contact Darren Fortescue from EPA at (617) 918-1162 or fortescue.darren@epa.gov.

Sincerely,

**DENNY
DART**

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DENNY DART
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Denny Dart, Manager
Enforcement and Compliance Assurance Branch

Cc: Jacob Felton, CT DEEP