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MEMORANDUM

TO: Regional Directors
Regional Air Compliance Managers
Regional Air Permitting Managers
Regional Enforcement Managers
Central Office Air Managers

FROM: Michael Dowd, Director, Air Division MGD

SUBJECT: ACG-006:
Guidance for Reporting NO_x Excess Emissions for Facilities subject to 40 CFR 60, Subparts GG and KKKK

DATE: July 1, 2016

Purpose

The purpose of this guidance document is to provide clarification and promote consistency regarding the reporting of NO_x excess emissions during startup and shutdown from stationary gas turbines subject to 40 CFR 60, Subparts GG and KKKK, as outlined in §60.334(j)(1)(i)(A) and §60.4380(a)(1).[1]

Applicability

This guidance is applicable to stationary combustion turbines that:

- Are subject to 40 CFR 60, Subpart GG[2]
  - Have a heat input at peak load equal to, or greater than, 10 mmBTU/hr (based on the *lower* heating value of the fuel fired)
  - Were constructed, modified, or reconstructed after October 3, 1977

[1] Subparts GG and KKKK can be found respectively at the following websites:
- http://www.ecfr.gov/cgi-bin/text-idx?SID=adefcb2556e0464e5105253eda3e93ab&mc=true&node=se40.7.60_1334&rgn=div8
- http://www.ecfr.gov/cgi-bin/text-idx?SID=e9e776fff5e3443fe18497894c8b84c3&mc=true&node=se40.7.60_14380&rgn=div8

[2] See delegation letter from EPA dated 7/2/1985. (http://www.deq.virginia.gov/Portals/0/DEQ/Air/Regulations/5-070285.pdf) EPA delegated to DEQ the authority to implement the Subparts, retaining authority for unrelated provisions of Subpart GG (§60.332[a][3] and §60.335[a][5][ii]) regarding calculation of the NOx standard and alternative sample point selection, respectively).

- Are subject to 40 CFR 60, Subpart KKKK
  - Have a heat input at peak load equal to, or greater than, 10 mmBTU/hr (based on the *higher* heating value of the fuel fired)
  - Were constructed, modified, or reconstructed after February 18, 2005
- Use water or steam injection for NO_x control
- Use water or steam to fuel ratios to demonstrate compliance with NO_x limits

Background and Discussion

40 CFR 60, Subparts GG and KKKK state that NO_x excess emissions are identified when the required water or steam to fuel ratio is not maintained and/or when water or steam is not injected. Specifically, the Subparts define excess emissions for these turbines as follows:

> 40 CFR 60, Subpart GG, §60.334(j)(1)(i)(A) states:
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> "An excess emission shall be any unit operating hour for which the average steam or water to fuel ratio, as measured by the continuous monitoring system, falls below the acceptable steam or water to fuel ratio needed to demonstrate compliance with §60.332, as established during the performance test required in §60.8. Any unit operating hour in which no water or steam is injected into the turbine shall also be considered an excess emission."
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> 40 CFR 60, Subpart KKKK, §60.4380(a)(1) states:
>
> "An excess emission is any unit operating hour for which the 4-hour rolling average steam or water to fuel ratio, as measured by the continuous monitoring system, falls below the acceptable steam or water to fuel ratio needed to demonstrate compliance with §60.4320, as established during the performance test required in §60.8. Any unit operating hour in which no water or steam is injected into the turbine when a fuel is being burned that requires water or steam injection for NO_X control will also be considered an excess emission."

40 CFR 60, Subparts GG and KKKK provide requirements for stationary combustion turbines that use water or steam injection to control NO_x emissions. However, injecting water or steam into the turbines before reaching the minimum load level will extinguish the combustion flame, can cause damage to the unit, and can create a hazardous situation for workers. Therefore, these turbines cannot use water or steam injection below a minimum load level (e.g., start-up and shutdown), resulting in unavoidable excess emissions.

40 CFR 60, Subpart KKKK specifically addresses the inability of a turbine to inject water or steam during low loads by extending the averaging period to 4 hours. Also, the additional language in 40 CFR 60, Subpart KKKK (i.e., "...that requires water or steam...") indicates there are times when water or steam injection is not required (e.g., startup and shutdown).

Furthermore, the preamble to the 7/8/2004 amendment of 40 CFR 60, Subpart GG discusses a turbine's inability to use water or steam injection during startup and shutdown.[3] Specifically, EPA responded to the commenter that excess emissions were to be recorded during all periods of operation, including startup, shutdown, and malfunction. However, EPA's response did not include additional clarification like that provided in 40 CFR 60, Subpart KKKK.

40 CFR 60, Subparts GG and KKKK require excess emissions be recorded and reported for any unit operating hour. "Unit operating hour" is defined in §60.331[s] and §60.4420 as follows:

> *"Unit operating hour* means a clock hour during which any fuel is combusted in the affected unit. If the unit combusts fuel for the entire clock hour, it is considered to be a full unit operating hour. If the unit combusts fuel for only part of the clock hour, it is considered to be a partial unit operating hour."

To accurately quantify the duration of each excess emission event, the minutes comprising the "full" and/or "partial" unit operating hour(s) must be reported in the facility's Excess Emission Report (EER).

Implementation

To effectively evaluate a facility's ability to minimize emissions during low-load operation, facilities must provide the following information for each excess emissions event:

- Total number of unit operating hours (full and partial)
- Start time
- Duration of event (in minutes)
- Actual and required water or steam to fuel ratios
- Average fuel consumption
- Ambient conditions (temperature, humidity, and barometric pressure)[4]
- Turbine load and operating mode
- Reason for excess emissions
  (e.g., no water or steam injection, or inadequate water or steam to fuel ratio)
- All corrective action taken

This information, in conjunction with the total monitored operating time of the turbines, will be used to determine compliance with 40 CFR 60, Subparts GG and KKKK requirements, as well as the requirements of Virginia regulations.[5] Based on the information provided, the facility's response, and the ability to minimize emissions during low-load operation, DEQ will determine the appropriate level of enforcement required to resolve any issues identified.

Additional information concerning excess emissions report submittals can be found in ASOP-10 (Review of Excess Emission Reports). Questions or comments concerning this guidance should be directed to DEQ's Office of Air Compliance Coordination.

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[3] http://www.gpo.gov/fdsys/pkg/FR-2004-07-08/pdf/04-14825.pdf

[4] Unless the worst case ISO correction factor per §60.334(b)(3)(iii) is used, or if the ISO correction factor per §60.335(b)(1) is not used.

[5] http://law.lis.virginia.gov/admincode/title9/agency5/chapter40/section20/ and
http://law.lis.virginia.gov/admincode/title9/agency5/chapter50/section20/