Gas Turbine Association
Guy DeLeonardo, Chairman

March 20, 2018

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RE: Feedback on Technology Review Questions for Combustion Turbine MACT

Submitted By: Gas Turbine Association

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The Gas Turbine Association (GTA) appreciates the opportunity to provide comment on technology review questions related to the ongoing Risk and Technology Review for the Gas Turbine MACT (40CFR63 Subpart YYYY). The GTA would like to offer to meet/communicate with EPA to discuss our comments in more depth once the EPA has had a chance to review and consider all received comments.

GTA is a trade organization representing the major gas turbine manufacturers in the United States. GTA members produce turbines ranging from 1 to over 300 MW in size. Member companies produce gas turbines for the power industry, oil and gas applications, commercial applications such as hospitals and campuses, and manufacturing/industrial applications such as refineries and chemical plants. GTA members sell their products worldwide.

Our brief responses to the six questions asked follow.

1. ***In the original rulemaking, we concluded that there are two types of turbine design, diffusion flame and lean premix. Is that still the case, or have any new designs been developed?***

   No new designs have been developed.

Have there been any other changes in turbine design or operating practices that affect HAP emissions?

In the context of current 40CFR63 Subpart YYYY language, the answer is no. The current numerical standard is based on a controlled turbine operating at full load.

Extending standards beyond the full load standard introduces significant complexity. Any turbine design or operating practices that may affect HAP emissions will vary by turbine design (aeroderivative, frame, industrial, recuperated, diffusion flame, low NOx), OEM, fuel, cycle, etc. and may be considered Confidential Business Information. A "work practice" standard based on state-of-the-art combustor is appropriate at non-full load operating conditions.

Are there any operating practices that minimize emissions during turbine startup?

GTA would suggest EPA adopt a work practice standard since it is not feasible to enforce an emissions standard for an unsteady state operating condition. 40CFR63 Subpart ZZZZ is an example/precedent, though some turbine design/cycles (e.g. systems with add-on control) would need longer than 30 minutes. The start-up and stabilization of a gas turbine is a transient process that depends on a broad spectrum of variables involving turbine design and operation, and site-specific issues and constraints. A permutation of these variables makes it extremely difficult to encapsulate a fair and reasonable standard that fits all equipment types and operating modes. A few of the considerations include, fuel type, combustor type, cold engine or hot engine start, engine architecture (frame or aero derivative or industrial), cycle type (simple, combined, etc), equipment warm-up and health, catalyst activation and contamination prevention, part load standby off grid, and grid synchronization requirements.

2. ***We determined that the only add-on control technology currently proved to reduce HAP emissions is oxidation catalyst in the original rulemaking. Have there been any new add-on control technologies that reduce HAP emissions applied to turbines?***

   No.

3. ***The attached memo describes the cost estimate for oxidation catalysts in the original rulemaking. Have the costs for this control technology changed significantly since this memo was written?***

   Yes. It is estimated costs are ~50% higher than shown in the 2001 memo.

   Please note that the cost estimates from 2001 are for "new" installations. Retrofits, if technically feasible, would be much more expensive due to the modifications potentially impacting the exhaust duct work, HRSG, foundation, building, etc.

4. ***Have there been any developments in the application of oxidation catalysts to turbines burning landfill gas, digester gas, and gasified MSW?***

   Yes, several landfill and digester gas turbines have been installed with a CO catalyst since 2005. However, the catalyst systems do not operate as designed. Catalysts are rendered ineffective within 30-60 days of installation due to siloxane, sulfur related, or other fuel constituent catalyst poisoning.

5. ***The rule stipulates continuous measurement of catalyst inlet temperature for turbines that are using a catalyst. Owners and operators of turbines that are not using a catalyst must determine what parameters, if any, to continuously monitor and record. Are there any other parameters that could be specified in the rule, so that owners and operators do not have to petition?***

   As the standard is written today, full load only, the GTA recommends that compliance with a CO permit limit be the surrogate for HAP compliance. Otherwise, the GTA would recommend that the EPA maintain the "petition" option for gas turbines owners that choose not to use a CO catalyst to meet Subpart YYYY. Any "appropriate" parameters to monitor would vary by OEM, turbine deign, etc. There is no single parameter for every OEM/turbine.

6. ***Have there been any developments in formaldehyde measurement methods?***

   With respect to gas turbines, the test methods are effectively the same as they were when Subpart YYYY was developed. More recently EPA has adopted Method 323 ("wet chemistry" formaldehyde method), but Method 323 is more appropriate for "ppm-level" measurements at steady state. Subpart YYYY currently includes FTIR methods however, FTIR testing for ppb-level measurements commensurate with the current Subpart YYYY standard have not been commonplace, and technical questions remain about the feasibility of measuring formaldehyde levels less than 100 ppb. Gas turbine OEMs and industry continue to have significant concerns regarding whether it is practicable to measure formaldehyde from a turbine. Work practice standards based on good combustion practices should be considered.