Missouri
Department of
Natural Resources

The following comments were received on the draft rulemaking text for 10 CSR 10-6.390 Control of NO_x Emissions From Large Stationary Internal Combustion Engines.

Comment on 10 CSR 10-6.390 draft rulemaking text via email from Boeing Company on January 15, 2016.

One of the exemptions in the draft rule is for emergency standby engines. Draft section (1)(B)1 references the following definition at 10 CSR 10-6.020(2)(E):

"14. Emergency standby engine—For the purpose of 10 CSR 10-6.390, an internal combustion engine used only when normal electrical power or natural gas service is interrupted or for the emergency pumping of water for either fire protection or flood relief. An emergency standby engine may not be operated to supplement a primary power source when the load capacity or rating of the primary power source has been either reached or exceeded."

This definition does not provide for periodic readiness testing that is an inherent and necessary part of routine maintenance of these emergency engines. This same deficiency was found in the 2012 definition of "emergency standby engine," which was previously located in subsection (2)(C) of the 6.390 rule. A discrepancy is most obvious when comparing the "emergency standby engine" definition with all the other emergency equipment definitions in 10 CSR 10-6.020(2)(E), which allow for routine maintenance (which includes readiness testing) without voiding the emergency status of the emission unit:

- 13. Emergency standby boiler….a boiler operated during times of loss of primary power…., during routine maintenance,….
- 15. Emergency standby generator….operated only during times of loss of primary power…, or during routine maintenance.
- 16. Emergency stationary combustion turbine…operated only during times of loss of primary power…., or during routine maintenance.
- 17. Emergency stationary internal combustion engine…used to drive pumps, aerators, or other equipment only during times of loss of primary power…, or during routine maintenance.

By referencing the definition of emergency standby engine at 10 CSR 10-6.020 that uniquely omits any mention of routine maintenance, the draft NOx rule for large IC engines can be read to disqualify emergency engines from exemption if they perform periodic readiness tests as part of the prescribed maintenance schedule.

While emergency engines will emit some NOx during maintenance/readiness checks, these emissions would be well below the 25 ton/summer season exemption in section (1)(B)2 of the draft rule. As a practical matter, ozone-season NOx emissions from readiness tests are limited by the following factors:

- In some cases, readiness test schedules are prescribed by a regulatory agency, such as the Nuclear Regulatory Commission for backup power at nuclear plants, or life safety codes at critical facilities such as hospitals. In other cases, operators rely on engine manufacturer recommendations that specify readiness test schedules and maintenance cycles (oil changes, etc.). These vary from one engine/application to another, but the typical readiness check (automated or manual) is about 30 minutes, either weekly or monthly. Assuming a weekly test as worst-case, total run time during the May 1-Sept. 30 summer period in the draft rule would be about 10 hours. Using the longer March 1-October 31 ozone monitoring season associated with the 2015 ozone NAAQS, the total ozone season run time for readiness testing would be about 16 hours total.
- Readiness tests occur on a year-round schedule that includes time in non-ozone season months as well as in the ozone season.
- Readiness test protocols vary, but typically include periods of low speed operation as well as full operating speed. Likewise, there are portions of the test cycle when the engine is not under load, as well as test periods under full or partial load. With diesel engines, testing under at least 40% load is recommended monthly or quarterly, to prevent no-load wet-stacking (buildup of unburned diesel fuel in the exhaust system). Thus, readiness testing hours do not equate to the NOx emissions that would occur under full load and full speed operations during an actual emergency.

The duration of emergency engine readiness testing is also limited by the NESHAP for Stationary Reciprocating Internal Combustion Engines (RICE), 40 CFR 63 Subpart ZZZZ. The RICE NESHAP applies to new and existing engines at both major and area sources.[1] Under NESHAP section 40 CFR 63.6640(f)(2)(i), emergency RICE may not be operated for maintenance checks and readiness testing in excess of 100 hours per calendar year.

There are several ways the Missouri rules could be altered to allow emergency engines to follow regulatory or manufacturers' maintenance/readiness testing schedules, without disqualifying the engine from the emergency standby engine exemption of 10 CSR 10-6.020.

1. The simplest approach would be to align the "emergency standby engine" definition in 10 CSR 10-6.020 with all the other emergency equipment definitions, as follows: "Emergency standby engine—For the purpose of 10 CSR 10-6.390, an internal combustion engine used only when normal electrical power or natural gas service is interrupted or for the emergency pumping of water for either fire protection or flood relief, ***or for routine maintenance***. An emergency standby engine may not be operated to supplement a primary power source when the load capacity or rating of the primary

[1] The RICE NESHAP does not cover rotary engines, IC engines that lack reciprocating pistons, but these are not available commercially as stationary engines in the >1300 HP size class regulated by the Missouri rule.

power source has been either reached or exceeded." Unfortunately, the definition rule at 10 CSR 10-6.020 is not presently undergoing revision, so there may be a delay in resolving the issue, until the Missouri definition rule is reopened and revised.

2. Another approach that would be effective sooner is to modify the emergency engine exemption at 10 CSR 10-6.390(1)(B)1, as follows: "Any stationary internal combustion engine that is operated according to the definition of emergency standby engine in 10 CSR 10-6.020, with allowance for operation during routine maintenance or readiness testing."

   The 100 hour federal NESHAP time limit is applicable to such engines, and could be stated explicitly in the exemption, if desired. In such case, the exemption could read: "Any stationary internal combustion engine that is operated according to the definition of emergency standby engine in 10 CSR 10-6.020, with allowance for up to 100 hours per year of operation for routine maintenance or readiness testing."

3. A third approach would be to align the exemption in 10 CSR 10-6.390 with the federal NESHAP definition of "Emergency stationary RICE" at 40 CFR 63.6675. In this case, the exemption at (1)(B)2. would read: "Any stationary internal combustion engine that meets the definition of emergency stationary reciprocating internal combustion engine at 40 CFR 63.6675 is exempt from this rule." The Missouri definition of "emergency standby engine" at 10 CSR 10-6.020 could then be rescinded at a later time. The allowances for emergency engines in the federal NESHAP [40 CFR 63.6640(f)] include routine maintenance and readiness testing up to 100 hours per year, but also include some grid stability and non-emergency usage (up to 50 hours/year within the 100 hour absolute cap).

   Demand response provisions in the federal rule are in litigation and remand to EPA, so there is some uncertainty with this approach, but the litigation is focused on allowable demand response operation within the 50 hours of non-emergency use, and would not affect the 100 hour absolute cap. Regardless of the outcome of the litigation, any change in the scope of the NESHAP definition of emergency stationary RICE at 40 CFR 63.6675 is unlikely to affect large IC engines in eastern Missouri that supply power during extended periods of time. These engines would not qualify for the federal emergency RICE definition. They would need to rely on the 25 ton exemption in the draft rule, or meet the NOx emission limits of the rule.