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**Stationary Engine Rules
Quad-I, Quad-J, & Quad-Z
*Leveraging Lessons Learned***

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Outline - Top 11 Lessons Learned

1. Emission calc. cautions
2. Emission factor concerns
3. Expiration of Certificates
4. De-rating an engine
5. Stationary v. nonroad (temporary units?)
6. Caution about applying exemptions
7. No-requirements determinations
8. The “Gap”
9. Reconstructing on purpose
10. Consequences of emergency provisions
11. Owned v. Leased



1. Emission calculation issues

- > Conversions between output (hp) and input (MMBtu) units
 - ❖ Do not use 2,544 Btu/hp-hr directly!
 - ❖ Engines are not very efficient (30 to 40+ %)
 - ❖ It actually takes ~6,000 to 7,000 Btu/hr of fuel heat input to generate 1 hp of mechanical power output
- > Improper fuel heating value
 - ❖ Lower Heat Value (LHV) is used by manufacturers
 - ❖ Higher Heat Value (HHV) is used by EPA
 - ❖ The difference, which is the heat lost to water vaporization, is fuel-specific, significant (~10 % for methane NG)

2. Where do you get emission factors?

- > CEMS or testing
 - ❖ Use EPA and State-approved methods
 - ❖ Testing is highly credible, but only a snapshot in time
- > Vendor-Provided Data
 - ❖ Watch for exclusions (e.g., formaldehyde)
- > Published “average” factors
 - ❖ AP-42, CARB, others
- > Compare to any applicable regulations
 - ❖ But don't necessarily use Tier standards to set PTE
 - ◆ They apply to the *family* of engines as an average
 - ◆ Tier standards for CO for small engines are very large (10+ X AP-42 factor)

3. What happens when your certificate expires?

- > The easiest compliance requirement for many NSPS engines is to purchase a certified engine
- > But these certifications expire
- > And some certificates have a disclaimer that certified emissions are only good for XXX hours of operation
- > Neither document expiration nor operation limitation exceedances results in noncompliance with the NSPS rules
- > The NSPS requirements are to (1) purchase a certified engine and (2) operate and maintain it according to manufacturer instructions

4. De-rating an engine

- > A new 4SRB engine's maximum nameplate power is 510 bhp at 3,000 rpm
- > The engine is placed in Kansas and coupled to a compressor that limits the rpm to 2,200...the effective horsepower is 440 bhp
- > Which RICE MACT provisions apply?...
 - ❖ If > 500 hp, MACT monitoring plus NSPS provisions
 - ❖ If ≤ 500 hp, NSPS provisions only
- > The restriction due to the compressor is moot
- > “Site-rated HP” for MACT (i.e. maximum manufacturer's design capacity at engine site conditions)
- > “Maximum engine power” for NSPS (510 bhp)

5a. Stationary v. nonroad

- > “Nonroad” engines are not “stationary” and are therefore not subject to IIII, JJJJ, & ZZZZ
 - ❖ EPA 420-F-02-034 (9/2002) for definition of “stationary”
- > Nonroad engine means any ICE that is in or on a piece of equipment that is...
 - ❖ self-propelled; or propelled while functioning; or
 - ❖ portable or transportable
 - ◆ *Designed to be moved*, e.g., on wheels or skids
 - ◆ *And actually is moved routinely*
 - ◆ Portability is moot if it remains [*in service*] at a location (building, structure, facility, or installation)...
 - *for more than 12 months...or...*
 - *for seasonal sources, for the entire season (3 months or more) for at least 2 years*

5b. Back door to a temporary unit exemption?

- > There is no exemption for temporary units, but...
- > a temporary engine used for a temporary purpose is not a stationary engine if it does not remain in the location for more than 12 months (and therefore not subject to NSPS or RICE MACT)

5c. Temporary Exemption - Two Big Caveats

1. Replacing one temporary engine with another to be used for the same purpose does not restart the 12-month clock

The 12-month clock applies to the location and purpose, not a particular engine

2. An engine to be used temporarily in place of a stationary engine (e.g., while it is being overhauled) is considered a stationary engine

The location and purpose is stationary even if it consists of more than one engine over time

6. Exercise caution when applying exemptions

- > An institution uses the area source commercial-residential-institutional exemption for its old backup power generators
- > They buy a new generator and apply the same exemption...not realizing it applies to existing sources only
 - ❖ Not available for new sources under ZZZZ, or, of course, either NSPS

7a. Engines with **NO** Requirements

- > Technically, still “affected sources”
- > At major sources, existing RICE > 500 hp:
 - ❖ SI 2SLB
 - ❖ SI 4SLB
 - ❖ Emergency
 - ◆ If it does not operate and is not contractually obligated to be available for more than 15 hr/yr for emergency demand response or voltage or frequency deviations
 - ❖ Limited use (LU)
 - ❖ Landfill or digester gas (LG/DG)
(>10% gross heat input annually)

7b. Can you depend on a no-requirements determination?

- > Many emergency engines have no requirements under RICE MACT
- > How do you prove that the engine qualifies as emergency?
 - ❖ Does the proof have to be enforceable?
- > Some states say *yes*
 - ❖ So you end up being subject to the RICE MACT definition in 63.6640 (hours of operation limitations) despite the rule affirmatively stating that you have no applicable requirements
 - ❖ EPA recognizes the “catch 22” but doesn’t offer help

8a. Understanding the “Gap” -- First, how do the rules overlap?

- > NSPS IIII - CI ICE
 - ❖ *Ordered* after 7/11/05 and *manufactured* after 4/1/06
- > NSPS JJJJ - SI ICE
 - ❖ *Ordered* after 6/12/06 and *manufactured* after, depending on engine type, 7/1/07, 1/1/08, 7/1/08, or 1/1/09
- > MACT ZZZZ - all RICE
 - ❖ Existing or new source provisions depend on if the engine was **constructed** (i.e., contracted to be installed “on site”) before or after 6/12/06 (12/19/02 for major source RICE > 500 hp)

8b. Engines that meet RICE MACT requirements by **meeting NSPS as applicable**

- > At major sources, new and reconstructed RICE...
 - ❖ \leq 500 HP, CI
 - ❖ \leq 500 HP, 2SLB
 - ❖ \leq 500 HP, 4SRB
 - ❖ $<$ 250 HP, 4SLB (not LG/DG, emergency, or LU)
 - ❖ \leq 500 HP, landfill or digester gas
 - ❖ \leq 500 HP, emergency or limited use
- > At area sources, all new/reconstructed RICE
 - ❖ This results in a regulation GAP (loop hole) for RICE constructed (on site) after 6/12/06 and manufactured before the applicable NSPS date

8c. Real-life example gap engine?

- > CI RICE at area source
 - ❖ Ordered on June 1, 2012
 - ❖ Manufactured on March 1, 2005
 - ❖ Contracted for on-site installation on July 1, 2012
- > Engine is a “new” RICE MACT source since it was constructed (on-site) after June 12, 2006
 - ❖ RICE MACT requires compliance with NSPS III, as applicable
- > NSPS III does not apply
 - ❖ Ordered after July 11, 2005, but...
 - ❖ Manufactured prior to April 1, 2006

9. Reconstructing on purpose

One situation where it might help

- > Existing major source 380-hp 4SRB RICE that operates ~200 hrs/yr (so not emergency or limited use) MACT ZZZZ requires continuous T and monthly ΔP monitoring
- > Upon reconstruction, MACT ZZZZ simply points to NSPS JJJJ
- > NSPS JJJJ requires testing but not monitoring

10a. Can you use emergency engines to *prevent* an emergency?

- > A facility uses pumps during heavy rains to prevent flooding
- > EPA says NO ..., the operation counts towards the allowable 50 hours of non-emergency operation
- > Same determination for other emergency *anticipation* situations
 - ❖ Ex. Process power back-up engines started as a storm approaches

10b. What if you operate an emergency engine more than the allowable non-emergency hours?

- > Based on EPA's April 2, 2013 Q&A document, it is then forever a non-emergency engine
- > Based on EPA's RTC 10.2.1 published with the 2013 rule preamble, a decision will be made on a "case-by-case" basis

10c. Unintended consequences...

Are we harming the environment?

- > A power generation facility is planning a 3-day (72-hour) outage for switchyard maintenance to comply with new NERC standards
- > Power for critical systems will need to come from engines
- > Existing, on-site emergency engines could accommodate the need, but 72 hours of operation in a single year would make them non-emergency...forever?
- > EPA was asked for a variance - no such luck; their solution is to bring in portable engines...which is likely worse for the environment
 - ❖ Potentially higher emitting design
 - ❖ Extra fuel storage and transportation

10d. Is it always worth the hassle?

- > No, for several types of engines, it is easier to comply with non-emergency provisions than with emergency provisions
 - ❖ Maintenance requirements only v. maintenance requirements + hours records
- > Major source existing RICE < 100 hp
- > Area source existing CI RICE < 300 hp
- > Area source existing 4S RICE < 500 hp
- > Area source existing 2S RICE
- > Area source existing 4S remote RICE

11. What if my leasing company takes care of compliance?

- > Great, but you still have ultimate responsibility as the operator
- > Some leasing companies have databases that provide all the information you need to determine applicability and maintain compliance...
 - ❖ But the operator is ultimately responsible to the state and EPA
- > Make sure you get what you paid for

EPA's Contacts for Engines Rules

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Upcoming *Understanding Engines* course:

March 24, 2016 - Wichita, KS