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...
  - ≤ 500 HP, CI
  - ≤ 500 HP, 2SLB
  - ≤ 500 HP, 4SRB
  - < 250 HP, 4SLB (not LG/DG, emergency, or LU)
  - ≤ 500 HP, landfill or digester gas
  - ≤ 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 IIII, as applicable

> NSPS IIII 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 JJJJJ

- NSPS JJJJJ 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

<table>
<thead>
<tr>
<th>Region</th>
<th>Contact</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Roy Crystal</td>
<td>617-918-1745</td>
</tr>
<tr>
<td></td>
<td>Susan Lancey</td>
<td>617-918-1656</td>
</tr>
<tr>
<td>II</td>
<td>Umesh Dholakia</td>
<td>212-637-4023</td>
</tr>
<tr>
<td>III</td>
<td>Ray Chalmers</td>
<td>215-814-2061</td>
</tr>
<tr>
<td>IV</td>
<td>Lee Page</td>
<td>404-562-9131</td>
</tr>
<tr>
<td>V</td>
<td>Rae Trine</td>
<td>312-353-9228</td>
</tr>
<tr>
<td></td>
<td>Nathan Frank</td>
<td>312-886-3850</td>
</tr>
<tr>
<td></td>
<td>Sara Breneman</td>
<td>312-886-0243</td>
</tr>
<tr>
<td></td>
<td>Jeff Gahris</td>
<td>312-886-6794</td>
</tr>
<tr>
<td></td>
<td>Reza Bagherian</td>
<td>312-886-0674</td>
</tr>
<tr>
<td>VI</td>
<td>Charles Handrich</td>
<td>214-665-6553</td>
</tr>
<tr>
<td></td>
<td>Cynthia Kaleri</td>
<td>214-665-6772</td>
</tr>
<tr>
<td></td>
<td>Donald M. Smith</td>
<td>214-665-7270</td>
</tr>
<tr>
<td>VII</td>
<td>Elizabeth Kramer</td>
<td>913-551-7186</td>
</tr>
<tr>
<td></td>
<td>David Peter</td>
<td>913-551-7397</td>
</tr>
<tr>
<td>VIII</td>
<td>Alexis North</td>
<td>303-312-7005</td>
</tr>
<tr>
<td>IX</td>
<td>Lisa Beckham</td>
<td>415-972-3811</td>
</tr>
<tr>
<td>X</td>
<td>Heather Valdez</td>
<td>206-553-6220</td>
</tr>
<tr>
<td>HQ</td>
<td>Melanie King</td>
<td>919-541-2469</td>
</tr>
</tbody>
</table>

Email: lastname.firstname@epa.gov
Or, if you’d prefer to not call EPA

Kristen Chrislip
kchrislip@trinityconsultants.com
913-894-4500

Upcoming *Understanding Engines* course:
March 24, 2016 - Wichita, KS