

# Conquering the Challenges Posed by the Reciprocating Internal Combustion Engine (RICE) Rules

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# Conquering the RICE Rules

- RICE Regulatory Overview
- Key Definitions
- Challenges of Compliance
  - Roadblocks;
  - Common Misinterpretations; and
  - Potential Title V “Deviations”
- Case Study at a Major Refinery

# RICE Regulatory Overview

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- 40 CFR 60 Subpart III – Compression Ignition (CI) Internal Combustion Engines (ICE) – Diesel Engines
- 40 CFR 60 Subpart JJJJ – Spark Ignition (SI) Internal Combustion Engines (ICE) – Gasoline Engines
- 40 CFR 63 Subpart ZZZZ – Reciprocating Internal Combustion Engines (RICE) – Diesel and Gasoline Engines

# RICE Regulatory Overview

- June 15, 2004
  - NSPS Subpart IIII and MACT Subpart ZZZZ were promulgated
- January 18, 2008
  - NSPS Subpart JJJJ and amendments to MACT Subpart ZZZZ were promulgated
- March 3, 2010 and August 20, 2010,
  - Amendments to MACT Subpart ZZZZ were promulgated
- NSPS IIII and JJJJ contain requirements for both manufacturers and owners/operators.

# RICE Regulatory Overview (III)

- Stationary CI ICE are NSPS Subpart III affected facilities if:
  - Commenced construction (ordered) after 7/11/05 and are manufactured:
    - After 4/1/06 (and are not fire pump engines); or
    - As a certified NFPA fire pump engine after 7/1/06.
  - Modified or reconstructed after 7/11/05.

# RICE Regulatory Overview (JJJJ)

- Stationary SI ICE are NSPS JJJJ affected facilities if:
  - Commenced construction (ordered) after 6/12/06 and are manufactured:
    - On or after 7/1/07, for engines >500 HP (except for lean burn engines > 500 HP and <1350 HP, on or after 1/1/08); or
    - On or after 7/1/08 for engines <500 HP; or
    - On or after 1/1/09 for emergency engines >25 HP.
  - Modified or reconstructed after 6/12/06.

# RICE Regulatory Overview (III and JJJ)

- Tiered system where the standards are phased in based on:
  - Power rating
  - Model year – Date the engine commenced construction and manufacture date are key
    - Commence construction is the date the engine was ordered
  - Cylinder Displacement (expressed in liters per cylinder)
  - Emergency or fire pump engine



# RICE Regulatory Overview (IIII and JJJJ)

- Important Note – NSPS IIII and JJJJ are designed to phase engines out of applicable use:
  - (IIII) After December 31, 2008, owners/operators may not install stationary CI ICE that do not meet the applicable requirements for 2007 model year engines.
  - (IIII) After December 31, 2009, owners/operators may not install stationary CI ICE <25 HP that do not meet the applicable requirements for 2008 model year engines...
  - See 40 CFR 60.4208 (IIII) and 60.4236 (JJJJ) for the entire lists.

# RICE Regulatory Overview (ZZZZ)

Engine Power Rating	Existing	New or Reconstructed
>500 HP	Commence construction or reconstruction before December 19, 2002	Commence construction on or after December 19, 2002
≤500 HP	Commence construction or reconstruction before June 12, 2006	Commence construction on or after June 12, 2006

# RICE Regulatory Overview (ZZZZ)

- The following must submit initial notification only:
  - New/reconstructed emergency or limited use >500 HP
- The following do not have to meet the requirements of this subpart or subpart A, including initial notification requirements:
  - Existing SI 2SLB >500 HP
  - Existing SI 4SLB >500 HP
  - Existing emergency or limited use >500 HP

# RICE Regulatory Overview (ZZZZ)

- The following new/reconstructed engines must meet the requirements of this part by meeting the requirements of NSPS III or JJJJ
  - Emergency or limited use engines  $\leq 500$  HP
  - CI engines  $\leq 500$  HP
  - SI 2SLB engines  $\leq 500$  HP
  - SI 4SLB engines  $\leq 250$  HP
  - 4SRB engines  $\leq 500$  HP

# RICE Regulatory Overview (IIII, JJJJ, ZZZZ)

- Recordkeeping & reporting requirements
  - Initial notifications depending on capacity, HP and model year
  - Records of emissions testing, maintenance or hour meter readings

# RICE Regulatory Overview (IIII, JJJJ, ZZZZ)

- Operational and Monitoring Requirements
  - Must operate all engines and control devices according to manufacturer specifications
- Fuel Usage schedule (NSPS IIII):
  - October 1, 2007 – Low Sulfur Diesel (LSD) (< 500 ppm)
  - October 1, 2010 – Ultra Low Sulfur Diesel (ULSD) (< 15 ppm)
- Non-certified engines require notification and possible testing

# Example of Numerical Emissions Limitations (MACT ZZZZ)

# New/Reconstructed CI & SI RICE Emission Limitations

New/Reconstructed RICE	Limitation (except during SU)
2SLB HP>500	58% CO reduction OR 12 ppmvd formaldehyde @ 15% O <sub>2</sub> .
4SLB HP <sub>≥</sub> 250	93% CO reduction OR 14 ppmvd formaldehyde @ 15% O <sub>2</sub> .
CI HP>500	70% CO reduction OR 580 ppbvd formaldehyde @ 15% O <sub>2</sub> .
4SRB HP>500 (includes existing engines)	76% formaldehyde reduction or 350 ppbvd formaldehyde @ 15% O <sub>2</sub> .

New/Reconstructed CI RICE HP  $\leq$ 500 are subject to NSPS III and therefore meet the requirements of MACT by meeting the requirements of NSPS.



# Existing CI RICE Emission Limitations (3/3/2010 Amendment)

Existing CI RICE	Limitation (except during SU)
Non-Emergency $100 \leq \text{HP} \leq 300$	230 ppmvd CO @ 15% O <sub>2</sub>
Non-Emergency $300 < \text{HP} \leq 500$	49 ppmvd CO @ 15% O <sub>2</sub> or 70% CO reduction
Non-Emergency $\text{HP} > 500$	23 ppmvd CO @ 15% O <sub>2</sub> or 70% CO reduction
Emergency $\text{HP} \leq 500$	Work Practice Standards
Non-Emergency $\text{HP} < 100$	Work Practice Standards

Additional requirements include fuel use, installation of crank case ventilation system, SU limitations, emergency engine hour limitations, etc.

# Existing SI RICE Emission Limitations (8/20/2010 Amendment)

Existing SI RICE $\leq 500$ HP	Limitation (except during SU)
2SLB Non-Emergency $100 \leq \text{HP} \leq 500$	225 ppmvd CO @ 15% O <sub>2</sub>
4SLB Non-Emergency $100 \leq \text{HP} \leq 500$	47 ppmvd CO @ 15% O <sub>2</sub>
4SRB Non-Emergency $100 \leq \text{HP} \leq 500$	10.3 ppmvd formaldehyde @ 15% O <sub>2</sub>
Landfill/Digester Gas Non-Emergency $100 \leq \text{HP} \leq 500$	117 ppmvd CO @ 15% O <sub>2</sub>
Emergency $\text{HP} \leq 500$	Work Practice Standards
Non-Emergency $\text{HP} < 100$	Work Practice Standards

Additional requirements include operating limitations for oxidation catalysts or NSCR, SU limitations, etc.

# Key Definitions

# Nonroad Engine vs. Stationary Engine

- Stationary ICE (IIII, JJJJ, ZZZZ) – any ICE that converts heat energy into mechanical work and is not mobile.
- Stationary ICE differ from mobile ICE in that a stationary ICE is **NOT a nonroad engine** as defined at 40 CFR 1068.30 (excluding paragraph (2)(ii) of that definition) and is not used to propel a motor vehicle or a vehicle used solely for competition.

# Nonroad Engine vs. Stationary Engine (cont.)

- An ICE is **NOT a nonroad engine** if it meets the following criteria (40 CFR 1068.30)
  - Used to propel a motor vehicle, an aircraft or equipment used solely for competition;
  - Will remain at a location for more than 12 consecutive months.
- 40 CFR 1068.30 – General Compliance Provisions for Nonroad Programs – Definitions

# Nonroad Engine vs. Stationary Engine (cont.)

- Location

- A location is any single site at a building, structure, facility or installation.
- Any engine that replaces an engine at a location and is intended to perform the same function will be included in calculating the consecutive time period.

# Nonroad Engine vs. Stationary Engine (cont.)

- RICE brought onsite for < 12 months that is not being replaced by an engine to perform the same job is NOT applicable to NSPS III, JJJJ or MACT ZZZZ because it does not meet the definition of a Stationary ICE.
- Many facilities lease RICE for periods of less than 12 months, so this is a very common situation.

# Challenges of Compliance



# Challenges of Compliance

- Roadblocks – Inventory
  - Do you know how many engines are onsite at your facility?
  - Three main sources of engines onsite at facilities:
    - Rented
    - Facility - owned
    - Contractor - owned/rented
  - Are your rental companies, maintenance departments and contractors aware of the requirements for the owner/operator?

# Challenges of Compliance

- Rented engines:
  - Rental companies do not have responsibility for RICE requirements, and not all of the engines leased are certified.
  - Must maintain control over the engines to prove non-applicability for engines onsite for 12 months.
- Facility-owned engines:
  - Applicability determination on each engine.
  - Weigh options of purchasing a certified new model year or face the potential requirements to install CEMs, conduct performance tests, etc.

# Challenges of Compliance

- Contractor - owned/rented engines
  - Similar to rented equipment, but often less owner supervision.
  - Must have control over these engines to manage compliance implications.
- Onsite equipment yards
  - Lay down yards or storage areas that may house several SI or CI ICE.
  - Engines could be applicable to the regulations if they remain “at a location” for >12 months.

# Challenges of Compliance

- Common Misinterpretations:
  - MACT ZZZZ is only applicable to engines greater than 500 HP – NOT TRUE
    - Initial promulgation of MACT ZZZZ only had requirements for engines >500 HP.
    - January 2008, March 2010 and August 2010 amendments brought in all engines as “affected.”

# Challenges of Compliance

- Common Misinterpretations:
  - Emergency and fire pump engines are not applicable –  
NOT TRUE
    - Subject to an hourly operation limitation and monitoring by a non-resettable hour meter.
    - Potential emission limitations, recordkeeping, reporting notification requirements.

# Challenges of Compliance

- Common Misinterpretations:
  - Stationary engine means an engine that is physically stationary – NOT TRUE
    - Stationary engine: NOT a nonroad engine, can be portable or transportable and will remain onsite >12 months

# Challenges of Compliance

- Potential Title V “Deviations”
  - Failure to meet continuous compliance can include:
    - Failure to submit the appropriate notifications;
    - Failure to operate the RICE according to the manufacturer’s specifications;
    - Failure to adhere to the phased installation requirements; or
    - Failure to use the correct fuel as specified in NSPS.

# Case Study at a Major Refinery



# Case Study at a Major Refinery

- **Determine Compliance Status**
  - Identify key players
  - Inventory of ICE currently onsite
  - Determine requirements of each identified RICE
- **Develop Compliance Program**
  - Determine inventory and change management procedures that work best for your facility
  - Tracking system (tagging and form)
  - Limit types of engines that can be used for > 12 months
  - Promote champion to manage program (Environmental Staff)

# Case Study at a Major Refinery

- **Implement Compliance Program**
  - Train key personnel (environmental, operations, maintenance, procurement, supervisors, rental companies, contractors, etc)
  - Rental agreement/Contract language
- **Manage Compliance Program**
  - Audit monthly or quarterly
  - Update program with the changing rules to ensure the most recent requirements are being captured

# Questions?

# Thank you!

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