

# **New Federal Regulations for Internal Combustion Engines**

Doug Parce

# Pertinent Federal Regulations

- National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines  
(MACT – 40 CFR 63 Subpart ZZZZ)
- Standards of Performance for Stationary Spark Ignition Internal Combustion Engines  
(NSPS – 40 CFR 60 Subpart JJJJ)
- Standards of Performance for Stationary Ignition Internal Combustion Engines  
(NSPS – 40 CFR 60 Subpart IIII)

# Background

- Why did the EPA promulgate these regulations anyway?
- Complexity of these three rules impacts full span of engine sizes (horsepower) and is not specific to any industry
- Being subject to these regulations will not in themselves trigger a need for an operator to obtain a Title V Permit



# Categories of Engine Designs

- Engine design and operation
  - Spark Ignited / Compression Ignited
  - 2-cycle / 4-cycle
  - (Fuel) Rich / Lean operation
  - Emergency / Non-emergency use
- Horsepower rating
- Engine/cylinder displacement
- Type of fuel burned
- Date of construction\*, modification or reconstruction

# Which engines are subject?

- “New” or “Existing”
  - Spark ignited engines prior to June 12, 2006
  - Compression ignited engines prior to July 11, 2005
- “Modified” or “Reconstructed”
- “Major” or “Minor” sources
  - Title V Definition
  - Hazardous Air Pollutant Definition

# What pollutants are regulated?

- New Source Performance Standards (NSPS) regulate criteria pollutants
- National Emission Standards for Hazardous Air Pollutants (NESHAP) includes Maximum Achievable Control Technology (MACT) standards, and regulate certain chemical species defined to be toxics or carcinogens.

# Changes to the previous RICE MACT rules

- Previously subject engines' requirements are unchanged
- Amendments address all engines at major HAP sources
- Engines at minor HAP sources are addressed as area sources

# Overview of Requirements under MACT Subpart ZZZZ

For engines located at major sources of HAP emissions...

<u>Engine Size and Defined as</u>	<u>Emission Limits</u>	<u>Other Requirements</u>
<b>4-cycle, Rich-Burn</b>		
> 500 hp Existing, New and Reconstructed	Reduce formaldehyde by at least 76%; or limit formaldehyde in exhaust to <350 ppbvd at 15% O <sub>2</sub> as demonstrated by stack tests	Maintain pressure drop across catalyst; and catalyst inlet temperature
≤ 500 hp Existing	No requirements	No notification needed
≤ 500 hp New and Reconstructed		Follow NSPS Subpart JJJJ
<b>4-cycle, Lean-Burn</b>		
all hp Existing	No requirements	No notification needed
≥ 250 hp New and Reconstructed	Reduce CO by at least 93%; or limit formaldehyde in exhaust to <14 ppmvd at 15% O <sub>2</sub> as demonstrated by stack tests	Maintain pressure drop across catalyst; and catalyst inlet temperature
< 250 hp New and Reconstructed		Follow NSPS Subpart JJJJ
<b>2-cycle Lean-Burn</b>		
all hp Existing	No requirements	No notification needed
> 500 hp New and Reconstructed	Reduce formaldehyde by at least 58%; or limit formaldehyde in exhaust to <12 ppmvd at 15% O <sub>2</sub> as demonstrated by stack tests	Maintain pressure drop across catalyst; and catalyst inlet temperature
≤ 500 hp New and Reconstructed		Follow NSPS Subpart JJJJ
<b>Compression-Ignition</b>		
all hp Existing	No requirements	No notification needed
> 500 hp New and Reconstructed	Reduce CO by at least 70%; or limit formaldehyde in exhaust to <580 ppbvd at 15% O <sub>2</sub> as demonstrated by stack tests	Maintain pressure drop across catalyst; and catalyst inlet temperature
≤ 500 hp New and Reconstructed		Follow NSPS Subpart IIII



# Standards for Spark Ignited, Non-Emergency, Natural Gas and LPG Fueled Engines

Maximum Engine Power	Manufactured after	Emission Standard (g/hp-hr)		
		NOx	CO	VOC-f *
hp ≤ 25	July 1, 2008	Varies depending upon engine displacement		
25 < hp < 100 **	July 1, 2008	2.8	4.8	---
100 ≤ hp < 500	July 1, 2008	2.0	4.0	1.0
	January 1, 2011	1.0	2.0	0.7
hp ≥ 500	July 1, 2007	2.0	4.0	1.0
rich burn	July 1, 2010	1.0	2.0	0.7
500 ≤ hp < 1350	January 1, 2008	2.0	4.0	1.0
lean burn	July 1, 2010	1.0	2.0	0.7
hp ≥ 1350 lean burn	July 1, 2007	2.0	4.0	1.0

\* VOC-f indicates that the standard is given exclusive of formaldehyde

\*\* The standard is given for NOx + HC, however for natural gas engines the HC component is assumed to be zero

# Standards for Spark Ignited, Non-Emergency, Gasoline Fueled Engines

Maximum Engine Power	Manufactured after	Emission Standard (g/hp-hr)	
		NOx + HC	CO
hp ≤ 25	July 1, 2008	Varies depending upon engine displacement	
25 < hp < 500	July 1, 2008	2.0	3.3
	7/1/2008 (severe duty)	2.0	97.0
hp ≥ 500	July 1, 2007	2.0	3.3
rich burn	7/1/2007 (severe duty)	2.0	97.0

# Standards for other Spark Ignited Engines

Engine Type and Fuel	Maximum Engine Power	Manufactured after	Emission Standard (g/hp-hr)		
			NOx	CO	VOC-f *
Landfill Digester Gas (except lean burn)	hp < 500	July 1, 2008	3.0	5.0	1.0
		January 1, 2011	2.0	5.0	1.0
	hp ≥ 500	July 1, 2007	3.0	5.0	1.0
		July 1, 2010	2.0	5.0	0.7
Emergency Use Only	25 < hp < 130	January 1, 2009	10.0	387.0	---
	hp ≥ 130		2.0	4.0	1.0

\* VOC-f indicates that the standard is given exclusive of formaldehyde

# Certified / Non-Certified Engines

- New definition of “Certified Emissions Life”
- Engine manufacturers are required to provide “certified” small engines
- Engine manufacturers may optionally provide “certified” large engines
- Period of “certification” does not appear to be useful for most operators of large, industrial engines

# Operation and Maintenance Plan

- All engines subject to these regulations must have a written Operation & Maintenance Plan
- If operating as a “certified” engine, recommendations by both the engine manufacturer and any control device manufacturers must all be followed
- If not operating as a “certified” engine, the operator must develop a written O&M Plan

# Performance Tests

- “Certified” engines with ratings of less than 100-hp are not required to be tested
- Uncertified engines  $25 < \text{hp} < 100$  hp require an initial stack test
- All engines (both “Certified” and not)  $100 \leq \text{hp} < 500$  hp require an initial stack test
- Engines  $\geq 500$  hp require both an initial stack test and subsequent compliance tests

# Notification and Recordkeeping Requirements

- Initial Construction Notification Required for  $\geq 500$  hp engines
- Notice is required 30-days prior to stack testing; and results must be submitted within 60-days of the testing
- Operators must maintain maintenance records to document that the O&M Plan is being followed

# Suggestions for Implementation Priorities

- Focus on engines located at Title V sites first
- Review inventory of engines located at non-Title V sites second and create documentation of non-applicability
- Advise the operators you support of these new regulations to better ensure any new engine installations are compliant with these regulations



Discussion?

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[douglas@sageenvironmental.com](mailto:douglas@sageenvironmental.com)

303-601-0189 (cell)

303-779-0105 x1602 (office)