

Untangling the Complex Web of IC Engine Regulations



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Engine Categories and Regulations

NSPS IIII

- Compression ignition ICE (reciprocating and rotary)
- Diesel
- New, modified, or reconstructed

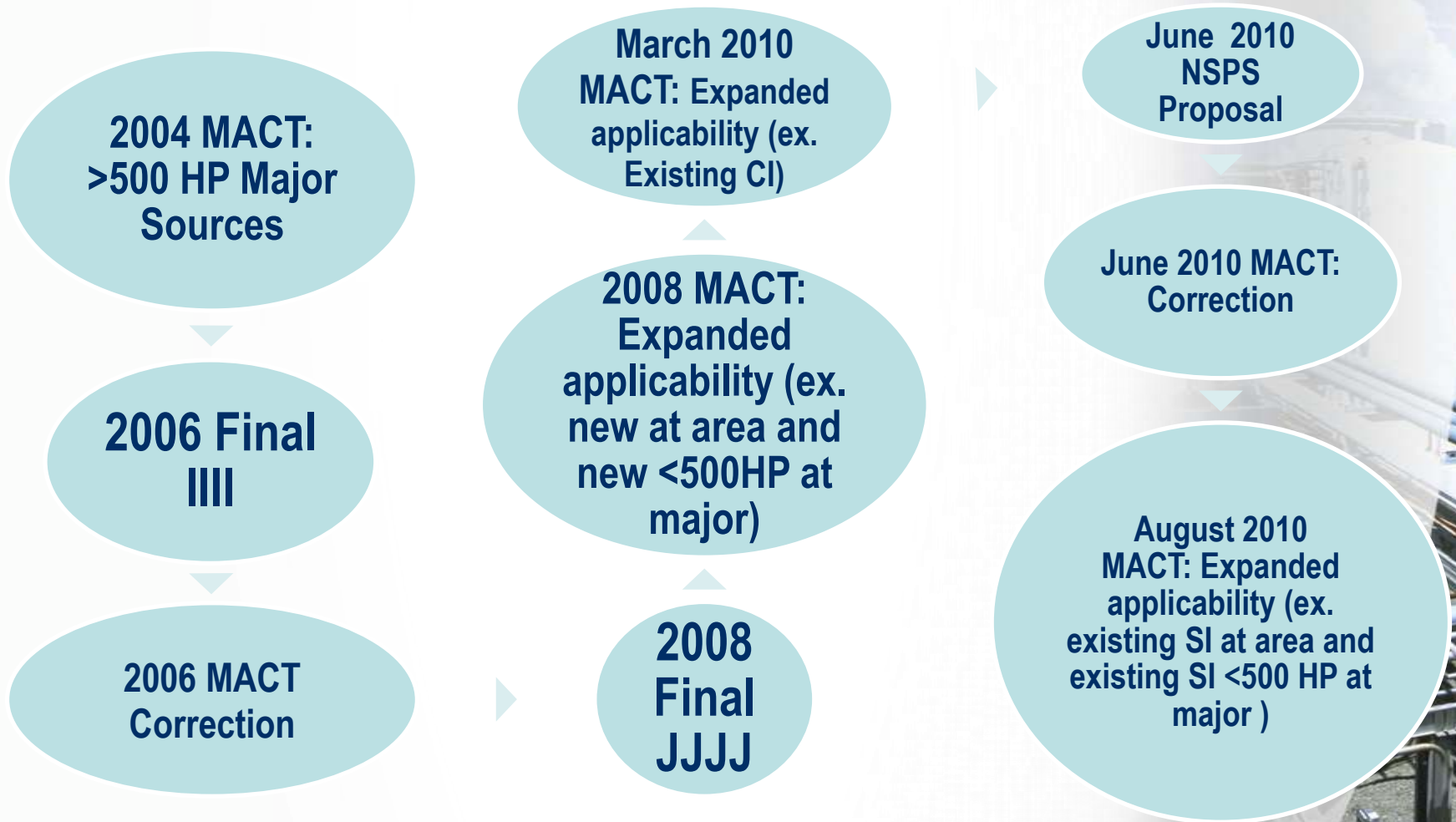
NSPS JJJJ

- Spark ignition ICE
- Gasoline, gas, LPG
- New, modified, or reconstructed

MACT ZZZZ

- Reciprocating ICE
- Gasoline, gas, LPG, diesel, landfill gas
- Area and major sources

Timeline of Engine Regulations



What Pollutants are Regulated?

Regulation →	IIII	JJJJ	ZZZZ
CO	X	X	X
SO ₂	X		
Particulate Matter	X		X
NO _x	X	X	
Formaldehyde			X
Non-methane HC	X	X	X

What Do I Need to Know to Classify My Engine?

- Stationary ICE regulatory analysis is based on the following:
 - Manufacturing and order date
 - Major vs. Area HAP sources (NESHAP)
 - “Existing” vs. “New/ Modified/ Reconstructed”
 - Brake Horsepower
 - Ignition Type (Compression vs. Spark)
 - Usage (Emergency vs. Non-Emergency)
 - Air-to-Fuel Ratio (Rich-burn vs. Lean-burn)
 - 2-stroke vs. 4-stroke
 - Fuel Type
- Very situation-specific – hundreds of scenarios are possible



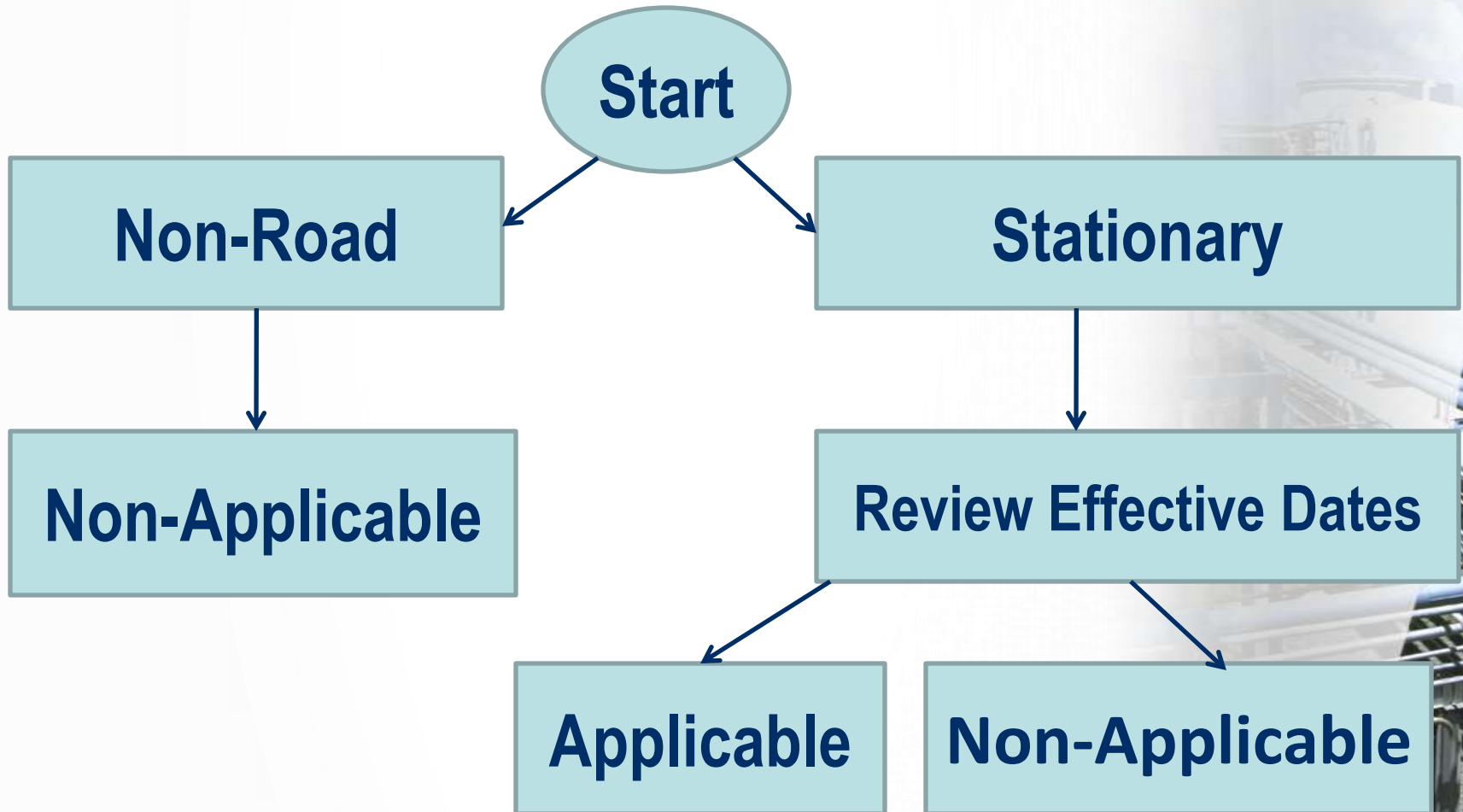
Key Terms to Know When Evaluating Engine Rule Applicability & Requirements

**Stationary
or
“Non-Road”**

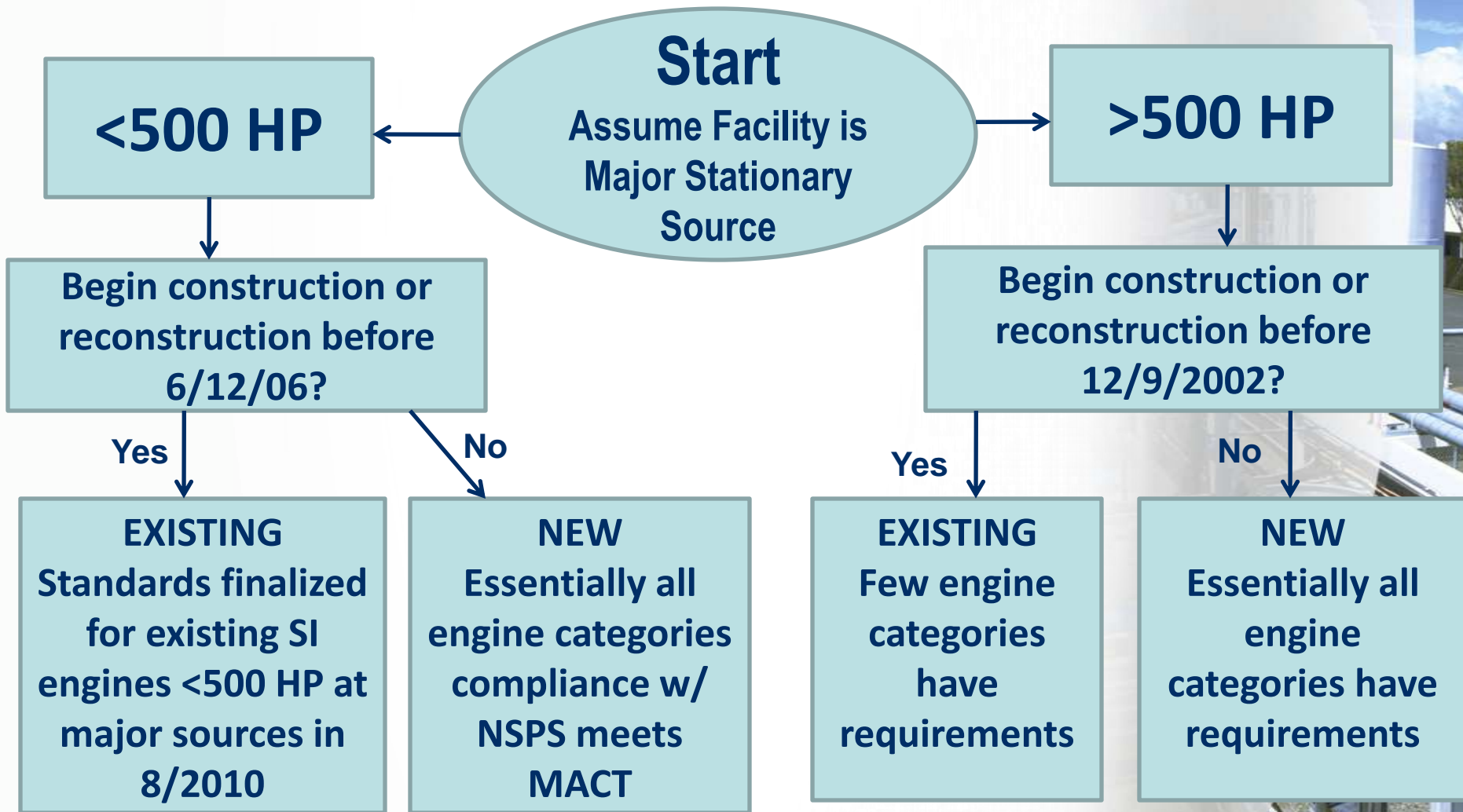
**New,
Modified, or
Reconstructed**

**Categories:
Major or
Area HAP
Source;
Emergency**

Simplified NSPS (III and JJJ) Applicability Evaluation Diagram



Simplified MACT ZZZZ Diagram of Major Engine Categories



Key Point: Is the Engine Stationary?

- III, JJJJ, and ZZZZ engine regulations are subject to **STATIONARY** engines only
- Stationary engine = not a non-road engine
- The regulations define a non-road engine
- Stationary engine is defined as not a non-road engine.



Would these IC engines be considered stationary (not non-road) engines?

What is a Non-Road Engine?

- **According to the regulations, key criteria are:**
 - **Portable or transportable**
 - **Designed to be and capable of being carried or moved from one location to another**
 - **Examples include, but are not limited to, wheels, skids, carrying handles, dolly, trailer, or platform**



What is a NOT a Non-Road Engine?

(per 40 CFR 1068.30)

- It is a stationary engine.
- It remains at a single location for more than 12 consecutive months.
- If a seasonal source, it remains at a single location on a permanent basis and operates at least 3 months or more each year.

Note: Any engine that replaces an engine at a location and that is intended to perform the same or similar function as the engine replaced will be included in calculating the consecutive time period.

LOCATION! LOCATION! LOCATION!

- **Specific site within a facility**
 - Chemical Company Acme is not a location – it is a facility
- **Currently defined via “non-road engine”**
 - *“A location is any single site at a building, structure, facility, or installation ”*
 - Example: Docks at Acme = Location; or,
 - Any single site at a stationary source = Location
- **Proposed 2010 NSPS definition:**
 - *“Engine placed and secured at a location where it is intended to be operated: piping and wiring... installed.....connections are made... engine capable of being started”*
 - Definition has evolved to a more useful and precise
 - Comment period ended 9/8/2010 and proposal has not been promulgated.

Non-Road Engine Example

- **Quandary:** Acme Co. stores an engine on skids in its warehouse. The engine is placed at its docks for 3 months and then at the wastewater plant for 6 months.
- **Answer:** Engine would qualify as a non-road engine and would therefore, not be subject to any of the stationary engine regulations discussed in this presentation.
- Note this example meets the key criteria of the non-road engine definition:
 - Portable ✓
 - Designed to be moved (on skids) ✓
 - Not at a single location >12 months ✓



More Non-Road Engine Examples

- A 10 HP compressor is wheeled or easily lifted by a person and is relocated throughout a facility
 - Key non-road engine terms: Designed to be moved (wheeled) and does not stay in one location more than 12 months
- A 500 HP compressor is at a location for approximately one week and is then wheeled away to another location
 - The size of the engine does not make a difference in determining if it is stationary or non-road
 - Key non-road engine terms: Designed to be moved (wheeled) and does not stay in one location more than 12 months



Do Temporary Replacement Engines Qualify as Non-Road?

- **EPA Rule Preamble Examples of Non-Road Engines:**
 - A unit that temporarily replaces an engine that is undergoing an overhaul
 - A temporary engine that is not the identical make, model or hp used for a short-term (not to exceed 90 days) replacement
- **Yes- above examples qualify as non-road**
 - Portable and <12 months at a single location
- **After original stationary engine returns, original engine is immediately subject to applicable stationary engine requirements**

Key Point: Engine Relocation Does Not Trigger NSPS Applicability



- Per NSPS IIII and NSPS JJJJ regulations:
 - “...requirements...do not apply.. to engines that were removed from one existing location and reinstalled at a new *location* ”
- *Interpretation that relocation does not trigger NSPS applicability consistent with NSPS interpretations for relocations of other NSPS sources such as boilers.*



Key Point: Applicability Dates

- NSPS: date of “construction“ is defined as date engine is ordered
- NESHAP: date of “construction” is defined as the date of installation of the engine (per rule preamble)
- For new engines to be subject to NSPS:
 - Order date must be after the NSPS construction date cutoff, and
 - Manufacture date must be after the NSPS manufacture date cutoff.
- For modified/reconstructed engines to be subject to NSPS:
 - Modification or reconstruction date, must be after the order and manufacture date thresholds.

New – Modified – Reconstructed Trigger Dates

NSPS IIII

- **New: Ordered**
After 7/11/2005, *and*
Manufactured
After 4/1/2006
- **Modified or Reconstructed:**
After 7/11/2005

NSPS JJJJ

- **New: Ordered**
After 6/12/2006 *and*
Manufactured After
 - 7/1/2007 for >500 HP
 - 1/1/2008 for lean burn
w/>500 HP & <1,350 HP
 - 7/1/2008 for <500 HP
 - 1/1/2009 for
Emergency >25 HP
- **Modified or Reconstructed:**
After 6/12/2006

MACT ZZZZ

- **New/ Modified/ Reconstructed**
Engines After
6/12/2006 (<500HP)
- **New / Modified/ Reconstructed**
Engines After
12/19/2002 (>500HP)

NSPS Installation Deadlines

Engine size and requirements*	Deadline to Stop Installing
Any size CI ICE that does not meet 2007 model year engine requirements (excludes fire pump engines)	December 31, 2008
SI ICE >500 HP that do not meet applicable JJJJ requirements	July 1, 2009
Stationary CI ICE less than 25 HP that does not meet 2008 requirements (excludes fire pump engines)	December 31 , 2009
Lean burn engines >500 HP and <1,350 HP that do not meet applicable JJJJ requirements	January 1, 2010
Stationary SI ICE <500 HP that do not meet applicable JJJJ requirements	July 1, 2010
Emergency SI ICE >25 HP that do not meet applicable JJJJ requirements	January 1,2011
Non-emergency stationary CI ICE >175 HP that do not meet 2011 requirements	December 31, 2012

*** Installation deadlines do not apply to engines that have been modified, reconstructed or relocated. Refer to regulation for a complete list of deadlines.**



NSPS Installation Deadline Example: Use of Older Engines

- **Can a facility install a pre-2007 engine used at other locations?**
 - A facility maintains several engines for use at various locations and may opt to permanently install one of these engines
- **The NSPS rule (i.e., installation deadlines) would seem to prohibit this, even though the engine was in the company's possession long before the rule was drafted**
- **However, can use an older (pre-2007) model engine is if it is removed from one existing location and reinstalled at a new location, as stated in 60.4208(h)**
- **In other words, the rule allows the installation of “used” engines even if the engine does not meet NSPS standards**
 - Alternately, the rule prohibits installation of a new (i.e., un-used engine) that does not meet NSPS standards.
- **Preamble: It was not EPA's intention to restrict use of engines that had been previously used and reinstalled in a different location**

Proposed 2010 NSPS Reconstruction Definition

- Includes a specific definition for “reconstruct”: if cost is >50% of comparable new engine
- Adds provisions that require reconstructed engines to meet the emission standards for the model year in which the reconstruction occurs if the reconstructed engine meets any of the following criteria:
 - The crankshaft is removed as part of the reconstruction; or
 - The fixed capital cost of the new and refurbished components exceeds 75 percent of the fixed capital cost of a comparable new engine; or
 - The serial number of the engine is removed as part of the reconstruction; or
 - The reconstructed engine consists of a previously used engine block with all new components.

Compliance Tips: Applicability



- Track length of time engine is installed at a single location to identify non-road versus stationary engines
- The following will likely not trigger NSPS/NESHAP applicability:
 - Engine overhaul or maintenance – depending on the project, document NSPS/NESHAP economic evaluation
 - Relocation of an engine
 - Temporary or rental engines (depending on length of use)
- Review and document order dates, installation dates and manufacturing dates



Check
Carefully!

Key Point: Other Engine Categories: Emergency and Limited Use Engine



- **Emergency use: Operation limited to emergency situations and required readiness testing and maintenance**
- **Emergency regulatory definition highlights:**
 - Produce power for critical networks or equipment when power source is interrupted (utility, or own power production)
 - Pump water in the case of fire or flood, *etc.*
- **According to EPA regulations/preamble, no time limit on the use of emergency engines in emergency situations.**
 - Per EPA rule preambles, emergency operation: Not a one-size-fits-all. Crucial for life-threatening situations...It is inappropriate to restrict the hours for supporting such equipment
- **Limited use: Operates less than 100 hrs/yr**



Emergency Engines: Allowable Maintenance Hours of Operation

Regulation →	IIII	JJJJ and ZZZZ
Allowable maintenance operation time	<100 hours/yr	<100 hours/yr with up to 50 hrs/yr for non-emergency operation of the 100 hours allowed.

2010 Proposal: Updates IIII emergency language to allow for 50 hrs/yr for non-emergency operation of the 100 hours allowed.

Certification: The Basics for III/JJJ/ZZZ

- Certified engines that operate according to the manufacturer's procedures:
 - No performance tests are required
 - Keep records of maintenance
 - EPA rule preamble: Most engines <100 HP will be certified
- Performance tests may be required:
 - If engine not certified; or
 - Engine is certified but manufacturer's procedures are not followed



**IC ENGINE
CERTIFIED!**



Stationary IC Engine Regulation Compliance Management Areas

HSE Audits

- Inventory engines
- Identify applicable engine regulations and requirements
- Check and review quarterly




Rental Company Management

- Review rental company contracts
- Update contract to assure compliance

Operations Responsibilities

- Document maintenance
- Notify Environmental via MOC if any engines are brought on-site
- Maintain compliance system to track engines in the field

Engine Tag Management System

- Hang color-code tags for field identification. Examples:
 - Green tags: permanent, stationary 
 - Orange tags: emergency 
 - Red tags: rental or temporary 
- Monthly log documentation by Operations:
 - Location, Tag ID, date, signature
- Operations to alert HSE of any engine that will be in place at a single location for more than 12 months.

Recommended Compliance Practices

- **Document and track engine inventory, applicability, and requirements .**
 - **Applicability and requirements should be identified for each individual stationary engine.**
- **Manage rental engine companies and on-site contractors to assure they meet any responsibilities related to the engine compliance program**
 - **Review contract requirements and modify as needed**
- **Operations to document any required engine maintenance and emergency operations**
- **HSE Department should develop training**
- **Establish system, such as engine tags, to document non-road status (<12 months at single location)**