



Existing Engine NESHAP Rulemaking

API Pipeline Conference

April 20-21, 2010

Overview of Engine Rules



Draft - Proposed Existing Engine NESHAP^a Overview^b - Draft

HP	Engine Rule Applicability											
	Major Sources						Area Sources					
	Existing			New/Reconstructed			Existing			New/Reconstructed		
	CI	RB	LB	CI	RB	LB	CI	RB	LB	CI	RB	LB
>1350	Oxy Cat	NSCR		Oxy Cat	NSCR	Oxy Cat	Oxy Cat	NSCR	Oxy Cat	MC	NSCR	CBT
500-1350	Oxy Cat	NSCR		Oxy Cat	NSCR	Oxy Cat	Oxy Cat	NSCR	Oxy Cat	MC	NSCR	CBT
300-500	Oxy Cat	NSCR	Oxy Cat	MC	NSCR	CBT/Oxy Cat	Oxy Cat	NSCR	Oxy Cat	MC	NSCR	CBT
250-300	EL - 230	NSCR	Oxy Cat	MC	NSCR	CBT/Oxy Cat	MMP	NSCR	Oxy Cat	MC	NSCR	CBT
100-250	EL - 230	NSCR	EL	MC	NSCR	CBT	MMP	NSCR	Maint ¹	MC	NSCR	CBT
50-100	MMP	NSCR	EL	MC	NSCR	CBT	MMP	NSCR	Maint ¹	MC	NSCR	CBT
25-50	MMP	EL	EL	MC	NSCR	CBT	MMP	Maint ²	Maint ²	MC	NSCR	CBT
<25	MMP	EL	EL	MC	MC	MC	MMP	Maint ²	Maint ²	MC	MC	MC

Maint¹ – Maintenance requirements for engines not requiring catalyst and >50 hp include changing oil every 500 hours, replacing spark plugs every 1000 hours and inspecting the hoses and belts every 1000 hours.
 Maint² – Maintenance requirements for engines not requiring catalyst and <50 hp include changing oil every 200 hours, replacing spark plugs every 500 hours and inspecting the hoses and belts every 500 hours.
 EL – Emission Limit set for existing engines located at major sources and not requiring catalyst (for LB in PPMvd CO @15% O2)
 MC – Manufacturer Certification is required for almost all diesel, gasoline or LPG fueled engines. MC required for natural gas (NG) fueled engines <25 hp, but voluntary for all other sizes of NG fueled engines.
 CBT – Clean Burn Technology New lean burn are able to meet the Stage 1 emission limits of this rule with at least clean burn technology.
 NSCR – Non-Selective Catalytic Reduction; CI – Compression Ignition; RB – Rich Burn; LB – Lean Burn; MACT – Max Achievable Control Tech

Original RICE MACT Subpart ZZZZ	Consolidated Engine Final Rule NSPS, Subpart JJJJ & Amendments to NESHAP, Subpart ZZZZ
<ul style="list-style-type: none"> Proposed December 19, 2002 Finalized February 26, 2004 Existing if pre 12/19/02 Applies to engines > 500 hp at major sources of HAPs Controls HAPs – formaldehyde Complex administrative burdens for notifications, testing, monitoring and SSM Plans (start-up, shutdown, and malfunctions). Few engines are controlled by this rule. <p>Many companies choose to over control emission to become area source to avoid administratRICE MACT Final Rule</p> <ul style="list-style-type: none"> NESHAP, Sutive burden. Engines <500 hp delayed due to lack of sufficient data. 	<ul style="list-style-type: none"> Proposed June 12, 2006; Final: January 18, 2008 Three separate rules in one <ul style="list-style-type: none"> New Source Performance Standard (NSPS, 40 CFR, Part 60) Subpart JJJJ NESHAP, MACT Small Engine Standard at a Major Source National Emission Standards for Hazardous Air Pollutants (NESHAP) Areas Source Standard Applies to new/reconstructed (after July 12, 2006) spark ignition (SI; natural gas, gasoline or LPG fueled) engines <p>NSPS, Subpart JJJJ Rule Summary</p> <ul style="list-style-type: none"> Controls criteria pollutants (NOx, CO, PM and HC) Some engines have Manufacture Certification requirement (see MC note in table) All engines have maintenance requirements Most engines require performance testing (initial test for engines <500 hp, initial and every 8760 hours for engines >500 hp). <p>NESHAP, Subpart ZZZZ Rule Summary</p> <ul style="list-style-type: none"> Most engine categories demonstrate NESHAP compliance by NSPS compliance <ul style="list-style-type: none"> CO and VOCs are used as a surrogate for HAPs (predominately formaldehyde) No NESHAP requirements, notifications or General Provisions apply Lean burn engines between 250 hp and 500 hp at major sources have requirements that are identical to the 2004 RICE MACT (except that new/ reconstructed/existing threshold date is June 12, 2006) Restricts definition of emergency and adds requirements for these engines.

Existing SI Engine NESHAP Proposed Rule	Final Diesel Existing Engine NESHAP
<p>General Rule Information</p> <ul style="list-style-type: none"> Proposal published March 4, 2009 Consent decree final SI Rule Deadline - August 10, 2010 Existing if constructed before 6/12/2006 Two new engine groups covered <ul style="list-style-type: none"> All existing engines at area sources Existing engines <500 hp at major sites Revised rules for <ul style="list-style-type: none"> Adds emission standard for startup and malfunction periods for all engines. <p>Basic Issues</p> <ul style="list-style-type: none"> Use of MMP in lieu of controls at rural area sources Cost in economic justification for above the floor emission controls (catalyst). Use of operational variability in the calculation of the MACT floor MMP frequency of 1,440 hrs for all maintenance practices (i.e. oil change, spark plug replacement and hose/belt inspection). Obtain final approval of Method 323 as an alternative formaldehyde test to FTIR 	<p>Final Diesel Existing Engine NESHAP</p> <ul style="list-style-type: none"> Final Rule Published March 3, 2010 SSM Provision Effective Date – May 3, 2010; includes currently regulated SI major source engines Existing Engine Compliance Date – May 3, 2013 <p>Improved Requirements</p> <ul style="list-style-type: none"> 200 hr oil change frequency for small engines (<300 hp) increased to 500 hr for emergency and 1000 hr for non-emergency engines. Emission limits for emergency and <100 hp at major sources replaced by maintenance management practice (MMP) Increased emission limit/decrease control efficiency <ul style="list-style-type: none"> 300-500 hp – 49 PPMvd CO or 70% Reduction >500 hp – 23 PPMvd CO or 70% Reduction Added an oil condition analysis (OCA) option to changing the oil. Start-up work practice allowance of max. 30 min. for warm-up w/o EL. SSM Plans requirements appear to be removed, but test still vague. <p>New or More Stringent Requirements</p> <ul style="list-style-type: none"> Malfunction emission limit raised from MACT Floor to same as in normal operation Added MMP requirement to inspect air filter every 1000 hr Added requirement for crankcase ventilation control of oil mist, particulate and metallic HAPs for engines ≥300 hp.

^aNESHAP – National Emission Standards for Hazardous Air Pollutants, found in 40 CFR, Part 63.

^bThis is a **Draft Overview Only** and is **NOT intended to be used as a compliance tool** because regulatory requirements have been left out for simplification and brevity. Its purpose is to promote a general understanding of the multiple new regulations that cover Internal Combustion Engines (ICE).

^cNSPS – New Source Performance Standard, found in 40 CFR, Part 60.

Existing Engine Rules



2004 RICE (Recip. Internal Combustion Engine) MACT

- Applies only to engines >500 hp at major sites
- Few engines are covered by this rule.

2006 CI, ICE (a.k.a. Diesel Engine) NSPS, Subpart IIII

- New threshold date – July 11, 2005
- Manufacture Certification Philosophy, Similar to Vehicle

2008 SI (Spark Ignited), ICE NSPS, Subpart JJJJ

- Applies to All New/Rec. Engines – June 12, 2006
- API Litigation to resolve remaining issues

2008 Amendments to NESHAP, Subpart ZZZZ

- Most engine comply via NSPS compliance
- Lean-burn engines >250 hp & <500 hp added to RICE MACT



Existing Engine NESHAP

- Good News - Existing engines - 3 years to comply
- Diesel Rule - Published March 3, 2020
- Spark Ignition Rule – August 10, 2010
- Applicability – About 95% of All Engines
 - Major source engines <500 hp
 - All area source engines
- Most engines require catalyst
- Engines w/o catalyst covered by maintenance requirements

Final Diesel Rule Differences from Proposal



- Increased emission limit/decrease control efficiency
 - 300-500 hp – 49 PPMvd CO or 70% Reduction
 - >500 hp – 23 PPMvd CO or 70% Reduction
- Added requirement for crankcase ventilation control of oil mist, particulate and metallic HAPs for engines >300 hp.
- Emission limit for 100 – 300 hp engines at major HAP sites is 230 PPMvd CO.
- Emission limits for emergency and <100 hp at major sources replaced by maintenance management practice (MMP)

Maintenance Management Practices



- 200 hr oil change frequency for small engines (<300 hp) increased to 500 hr for emergency and 1000 hr for non-emergency engines.
- 500 hr oil change frequency remain for engines above 300 hp
- Added an oil condition analysis (OCA) option to changing the oil.
- Added MMP requirement to inspect air filter every 1000 hr

SSM Provisions



- SSM Provisions apply to all MACT Engines covered by existing rules.
- Compliance date – May 3, 2010
- Start-up work practice allowance of max. 30 min. for warm-up w/o EL.
- SSM Plans requirements appear to be removed, but text still vague.
- Malfunction emission limit raised from MACT Floor to same as in normal operation
- Continue discussions during SI rule development.
- Big concern as precedent in other NESHAP rules.



Key Concerns With Proposed Rule

- Above the Floor Emission Reductions
 - Require Max. Achievable Emission Reduction Considering Economics and Environmental Co-benefits.
 - EPA capital cost about 1/10th Industry's Estimate.
 - EPA annual cost low by a 1/4th.
 - EPA catalyst reductions started from MACT Floor, not a more realistic value.
- Sub-categories with special considerations (Work Practices)
 - **Rural Area Source Engines**
 - Small rich burn engines,
 - engines in cyclical duty, standby, and intermittent use applications (e.g., air compressors, stationary cranes, pumps, and emergency generators),
 - 2SLB engines - low exhaust temperature and/or back pressure making catalytic reduction difficult (e.g., Ajax engines & large bore slow speed 2SLB class engines),

Key Concerns With Proposed Rule (Cont.)



- MACT Floor Emission Limits (Minimum per CAA)
 - MACT floor for engines is no control, but Courts require an emission limit for major facilities.
 - Existing source - average achieved by best performing 12%.
 - May include variability of the best performing 12%.
 - EPA based MACT floors on almost no data.
 - Must provide quality data to improve the MACT floors.
 - **Less of a concern due to precedent in diesel rule** – MACT Floor emission limit only used for engines at major HAP source that does not require controls.

Key Concerns With Proposed Rule (Cont.)



- Maintenance Work Practices (for engines without catalyst)
 - Engines >50 hp require oil change every 500 hours, replacing spark plugs and inspecting the hoses and belts every 1000 hours.
 - Engines <50 hp require oil change every 200 hours, replacing spark plugs and inspecting the hoses and belts every 500 hours.
 - MMP frequency of 1,440 hrs for all maintenance practices (i.e. oil change, spark plug replacement and hose/belt inspection).
- Obtain final approval of Method 323 as an alternative formaldehyde test to FTIR

Q & A Session

