

## MEMORANDUM

Date: January 18, 2008

To: INGAA MACT / NSPS Task Group

From: Jim McCarthy, IES Inc.

Re: EPA Final Rules – Spark Ignition IC Engine NSPS and IC Engine NESHAP Amendments

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Consistent with the deadline established by Consent Decree, EPA signed the Spark Ignition (SI) Internal Combustion (IC) Engine New Source Performance Standards (NSPS) and revisions to the IC Engine National Emissions Standards for Hazardous Air Pollutants (NESHAP) on December 20, 2007. The “signature version” of the Final Rules was posted on EPA’s website on December 21, 2007. The NSPS and NESHAP amendments were published in the Federal Register (FR) on January 18, 2008. Because this action is considered a “major rule” (i.e., it is likely to have an annual affect on the economy of \$100 million or more), the rule effectiveness date is March 18, 2008, which is 60 days after FR publication.

The NSPS for spark ignited IC engines is 40 CFR Part 60, Subpart JJJJ. In addition to the NSPS, the Final Rules include amendments to the IC engine NEHSAP (i.e., amendments to the existing RICE MACT), which is 40 CFR Part 63, Subpart ZZZZ. The NSPS affects all spark-ignited IC engines, regardless of size. The NESHAP amendments address IC engines 500 hp and smaller at major HAPs sources and all IC engines at area sources. An area source is a HAPs source that is not a major source. In addition to these rules, the related NSPS for compression ignition (i.e., diesel-fired) IC engines was published in the Federal Register on July 11, 2006. Compression ignition engines are also addressed in the NESHAP amendments.

This memo provides an overview of key provisions in the Final Rules and discusses significant changes since proposal. In addition, primary INGAA issues not addressed in the Final Rules are briefly discussed, along with EPA’s stated plan to re-visit the NESHAP for existing IC engines. The memo addresses engines that are most relevant for the natural gas transmission industry, with a focus on natural gas-fired IC engines. Some of the new requirements for smaller engines (i.e., less than 100 hp) are complicated by their reliance on mobile source regulatory compliance criteria. Requirements for these engines are summarized in this memo, but a detailed discussion of complexities and potential implementation issues is not provided.

### **Summary of Major Changes since Proposal**

The Final Rules include revisions that address some of the INGAA comments on the proposed rule. The preamble to the Final Rules includes some discussion of EPA’s responses to comments, and EPA recently posted the complete Response to Comments Memo on its website. A separate memo will be provided later this month that discusses the disposition of the INGAA comments in the October 2006 comment letter submitted to EPA. Several of the changes in the Final Rule are generally consistent with INGAA comments and subsequent dialogue with EPA since the rule proposal. A summary of key changes in the Final Rule include:

- Manufacturer O&M requirements and Compliance Monitoring: The proposal required owners and operators (O/O) to follow manufacturer-defined operating and maintenance (O&M) specifications for the engine and control device, regardless of whether the engine was certified or not. The Final NSPS requires:

- For an engine that *is not certified*, the O/O must keep a maintenance plan and maintenance records, and conduct performance testing for all engine sizes. This is a one time test for engines >25 hp to 500 hp, and a periodic test for engines >500 hp.
- If the engine purchased *is certified*, the Final NSPS states that the O/O must “adjust engine settings according to and consistent with the manufacturer’s instructions”. Then, the O/O may choose to :
  - Follow manufacturer O&M instructions and maintain records, in which case, testing is not required.; OR
  - If the O/O does *not* follow the manufacturer’s O&M instructions for a certified engine, then the O/O must keep a maintenance plan and maintenance records, and conduct performance testing for all engines  $\geq 100$  hp. This is a one time test for engines from 100 to 500 hp and periodic test for engines >500 hp.

Note: Adjusting “engine settings” and selecting manufacturer versus operator-defined O&M procedures appear to be two separate requirements in the Final Rule. It appears that these provisions are intended to add the operator-defined compliance approach advocated by INGAA that eliminates the proposal *requirement* to follow manufacturer O&M procedures. In meetings subsequent to the comments, EPA committed to adding an approach based on operator-defined O&M and clarifying rule requirements. However, the rule text is complex and may be difficult to interpret for some state/local agencies; this is discussed further below.

- NSPS compliance addresses NESHAP requirements in most cases: INGAA commented on compliance, reporting, and recordkeeping complexities and overlapping burden for the NSPS and NESHAP. EPA simplified the Final NESHAP by adding a provision that indicates compliance with the NESHAP is achieved by complying with the NSPS for all area source engines and most major source engines affected by the amendments. The exception is major source 4-stroke lean burn (4SLB) engines from 250 – 500 hp, which must meet RICE MACT requirements for 4SLB engines >500 hp.
- Concentration-based alternative limits: The Final NSPS added concentration-based alternative limits for NO<sub>x</sub>, CO and VOCs (in ppmv at 15% O<sub>2</sub>). The O/O may choose to comply with g/bhp-hr standards or ppmv standards.
- VOC replaces NMHC: NMHC was the regulated hydrocarbon in the proposal and that has been changed to VOC. VOC excludes methane and ethane per the definition at 40 CFR 51.100(s).
- VOC excludes formaldehyde: The Final NSPS defines VOC to exclude formaldehyde. This is stated in several NSPS sections, including NSPS Table 1, footnote d, which indicates, “For purposes of this subpart, when calculating emissions of volatile organic compounds, emissions of formaldehyde should not be included.”
- Compliance dates: Compliance dates for new engines are based on the IC engine manufacture date. Due to the timing required to implement certification, EPA relaxed some of the dates that were in the proposed NSPS. The Tables below indicate the manufacture date for different engine subcategories. Engines modified or reconstructed after the June 12, 2006 proposal date are also affected units.
- Size-based distinctions: The Final NSPS adopts a 100 hp size threshold for non-emergency engines, and these engines must meet nonroad emission standards in 40 CFR Part 90 or Part 1048, as follows:
  - Non-emergency engines  $\leq 25$  hp are subject to the nonroad emission standards in Part 90 and require certification.

- Non-emergency engines larger than 25 hp and less than 100 hp are subject to the nonroad emission standards in Part 1048. Certification to Part 1048 is voluntary for natural gas-fired engines. In addition, the standards include a nominal allowance in the emissions standards for certification versus field performance tests (discussed further below). Also, Part 1048 includes “NO<sub>x</sub> + HC” limits, but the rule indicates that HC can be assumed to be zero for natural gas-fired engines.
- Natural gas-fired IC engines  $\geq 100$  hp and emergency engines are subject to the emission standards in Table 1 of Subpart JJJJ (Table 3 below).
- Additional detail on the emission standards are in the tables provided below.
- Emergency engine emission limits: EPA added separate size-based subcategories and requires natural gas-fired emergency engines  $\geq 130$  hp to comply with emission standards commensurate with LEC technology. EPA identified a small lean burn engine (130 hp) that it believes can comply. For units smaller than 130 hp (and  $>25$  hp), a higher emission standard was added to the Final Rule. However, the 10g/bhp-hr standard is for NO<sub>x</sub> + HC. New information has been posted in the Docket and a review will be completed to better understand EPA’s justification for this Final Rule requirement. This implies that HC, including *methane*, may be regulated under this requirement.
- Emergency engine definition: INGAA had requested that EPA rely on the consensus definition from the 2002 RICE MACT, including criteria in that definition related to runtime allowances and the ability for limited runtime in non-emergency, non-readiness test situations. EPA did not adopt the RICE MACT definition, but added some flexibility to allow an engine to run up to 50 hours per year for non-emergency purposes. This 50 hours of run time counts towards the 100 hour maximum allowed for readiness testing. In addition, EPA clarified that the run time cannot be used for the purposes of financial gain (e.g., peak shaving or generating electricity for sale to the grid). For the NESHAP definition, EPA clarified applicability dates for the definition under the existing RICE MACT versus the “new” definition.
- VOC test methods: EPA added Method 18 and extractive FTIR (Method 320 or ASTM D6348-03) for VOC measurement. Additional discussion on VOC test methods is provided below. EPA also included the extractive FTIR methods as acceptable methods for NO<sub>x</sub> and CO.
- Performance test requirements: The proposal did not specify operating constraints for the performance test (e.g., load), thus implying that the emission limits apply at all loads. The Final NSPS indicates that the performance test must be conducted within 10 percent of 100 percent peak load (or the highest achievable).
- “Useful Life” terminology: INGAA objected to using the mobile source term “useful life” in these regulations. The Final Rule changed the term to “Certified Emissions Life” and also revised the definition.

### **Summary of Final Rule Requirements:**

Additional detail on the requirements in the Final Rule follows:

- Applicability: The rule affects units that commence construction, reconstruction or modification after June 12, 2006 (the date of the proposal). However, applicability dates are based on the manufacture date. For new engines, the dates range from July 1, 2007 to January 1, 2009 depending upon the engine size and application. These category-specific dates are shown in Tables 2 and 3

below. In addition, existing units that are modified or reconstructed after the rule proposal date of June 12, 2006 are affected units.

- NESHAP Compliance and NSPS Link: Most engines affected by the NESHAP amendments comply by meeting NSPS requirements. This is a simplifying change from the proposal.
  - The exception is new or reconstructed 4SLB IC engines from 250 to 500 hp located at major HAP sources. For these engines, the requirements for new 4SLB IC engines larger than 500 hp under the existing RICE MACT apply (i.e., either reduce CO emissions by  $\geq 93$  percent or limit formaldehyde to  $\leq 14$  ppmv). These engines would also be required to meet the requirements in the final SI NSPS, but do not have to comply with the CO emission standards of the SI NSPS if in compliance with the NESHAP. The applicability date for these units is June 12, 2006.
  - Other new or reconstructed engines at major HAP sources and all area source engines, must meet the requirements of the final spark ignition IC engine NSPS (40 CFR part 60, subpart JJJJ). Thus, if a new or reconstructed engine in this category complies with 40 CFR Part 60, Subpart JJJJ (or Subpart IIII for compression ignition engines affected by the NESHAP amendments), the unit is also in compliance with 40 CFR Part 63, Subpart ZZZZ.
- Certification versus Owner / Operator Monitoring and Performance Tests for Compliance:
  - For *non-certified* engines, the O/O must conduct performance tests, and maintain an O&M plan and maintenance records. A one-time test is required for engines 500 hp and smaller. Engines  $\geq 500$  hp must complete an initial test with subsequent tests every 8760 hours of operation or three years, whichever comes first. A performance test is not required for engines 25 hp or smaller because certification is mandatory.
  - For *certified* engines, the O/O must adjust engine settings consistent with manufacturer instructions. In addition:
    - If the O/O follows manufacturer O&M instructions, then records must be retained and performance tests are not required.
    - If the O/O *does not* follow manufacturer O&M instructions, then the O/O must conduct performance tests, and maintain an operator-defined O&M plan and maintenance records. A one-time test is required for engines from 500 hp to 100 hp. Engines  $\geq 500$  hp must complete an initial test with subsequent tests every 8760 hours of operation or three years, whichever comes first. A performance test is not required for certified engines smaller than 100 hp that follow operator-defined O&M procedures.
- Pollutants: NO<sub>x</sub>, CO and VOC are regulated under the NSPS. Despite comments questioning the need and environmental benefit from CO and VOC standards, EPA retained those pollutants in the Final Rule. As noted above, NMHC was replaced by VOC and formaldehyde is excluded from the VOC limit. For the NESHAP, NSPS limits apply, except for 4SLB IC engines from 250 to 500 hp at major sources, which must meet the CO percent reduction or formaldehyde ppmv limit from the existing RICE MACT.
  - EPA includes “NO<sub>x</sub> + HC” limits for some engines. For engines >25 to 100 hp, the rule indicates that HC can be assumed as zero for natural gas-fired units. For emergency engines <130 hp, a change in the emission standard to 10 g/bhp-hr “NO<sub>x</sub> + HC” needs to be more closely investigated.

- Form of the Standard: EPA added concentration-based standards (in ppmv at 15% O<sub>2</sub>) for units that require performance tests. The limits are shown in Table 3. For VOC, the ppmv limit is based on a propane (C<sub>3</sub>H<sub>8</sub>) standard. Operators may comply with the ppmv or g/bhp-hr limits.
- Level of the Standard and Size-Specific Criteria: The following Tables present the emission standards for different size categories and include engine manufacture dates. These tables are based on the Tables 1, 2 and 4 in the preamble of the Final Rules and Table 1 of the NSPS.
  - Table 1 presents certification standards for engines  $\leq 25$  hp manufactured after July 1, 2008.
  - Table 2 (which is Table 3 from the preamble) provides *field performance test standards* for natural gas-fired engines  $>25$  to  $<100$  hp. If a manufacturer opts for voluntary certification, then slightly more stringent standards exist.
    - For these engines, EPA added an emissions margin for certification versus field tests.
    - These standards are from Part 1048. For example, certification requires NO<sub>x</sub> of 2.0 g/bhp-hr and CO of 3.3 g/bhp-hr; field performance test standards require NO<sub>x</sub> of 2.8 g/bhp-hr and CO of 4.8 g/bhp-hr.
    - The Part 1048 standard is “NO<sub>x</sub> + HC” but zero HC is assumed for natural gas-fired units.
    - Additional allowances for NO<sub>x</sub> versus CO tradeoff are provided in an equation in the table footnote.
  - Table 3 presents the standards for gas-fired engines 100 hp and larger and emergency engines. This is analogous to Table 4 from the preamble and Table 1 in Subpart JJJJ. Although not discussed in the memo, landfill and digester gas standards are included so that the table is consistent with the tables in the rule.
    - Note that for test frequency, the rule text indicates that a unit rated at exactly 500 hp is in the “smaller” size category (i.e.,  $\leq 500$  hp). This is consistent with the threshold in the existing RICE MACT. However, the rule text and NSPS Table 1 requirements for manufacture date applicability indicates that a 500 hp engine is in the “larger” size category ( $\geq 500$  hp). INGAA commented on this issue, but EPA did not address it in the Final Rule.
  - For modified or reconstructed natural gas-fired engines, §60.4233(f)(4) provides a NO<sub>x</sub> limit of 3.0 g/bhp-hr or 250 ppmv.
  - In addition, §60.4233(g) allows operators firing wellhead gas with high sulfur to petition for compliance with emission standards no higher than the limits for emergency engines  $<130$  hp (e.g., 10 g/bhp-hr for NO<sub>x</sub> + HC).

**Table 1. Engines 25 hp and Smaller – Certification Required;** Certification NO<sub>x</sub>, HC, NMHC, and CO Emission Standards in g/KW-hr (g/hp-hr) for Stationary SI Engines ≤19 KW (25 hp)

Engine Class <sup>a</sup>	Emission Standards in g/KW-hr (g/HP-hr) <sup>b</sup>		
	HC + NO <sub>x</sub>	NMHC + NO <sub>x</sub> <sup>c</sup>	CO
I	16.1 (12.0)	14.8 (11.0)	610 (455)
I-A	50 (37)	--	
I-B	40 (30)	37 (27.6)	
II	12.1 (9.0)	11.3 (8.4)	

<sup>a</sup> Class I-A: Engines with displacement less than 66 cubic centimeter (cc); Class I-B: Engines with displacement greater than or equal to 66 cc and less than 100 cc; Class I: Engines with displacement greater than or equal to 100 cc and less than 225 cc; Class II: Engines with displacement greater than or equal to 225 cc.

<sup>b</sup> Modified and reconstructed engines manufactured prior to July 1, 2008, must meet the standards applicable to engines manufactured after July 1, 2008.

<sup>c</sup> NMHC+NO<sub>x</sub> standards are applicable only to natural gas fueled engines at the option of the manufacturer, in lieu of HC+NO<sub>x</sub> standards.

**Table 2. Field Performance Test Standards for Gas-Fired Engines from 25 to 100 hp.** NO<sub>x</sub>, HC, and CO Emission Standards in g/KW-hr (g/hp-hr) for Owners/Operators of Stationary Non-Emergency SI Natural Gas Engines 19<KW<75 (25<hp<100) and Lean Burn LPG Engines 19<KW<75 (25<hp<100); (This is Table 3 in the preamble of the Final Rule)

Maximum Engine Power	Manufacture Date	Emission Standards in g/KW-hr (g/HP-hr) <sup>a,b</sup>	
		HC + NO <sub>x</sub>	CO
25<hp<100 <sup>c</sup>	July 1, 2008	3.8 (2.8)	6.5 (4.8)
	July 1, 2008 severe duty	3.8 (2.8)	200.0 (149.2)

<sup>a</sup> You may apply the following formula to determine alternate emission standards that apply to your engines instead of the standards in paragraph in Table 3 of this preamble:  $(HC+NO_x) \times CO^{0.791} \leq 16.78$ . HC+NO<sub>x</sub> emission levels may not exceed 3.8 g/kW-hr and CO emission levels may not exceed 31.0 g/kW-hr.

<sup>b</sup> For natural gas fueled engines, you are not required to measure non-methane hydrocarbon emissions or total hydrocarbon emissions for testing to show that the engine meets the emission standards of Table 3 of this preamble; that is, you may assume HC emissions are equal to zero.

<sup>c</sup> Modified and reconstructed engines between 25 and 100 HP manufactured prior to July 1, 2008, must meet the standards applicable to engines manufactured after July 1, 2008.

**Table 3. Gas-Fired Engines  $\geq$  100 hp and Emergency Engines.** NO<sub>x</sub>, CO, and VOC Emission Standards for Stationary SI Engines  $\geq$ 100 hp (except gasoline and rich burn LPG), Stationary SI Landfill/Digester Gas Engines, and Stationary Emergency Engines  $>$ 25 hp (This is Table 4 in the preamble and Table 1 of the NSPS)

Engine Type and Fuel	Maximum Engine Power	Manufacture Date	Emission Standards <sup>a</sup>					
			g / bhp-hr			ppmv (at 15% O <sub>2</sub> )		
			NO <sub>x</sub>	CO	VOC	NO <sub>x</sub>	CO	VOC
Non-Emergency SI Natural Gas and Non-Emergency SI Lean Burn LPG	100 $\leq$ hp < 500	7/1/2008	2.0	4.0	1.0	160	540	86
		1/1/2011	1.0	2.0	0.7	82	270	60
Non-Emergency SI Lean Burn Natural Gas and LPG	500 $\geq$ hp < 1,350	1/1/2008	2.0	4.0	1.0	160	540	86
		7/1/2010	1.0	2.0	0.7	82	270	60
Non-Emergency SI Natural Gas and Non-Emergency SI Lean Burn LPG*	hp $\geq$ 500	7/1/2007	2.0	4.0	1.0	160	540	86
		7/1/2010	1.0	2.0	0.7	82	270	60
Emergency	25 > hp < 130	1/1/2009	10 <sup>b</sup>	387	N/A	N/A	N/A	N/A
	hp $\geq$ 130		2.0	4.0	1.0	160	540	86
Landfill / Digester Gas*	hp < 500	7/1/2008	3.0	5.0	1.0	220	610	80
		1/1/2011	2.0	5.0	1.0	150	610	80
	hp $\geq$ 500	7/1/2007	3.0	5.0	1.0	220	610	80
		7/1/2010	2.0	5.0	1.0	150	610	80
Landfill / Digester Gas Lean Burn	500 $\geq$ hp < 1,350	1/1/2008	3.0	5.0	1.0	220	610	80
		7/1/2010	2.0	5.0	1.0	150	610	80

\* except lean burn engines 500 $\geq$ HP<1,350

<sup>a</sup> Owners and operators of stationary non-certified SI engines may choose to comply with the emission standards in units of either g/hp-hr or ppmvd at 15 percent O<sub>2</sub>.

<sup>b</sup> The emission standards applicable to emergency engines between 25 HP and 130 HP are in terms of NO<sub>x</sub>+HC.

- Emission Limits – Applicability: Performance test operating requirements imply the associated applicability of emission standards. The proposal did not discuss operating requirements for the performance test. The Final NSPS requires that the performance test be conducted at high load: “Each performance test must be conducted within 10 percent of 100 percent peak (or the highest achievable) load.” In a related matter for certification, the test duty cycles have been revised.
- Performance Test Requirements: As noted above, the performance test requirement was changed to a single, high load test based on three test runs. Tests are required for uncertified engines or certified engines that use operator defined O&M procedures rather than manufacturer O&M instructions. Requirements and frequency are as follows for natural gas-fired engines:
  - Engines >500 hp must complete an initial compliance test and subsequent tests every 8760 hours of operation or 3 years, whichever comes first.
  - *Uncertified* engines  $\geq 25$  hp and  $\leq 500$  hp must complete an initial compliance test, with no subsequent tests required.
  - *Certified* engines  $\geq 100$  hp and  $\leq 500$  hp that follow operator-defined O&M procedures must complete an initial compliance test, with no subsequent tests required.
  - Engines  $\leq 500$  hp with an initial performance test requirement must conduct a subsequent test after the engine is rebuilt or undergoes major repair or maintenance. “Rebuilt” is defined in 40 CFR 94.11(a), but “major repair or maintenance” is not defined.
- Performance Test Methods: The Final Rule allows federal Reference Methods (e.g., Method 7E for NO<sub>x</sub>) or the ASTM portable analyzer test method for NO<sub>x</sub>, CO and oxygen (ASTM D6522-00). In addition, NO<sub>x</sub> and CO can be measured using extractive FTIR (EPA Method 320 or ASTM Method D6348-03), which was added as an option for VOC tests.

For VOC measurement, the Final Rule includes:

- Method 25A and Method 18;
- Method 25A and the use of a “cutter” per 40 CFR 1065.265;
- Method 18; or
- Extractive FTIR via Method 320 or ASTM Method D6348-03.

The first two COC methods determine VOC “by subtraction”, i.e., attempting to remove methane and ethane from a hydrocarbon measurement. The latter two methods determine VOC by adding components that are quantified individually. Note that INGAA requested that EPA identify the species to include for natural gas-fired sources, but that is not included in the Final Rule. Thus, a “survey” approach to identify the species to include may be required to conduct the test via Method 18 or extractive FTIR. However, INGAA may be able to complete a project to establish the analytes to be included in subsequent tests for natural gas sources (e.g., ethylene and C<sub>3</sub> – C<sub>6</sub> alkanes and alkenes), or challenge EPA further on this topic.

If complying with the g/bhp-hr limit, Method 2 (exhaust measurement) or Method 19 (F-factor based on fuel rate and analysis) can be used to determine exhaust flowrates. The method to determine hp is not defined.

- Monitoring: The compliance monitoring requirements include: certification and adherence to manufacturer O&M procedures; OR, operator defined O&M procedures and performance tests. Differences based on size, etc. are discussed above.

- **Emergency Engines:** Emission limits and several changes since proposal for emergency engines are discussed above. For engines affected under the existing RICE MACT, EPA retains the RICE MACT definition, but clarified that the allowance to run the engine for purposes other than emergencies and readiness testing cannot be used for financial gain (e.g., peak shaving or electricity sales to the grid). A new definition applies to NSPS and all other NESHAP engines, but EPA added an allowance for up to 50 hours of run time for non-emergency, non-readiness testing purposes. This time cannot be used for financial gain. In addition, a new subcategory was added for emergency engines >25 hp to <130 hp. EPA did not intend for small gas-fired emergency engines to require NSCR (i.e., when only rich burn engines are available). Thus, EPA believes that a 130 hp threshold is consistent with the size where a commercially available lean burn exists. As discussed above and shown in Table 3, the limit for small emergency engines is higher than units  $\geq 130$  hp. However, the emission standard is for NO<sub>x</sub> + HC. New information in the Docket needs to be reviewed to better understand EPA's basis and the implications of this requirement.

### **Key INGAA Comments not Integrated into the Final Rule and Discussion of Potential Issues**

A supplementary memo will be provided to the INGAA Task Group later in January that provides an itemized summary of EPA's response to INGAA's October 2006 comments on the proposed rule. A section above highlights key changes that were incorporated into the final rule. In some cases, the recently released Response to Comments document may provide further insight into these issues, and that document will be reviewed in conjunction with the follow-up memo on disposition of INGAA comments. Several key comments and related implementation issues that were *not* resolved in the Final Rule or additional questions based on Final Rule revisions include:

- **Operator-defined O&M procedures:** The new rule text that allows operator-defined O&M procedures may be confusing to state and local agencies with implementation responsibilities. In addition, if only a certified engine is available for purchase, while EPA allows operators to use operator-defined O&M procedures, the operator must still, "adjust engine settings according to and consistent with the manufacturer's instructions". A key INGAA concern was the lack of clarity in the proposal for this issue, and clarity in the Final Rule may still be an issue.
- **Manufacturer O&M:** In regard to O&M requirements or engine set-points, INGAA commented on complexities associated with the stationary source engine market that relies on aftermarket control integration (e.g., NSCR separate from the engine purchase) and third party packagers. This issue was not discussed in the preamble and no rule revisions are apparent.
- **Emission margins:** INGAA comments discussed the need for compliance margins for field versus certification tests. Other than small engines (see Table 2 and the discussion for engines from 25 to 100 hp), EPA did not make changes to address concerns regarding certified versus in-use emissions performance.
- **Best Demonstrated Technology (BDT) and phased emission limits:** EPA retained staged emission standards in the Final Rule and apparently believes that this is commensurate with BDT under NSPS.
- **VOC Test Methods:** EPA added test methods requested by INGAA but has not defined which hydrocarbons constitute "VOC" for methods that are based on addition of the various HCs in the exhaust. In addition, EPA has excluded formaldehyde but not other oxygenated hydrocarbons from the definition of VOC. EPA did not respond to INGAA's request to better define "VOC" for additive methods for natural gas-fired sources. INGAA also requested the EPA account for

analytical response and method concerns for “other” oxygenated hydrocarbons (e.g., acetaldehyde, acrolein, methanol) and the rule leaves that responsibility to the operator – i.e., an operator can quantify method response factors and include that in the VOC determination.

- **“NO<sub>x</sub> + HC” Standards:** EPA has included NO<sub>x</sub> + HC standards for some natural gas-fired engines. For units <100 hp complying with Part 1048, it is assumed that HC is zero. Emergency engines also include NO<sub>x</sub> + HC Methods. While specific implications are not apparent until further review is completed, this “form” of the standard introduces the potential for explicit or implied regulation of *methane* from natural gas-fired sources. This may be undesirable precedent.
- **Environmental Benefit:** INGAA commented on EPA’s need to demonstrate the environmental benefit versus compliance costs for a number of provisions (e.g., CO or VOC limits, control of emergency engines or small engines). These concerns were not directly addressed in the Final Rule (i.e., the requirements remain), and it is not apparent that EPA completed additional analysis. New docket information will need to be reviewed to better characterize the status of this issue.

### **EPA Plans for Additional NESHAP Revisions**

In the preamble to the Final Rule, EPA acknowledges that it will re-visit the NESHAP for *existing* IC engines. Existing area source engines and existing engines 500 hp and smaller at major HAP sources are not affected by the NESHAP amendments. In the proposal, EPA concluded that no emission reductions were required for existing engines (e.g., the MACT floor is “no control” for major sources). In March 2007, the D.C. Circuit Court issued a ruling involving litigation on the Brick MACT that impacts EPA’s ability to issue “no reduction” MACT standards for existing sources. Since EPA used a similar MACT floor methodology for the IC engine NESHAP, EPA intends to re-evaluate the MACT floor for existing major source IC engines  $\leq 500$  hp – consistent with the Brick MACT Court decision. EPA also intends to re-evaluate the standards for existing area sources in light of comments received on the proposed rule.

Thus, the Final Rule does not promulgate any NESHAP standards for existing engines (unless reconstructed). EPA indicates in the preamble that it will initiate a separate rulemaking process focusing on existing sources. EPA intends to gather further information on existing engines and then promulgate standards that will take into account the comments it has received, the intervening court decision, and any new information EPA receives as a part of the rulemaking process. EPA expects to propose standards early in 2009. It is possible that a Consent Decree schedule will be agreed to for this rulemaking. The Final Rules do not mention whether major source engines >500 hp will be included in this review, but EPA previously indicated that the agency will make that decision no later than shortly after the rulemaking is initiated.