UNITED STATES AIR FORCE
COMPLIANCE GUIDE TO
STATIONARY INTERNAL COMBUSTION ENGINES

NATIONAL EMISSION STANDARDS FOR
HAZARDOUS AIR POLLUTANTS
AND
NEW SOURCE PERFORMANCE STANDARDS

Air Force Civil Engineer Center
Compliance Technical Support Branch
250 Goodrich Drive; Building #1650
San Antonio, TX 78226

August 2018

This page intentionally left blank

USAF COMPLIANCE GUIDE TO STATIONARY INTERNAL COMBUSTION ENGINES

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

AND

NEW SOURCE STANDARDS OF PERFORMANCE

Prepared For:

FRANK CASTANEDA, III, P.E., GS-14, DAF
Air Quality Subject Matter Expert
Air Force Civil Engineer Center,
Compliance Technical Support Branch
(AFCEC/CZTQ)
250 Goodrich Drive; Building #1650
San Antonio, TX 78226

Prepared By:

Solutio Environmental, Inc.
13003 Jones-Maltsberger Road
San Antonio, TX 78247
http://www.solutioenv.com

Based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

[SIGNED]

This page intentionally left blank

Table of Contents

List of Tables

This page intentionally left blank

EXECUTIVE SUMMARY

Energy security is an important aspect to military readiness and mission success. To fulfill mission demand, the United States Air Force (USAF) relies on dependable power generation, particularly for equipment necessary to provide critical tactical, strategical, and flight line operations. Essential services such as medical care, fire suppression, and communications also depend on a reliable power source. To address this need, Internal Combustion Engines (ICE) are used in a wide range of applications such as energy generation and powering pumps and compressors. ICE can be used as a back-up power supply or for full-time power generation, depending on the circumstances. However, the combustion gas exhaust from ICE contains substances that can contribute to serious health conditions, particularly among vulnerable populations, such as children and the elderly. For this reason, the EPA promulgated three interrelated federal regulations to control emissions from stationary ICE (ICE that are not mobile). The following table summarizes rule applicability:

Table ES-1. EPA Stationary Internal Combustion Engine Rules

ENVIRONMENTAL PROTECTION AGENCY STATIONARY INTERNAL COMBUSTION ENGINE RULES (Both RICE NESHAP and CI or SI NSPS can apply to the same engine.)		
Rule	**Pollutants Covered**	**Engines Covered**
NSPS[a] for CI ICE[b] (40 CFR 60 Subpart IIII)	Criteria Pollutants[d]	Stationary reciprocating CI ICE, rotary CI ICE, and other CI ICE: • Ordered after 11 July 2005 and manufactured after 1 April 2006 (1 July 2006 for fire pump engines certified by the National Fire Protection Association). • Modified or reconstructed after 11 July 2005.
NSPS for SI ICE[c] (40 CFR 60 Subpart JJJJ)		Stationary reciprocating SI ICE, rotary SI ICE, and other SI ICE: • Ordered after 12 June 2006 and manufactured on/after: - 1 July 2007 if ≥500 bhp[e] (except lean burn 500≤bhp<1,350). - 1 January 2008 if lean burn 500≤bhp<1,350. - 1 July 2008 if <500 bhp. - 1 January 2009 if emergency engine >25 bhp. • Modified or reconstructed after 12 June 2006.
RICE[f] NESHAP[g] (40 CFR 63 Subpart ZZZZ)	HAPs	All existing, new, and reconstructed stationary RICE. - RICE >500 hp at a major source[h] & construction or reconstruction began on or after 19 December 2002 is "new." - All other RICE if construction or reconstruction began on or after 12 June 2006 is "new."

[a]New Source Performance Standards. [b]Compression Ignition Internal Combustion Engine.
[c]Spark Ignition Internal Combustion Engine. [d]Ozone, particulate matter, carbon monoxide, sulfur oxides, nitrogen oxides, and lead.
[e]Brake Horsepower.
[f]Reciprocating Internal Combustion Engine. [g]National Emission Standards for Hazardous Air Pollutants.
[h]A major source is a facility emits has the potential to emit 10 tons per year or more of any HAP or 25 tons per year or more of any combination of HAPs.

This Guide covers all three stationary ICE rules and is organized to provide a four-step path towards compliance:

Introduction – This section discusses the purpose of the Guide and the legal background of the three rules. The purpose of this Guide is to provide affected USAF personnel (air program managers, technicians, maintenance crew, generator operators, etc.) with an understanding of the EPA rules and the associated mandatory compliance activities. The rules have been revised multiple times due to legal challenges and necessary corrections and clarifications. Since the three rules are interrelated, a change in one of the rules will often lead to a review and change in at least one of the other rules as well.

Step One: Engine Classification – This section guides the user through the requirement applicability variables to determine the engine's requirement classification. The rule requirements depend on various factors such as the age of the engine, whether it is reconstructed or modified, whether the engine is located at a major or new source of Hazardous Air Pollutants (HAPs), the design of the engine (combustion or spark ignition), and other factors. However, all three regulations specifically stipulate that only "stationary" ICE are affected. A stationary ICE includes any ICE, except combustion turbines, that converts heat energy into mechanical work and is not mobile. In summary, stationary ICE remains at a location for 12 months or longer, even if the engine is mounted on a portable platform or has wheels. A location is any single site at a building, structure, facility, or installation. There are only three exemptions from the stationary ICE rules:

- Engines at test cells/stands (apparatus used for testing uninstalled engines).
- Engines used for national security purposes.
- Existing (generally installed prior to 12 June 2006) emergency-use engines at residences (e.g., homes, apartment buildings), commercial facilities (e.g., stores, office buildings), and institutions (e.g., hospitals, libraries) located at an area source of HAPs (potential to emit less than10 tons per year of any HAP or less than 25 tons per year of any combination of HAPs). The rules do apply to emergency engines that do not meet the criteria for an exemption, but the standards are more relaxed.

Step Two: Determine Which of the Stationary ICE Rule(s) Apply to the Engine– This section describes how to determine which rule or rules (CI/SI NSPS and/or NESHAP) apply to stationary ICE. Rule applicability is dependent upon the engine size and its model year. Some engines may fall into a regulatory gap and are referred to as "Gap Engines." This is due to the differences in the definition of "commenced construction" and the variability in the applicability dates. The EPA may address the regulatory gap in the future, but there is no indication of the agency doing so at this time. Regardless of the engine's classification, all engines are required to be operated and maintained in accordance with either the manufacturer's recommendations, a manufacturer's approved plan or the minimum requirements acceptable for military installations maintenance and operations, whichever is more stringent.

Step Three: Determine Compliance Requirements – This section breaks down the various compliance requirements according to the three rules. Generally, the stationary RICE NESHAP rule directs most new, reconstructed, or modified engines to their respective CI or SI NSPS rule for compliance. For many of those engines, the only requirement is to be certified to be compliant with an emission "tier level" by the manufacturer and then operated/maintained according to the manufacturer's instructions (or an owner designed plan approved by the manufacturer). Most of the existing engines will be required to undergo at least work and maintenance practices such as oil, air cleaner, spark plug, hose, and belt replacement. The oil change frequency may be extended if an oil analysis demonstrates that the oil has not been contaminated and/or degraded over time and use (condemned). Other requirements may include one or more of the following:

- Monitoring system evaluations.
- Performance/Stack testing (emissions or catalyst activity).
- Installation of non-resettable hour meter.
- Plans (testing, monitoring, maintenance).
- Reporting and notifications.
- Recordkeeping.

Step Four: Comply with the applicable stationary ICE rules – After the compliance requirements for each applicable rule has been determined for the engine, action must be taken to ensure that the engine meets regulations. Penalties for noncompliance can include a civil penalty up to $37,500 per day and criminal charges if the noncompliance is found to be wanton or intentional. State and/or local penalties for noncompliance may also be incurred.

Additional Chapters - This Guide also includes separate chapters focused on special circumstances such as the National Security Exemption (NSE) and Emergency use stationary ICE. Engines classified as "emergency use" must meet stringent operating criteria to maintain the exemption (if applicable) or to be subject to a lower (or no) emission standard. These engines can be operated for an unlimited number of hours during emergencies (more stringent hour limits may be required in some states), but cannot exceed be operated for more than 100 hours for other purposes (all 100 of those hours are available for maintenance and testing, but only 50 of those hours can be used for non-emergencies if there is no financial benefit for the owner/operator).

While, from an environmental perspective, regulatory compliance is ideal, there are situations when compliance with regulatory requirements will result in unacceptable risks to the USAF's mission. All three stationary ICE rules specifically exempt compliance requirements for equipment that are "uniquely military in nature." However, the NSE is not to be taken lightly and should be reserved for bona fide situations when the rules conflict with the USAF's national security mission.

This page intentionally left blank

GUIDE INTRODUCTION

Energy security for military installations is a vital element to military readiness and mission success. United States Air Force (USAF) installations provide a wide range of functions that require a reliable power source:

- Essential services such as medical care, fire suppression, water distribution, and flood control.
- Critical mission support such as weapon systems, communications, computer technologies, training facilities, and flight line operations.

Additionally, military installations often serve as staging platforms for humanitarian needs during a crisis. However, most USAF installations are vulnerable to power disruption because they are dependent on a commercial power grid that is susceptible to failure due to natural disaster, aging infrastructure, and attack (physical and cyber).

Standalone power generators are used at USAF installations so that critical components of a military installation can function independently of the commercial power grid, should the need arise. At many military installations, one or more generators may be tied directly to each mission critical building. Independent power generation is also used to run equipment in situations when a conventional power source should not be relied on or is unavailable, such as on a flight line, at a remote location, or in a building's or aircraft hanger's fire suppression equipment (fire pump).

Independent power generation is usually accomplished through an Internal Combustion Engine (ICE). An ICE combusts fuel with an oxidizer (usually air) in a combustion chamber. The expansion of the high temperature and high-pressure gases, which are produced by the combustion process, applies direct force to the pistons (or nozzle) generating useful mechanical energy. Emissions are formed during combustion and are discharged through exhaust gas (often via a stack or an exhaust pipe). The combustion gas exhaust contains substances that are known or suspected of contributing to cancer and other serious health conditions, particularly among vulnerable populations, such as children and the elderly. For this reason, the United States Environmental Protection Agency (EPA) promulgated rules to control emissions from these engines.

EPA regulates stationary and portable (mobile) ICE differently. This Guide focuses on three interrelated stationary ICE rules (note that there may be additional State and Federal regulations not included in this list):

- National Emissions Standards for Hazardous Air Pollutants (NESHAP) for Stationary Reciprocating Internal Combustion Engines (RICE), also known as Quad Z, RICE NESHAP, or RICE MACT (40 CFR Part 63, Subpart ZZZZ).

- New Source Performance Standards for Stationary Compression Ignition, also known as Quad I, CI NSPS, or NSPS IIII (40 CFR Part 60, Subpart IIII). Diesel fueled generators are an example of a CI engine.
- New Source Performance Standards for Stationary Spark Ignition Internal Combustion Engines, also known as Quad J, SI NSPS, or NSPS JJJJ (40 CFR 60, Subpart JJJJ). These engines are usually fueled by natural gas, liquid propane, gasoline, landfill gas, or digester gas.

1.1 Purpose

This document has been prepared by the Air Force Civil Engineer Center (AFCEC), Compliance Technical Support Branch (CZTQ) to provide certain USAF personnel (air program managers, technicians, generator operators, etc.) with a basic understanding of key requirements for complying with the three interdependent EPA regulations concerning stationary ICE.

This Guide is intended to be used solely as general guidance for navigating the complexities of the stationary ICE rules and highlights important provisions regarding the subject matter. Due to the intricacy of the ICE rules and related regulations, the guidance cannot be expected to encompass every type of compliance situation. Furthermore, the information provided in this Guide, while current as of the date on the front cover, is subject to change as regulatory authorities revise regulations, policies, and forms, and as legal challenges to the rule(s) are mandated. Consequently, the Code of Federal Regulations (CFR) and the Federal Register (FR) should be consulted regularly for updates.

Citations to the regulatory text in the CFR are used throughout this Guide for reference and to assist the user in finding the appropriate regulatory sections. This guidance is not a law or regulation, nor is it intended to replace or revise any underlying regulatory requirements, including federal, state, or local regulations. The information presented here is not legal advice and the Guide must not be used as a legal resource. Although all reasonable efforts were made to ensure that information provided is accurate at the time written, no representations or warranties, implied or otherwise, can be made that this Guide is completely free from errors or omissions.

THIS GUIDE REPLACES AND SUPERSEDES ALL PREVIOUS VERSIONS.

Any questions concerning this document, and/or requests for additional information pertaining to the stationary ICE rules, should be directed to the Air Quality Subject Matter Expert; AFCEC Compliance Technical Support Branch (AFCEC/CZTQ); 250 Donald Goodrich Drive; Building #1650; Lackland AFB, TX 78226.

1.2 Statutory Authority and Regulatory History

Before federal regulations, stationary ICE were subject to an extraordinarily complex system of state and/or local regulations and permitting policies. Beginning in 2004, federal NESHAP and NSPS stationary engine emission requirements were promulgated by the EPA to streamline compliance. The authority for the regulations come from two different sections of the Clean Air Act (CAA). Section 112 of the Clean Air Act (CAA) directs the EPA to develop rules to control HAP emissions from stationary sources. These standards are referred to as NESHAPs and those regulations are codified in 40 CFR 61 and 63 (also known as MACT standards). Similarly, Section 111 of the CAA requires the EPA to control air pollution (criteria pollutants) from new stationary sources. These standards are referred to as NSPS and those regulations are codified in 40 CFR 60. The following table provides a basic comparison of the regulatory structure of the stationary ICE rules:

Table 1-1. Regulatory Comparison of RICE NESHAP and CI/SI NSPS

COMPARISON OF THE STATIONARY INTERNAL COMBUSTION ENGINE RULES			
Rule	**Pollutants Covered**	**Rule Applies to:**	**Regulatory Authority Under the CAA[a]:**
NSPS[b] for CI ICE[c] (40 CFR 60 Subpart IIII) and NSPS for SI ICE[d] (40 CFR 60 Subpart JJJJ)	Criteria Pollutants[h]	New, modified, and reconstructed stationary CI/SI ICE (which includes RICE[e])	Title I, Section 111 (Standards of Performance for New Stationary Sources)
RICE NESHAP[g] (40 CFR 63 Subpart ZZZZ)	HAPs[f]	Existing, new, and reconstructed stationary RICE	Title I, Section 112 (HAPs)

[a]Clean Air Act.
[b]New Source Performance Standards.
[c]Compression Ignition Internal Combustion Engine.
[d]Spark Ignition Internal Combustion Engine
[e]Reciprocating Internal Combustion Engine.
[f] Hazardous Air Pollutants.
[g]National Emission Standards for HAPs.
[h]Ozone, particulate matter, carbon monoxide, sulfur dioxides, nitrogen dioxides, and lead.

The EPA proposed the first stationary ICE rule in 1979, but a rule was not finalized until 2004. In the following years, EPA revised the rules many times to subject additional engines to the rules, to correct minor errors, and to address legal actions taken by various industry and environmental groups. Due to the relationship between the stationary ICE rules, whenever there is a change in one of the rules, the EPA frequently revisits the other rules to ensure consistency, which often leads to even further revisions. Also, in addition to the actual stationary ICE rules themselves, EPA published memorandums, guidance, letters, compliance tools, training

materials, and templates relating to all three rules. The following table demonstrates how the rules were designed to capture additional types of stationary ICE with each promulgation:

Table 1-2. History of the RICE NESHAP and CI/SI NSPS Rules

HISTORY OF FINAL RICE NESHAP AND CI/SI NSPS RULES			
Date	**Rule**	**Type of Engines Covered**	**Federal Register Reference**
June 2004	NESHAP	Existing and new engines >500 bhp at major sources	69 FR 33474
June 2006	CI NSPS	New CI engines	71 FR 39154
January 2008	SI NSPS	New SI engines	73 FR 3568
	NESHAP	New engines • ≤500 bhp at major sources • All hp at area sources	73 FR 3568
March 2010	NESHAP	Existing CI engines • ≤500 bhp at major sources • All hp at area sources ○ non-emergency CI >500 bhp at major sources	75 FR 9648
August 2010	NESHAP	Existing SI engines • ≤500 bhp at major sources and • All hp at area sources	75 FR 51570
June 2011	CI NSPS SI NSPS	Amendments for CI and SI engines	76 FR 37954
January 2013	NESHAP CI NSPS SI NSPS	• Reconsideration of 2010 NESHAP • Minor amendments to NSPS for CI and SI engines	78 Fr 6674
July 2016	CI NSPS	• Amendments to NSPS for CI engines	81 FR 44212

1.2.1 Vacatur of Demand Response Allowance for Emergency Engines

On 1 May 2015, the U.S. Court of Appeals for the District of Columbia Circuit issued a decision which vacated (rendered null and void) portions of all three stationary ICE rules. The rules allowed emergency stationary ICE to be used up to 15 hours per year for emergency demand response if utility authorities "determined there are emergency conditions that could lead to a potential electrical blackout, such as unusually low frequency, equipment overload, capacity or energy deficiency, or unacceptable voltage level" (75 FR 9677). Because of the court ruling, the allowance was remanded for all three ICE rules, and the rules automatically reverted to previous final versions. The EPA requested and received a stay (suspension) of the court's decision until

1 May 2016. Although the EPA has not yet revised the rules to reflect the vacatur, engines that qualified as "emergency engines" under the emergency demand response provisions may no longer operate for any number of hours unless these engines either:

- Comply with the emission standards and other requirements applicable for a non-emergency engine; or
- Qualify as an emergency engine under the remaining criteria (e.g., unlimited hours for actual emergency use, 100-hour limit for maintenance checks/readiness testing which may include 50-hours to supply non-emergency power if not part of a financial arrangement with another entity).

1.3 How to Use This Guide

Using a methodical approach will simplify the process of navigating through the federal stationary ICE regulations. The guidance is organized around four key steps toward compliance. Each step is elaborated with detailed explanations to guide the user through the process:

- **Step One (1)**: Determine the engine classification by using applicability variables. Familiarity with the engine is essential to determine whether the engine is exempt and which rule(s) and which compliance requirements are applicable.
- **Step Two (2)**: Determine which rule(s) apply to the stationary ICE based on the engine classification. New engines are usually subject to both the RICE NESHAP and one of the NSPS rules. Older engines will be subject to only the RICE NESHAP.
- **Step Three (3)**: Determine which rule requirements apply to the stationary ICE (per applicable rule). This step is broken down according to the three stationary ICE rules. Depending on the engine, the compliance requirements can vary from simply purchasing a certified engine and then maintaining/operating the engine per manufacturer's instructions to work practices and performance testing.
- **Step Four (4)**: Comply with the applicable rule(s) and requirements. The final step in the compliance process is to actually perform the activities as required and then document the completion of such activities. Failure to comply can result in substantial civil and/or criminal penalties (reprimands, fines, and/or imprisonment). Take note that the engine may also be subject to state and/or local regulations which may be more stringent than those contained in the stationary ICE rules.

This Guide also includes separate chapters focused on special circumstances such as the National Security Exemption and emergency-use stationary ICE. For clarity, the appendix contains supplementary documents and tables that are overly cumbersome to include in the main text of the Guide. For reference, an acronym and definition section is also included at the end of the Guide.

This page intentionally left blank

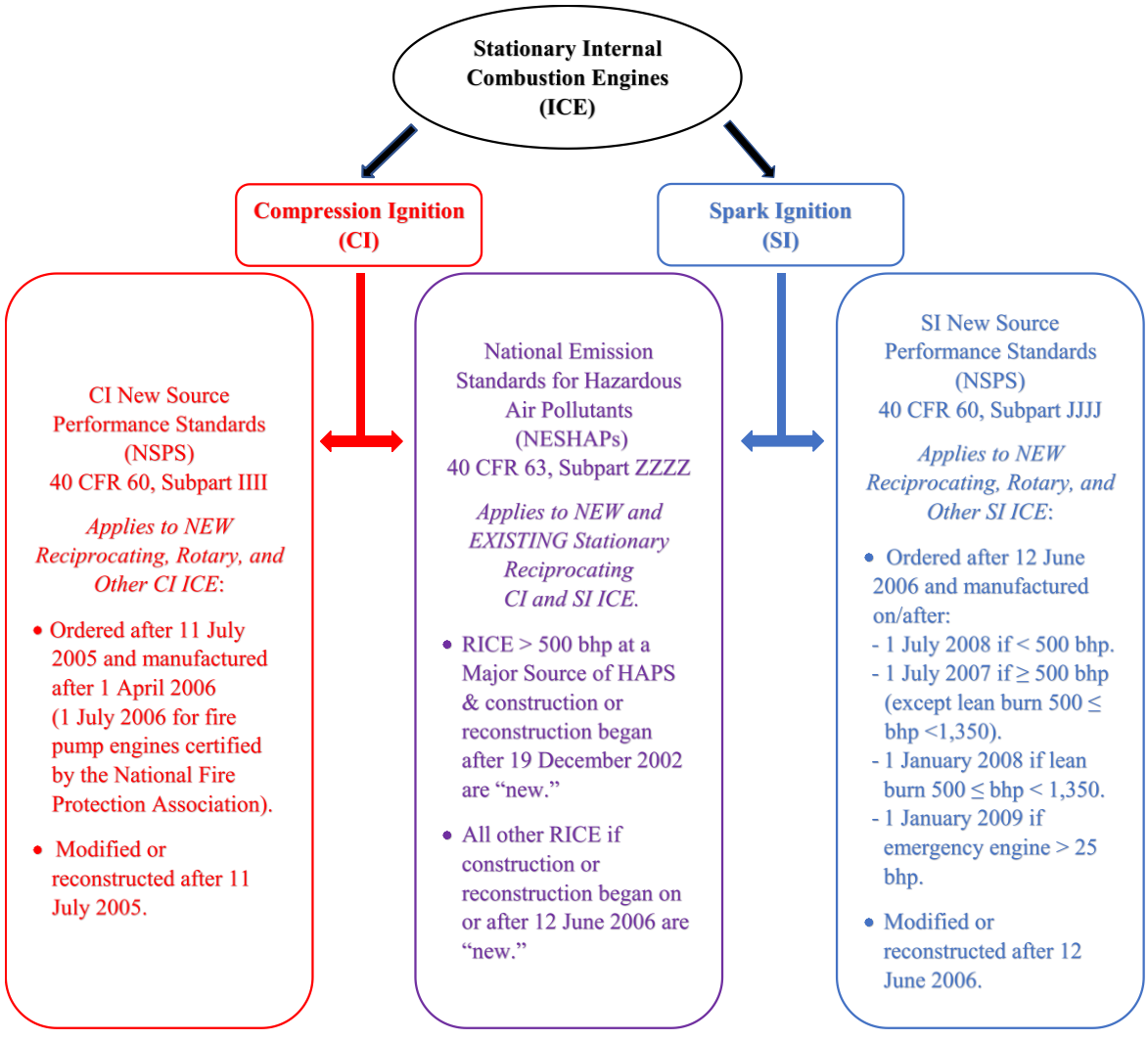
STEP 1: ENGINE CLASSIFICATION

NOTE: The engine itself drives rule applicability and the associated requirements; therefore, the information needed to determine engine classification is specific to the engine and not the attached equipment (e.g., the information attached to the engine and not the generator component of a generator-set contains determines which rule(s) apply and the requirements for that particular engine).

2.1 Importance of Engine Classification

The stationary ICE rule applicability factors and rule requirements are defined by criteria such as whether the engine is located at a facility that is an area or a major source for Hazardous Air Pollutants (HAPs), whether the engine is new or existing, whether the engine is compression ignition or spark ignition, or whether the engine is used only for emergencies. The flowchart below demonstrates how the stationary rules relate to each other and how certain engine criteria factor into governing which rule applies to the engine:

Figure 2-1. Stationary Engine Rule Flowchart



2.2 Required Engine Data

Although gathering as much relevant engine information as possible is important, stationary ICE data does not have equal priority for every engine. For example, accuracy of the dates the engine was constructed, manufactured, and ordered is most important for engines constructed or manufactured during the 2005 through 2007 transition years for the stationary ICE rules. The following table depicts what information pertains to certain types of engines:

Table 2-1. Required Stationary ICE Data

REQUIRED STATIONARY ICE DATA			
	Model Years 2006 and Older*	**Model Years 2006 and Newer**	
	All Engines	**Compression Ignition**	**Spark Ignition**
STATIONARY ENGINE RULE	**RICE NESHAP**	**CI NSPS**	**SI NSPS**
ESSENTIAL DATA			
Stationary Engine Determination	X	X	X
Major or Area Source of HAPs	X		
Date engine construction or reconstruction** began	X		
Date engine was ordered		X	X
Date engine was manufactured		X	X
Date engine was modified**		X	X
Engine Usage Determination			
- Emergency vs Nonemergency	X	X	X
- Fire Pump Certified by National Fire Protection Association (NFPA) Determination	X	X	
- Other Engine Usage (i.e., limited, black start)	X		
Engine Combustion Type (CI or SI)	X	X	X
Engine Power Rating (bhp)	X	X	X
Engine Displacement (liters/cylinder)	X	X	
Engine Displacement (cubic centimeters)			X
Fuel Type	X	X	X
Power Cycle (Two/Four Stroke)	SI Engines		X
Rich or Lean Burn Determination	SI Engines		X
Certified Engine Determination		X	X

*The focus of RICE NESHAP is on engines constructed prior to 12 June 2006.
**Specific criteria apply to be considered a reconstructed or modified engine.

2.3 Gathering Engine Data

Most, if not all, of the engine information should be available in the Air Program Information Management System (APIMS). Some engine data, such as the engine order date, usage, and hours of operation can be obtained by researching the engine records and any applicable permits. Engine specification sheets (spec sheets), which should be stored in the engine's file, frequently contain much of the engine information required. The Appendix of this Guide contains some useful information for obtaining information regarding a stationary ICE:

- Appendix A - Basic instructions on how to read an engine specification sheet.
- Appendix B – Suggestions on how to decipher the engine serial number and EPA Emissions Family Code (located on most newer model engines).

If a physical examination of the engine is necessary, contact shop or maintenance personnel familiar with the engine; they should know where to locate the nameplates, stickers, or other attachments that can provide engine model number, serial number, and other important engine data on the engine. The information is typically available on the engine's nameplate(s) which is attached to the engine, as opposed to the generator nameplate which is attached to the generator component. If the engine's nameplate is painted over or otherwise not decipherable, search for the serial number which is normally stamped or engraved on the engine (the serial number is useful when contacting the dealer or manufacturer for engine information). In rare circumstances, the manufacturer's distributor or representative may need to physically examine the engine to assist with identification.

However, some of the engine's data may be missing or needs verification. In those situations, the engine may need to be physically examined or the manufacturer representative will need to be contacted to obtain/verify the information. When contacting an engine distributor or manufacturer for information, always be prepared to provide the complete model and serial number to receive accurate and faster assistance. Many manufacturers have a searchable engine information database on their website; however, keep in mind that the engine may have been customized to meet military requirements, so the exact engine may not be represented.

IMPORTANT: Safety precautions should be followed at all times when examining the engine. Safe and responsible examination of the engine is of the utmost importance. Always obtain assistance from technicians that are familiar with the equipment and follow all safety related instructions (e.g., the use of safety goggles, hard-hats). Never handle the engine or connected equipment (including opening doors on engine/equipment) while it is operating. The danger is not only from moving parts, the engine components can get extremely hot from operation and can cause severe burns (do not touch these areas while the engine is running or soon after it is turned off). Additionally, the engine may be off, but an automatic start mechanism or stored energy may unexpectedly start the engine and/or equipment during inspection. The Occupational Safety and Health Administration created the Lock-Out/Tag-Out

standard to prevent the unintentional activation of machinery or equipment while inspection, maintenance, or other servicing activities are performed. For that reason, always be sure to have the assistance of a person authorized to conduct Lock-Out/Tag-Out procedures if the nameplate, sticker, stamping, or engraving is not readily visible on the engine and intrusive examination of the engine is necessary.

2.4 Stationary ICE Rule Applicability Variables

It may be necessary to conduct a thorough inventory of engines at the USAF installation to identify engines that may be subject to the stationary ICE rules, particularly if a significant period of time has elapsed since the last inventory. The determination of which rule(s) the engine is subject to follow, as well as which requirements apply to the engine, depends on a variety of factors. Each engine used at the installation should be classified based on its intended purpose for operation, using the following applicability variables:

- **Applicability Variable One**: Determine if the engine is stationary.
- **Applicability Variable Two**: Determine if the engine is exempt (not subject) from the rules.
- **Applicability Variability Three**: Determine if the engine is a major or area source of HAPs.
- **Applicability Variable Four**: Determine the date the engine was constructed, reconstructed, or manufactured.
- **Applicability Variable Five**: Determine if the engine is a compression ignition or spark ignition engine. Spark ignition engines are further subdivided by power cycle (i.e. two vs. four-stroke and "rich burn" vs "lean burn").
- **Applicability Variable Six**: Determine engine rating and displacement:
    - Rated engine power, kilowatt (kW) or horsepower (hp).
    - Engine de-rating.
    - Engine displacement; liters per cylinder.
- **Applicability Variable Seven**: Determine the intended use of the engine, including if the engine is "emergency" or "limited use."
- **Applicability Variable Eight**: Determine the fuel(s) used in the engine (i.e., gasoline, liquefied petroleum gas, natural gas, wellhead gas, landfill/digester gas).
- **Applicability Variable Nine**: Determine if the engine is reciprocating, rotary, or other stationary ICE.
- **Applicability Variable Ten**: Determine if the engine is certified by the EPA.

2.5 Applicability Variable One: Determine if the ICE is Stationary

This determination is critical to the applicability of all three stationary ICE rules. The rules specifically stipulate that only "stationary" ICE are affected. For some engines, this is an easy determination; for example, a large generator set bolted to a concrete foundation and connected to a hospital's electrical system to provide critical power during an outage is obviously a stationary ICE. Likewise, an automobile or airplane is clearly mobile and therefore, not stationary. However, for some ICE, the determination is more complicated. To be precise, stationary ICE is NOT a nonroad engine as defined in 40 CFR §1068.30 (*General Compliance Provisions for Nonroad Programs*). To summarize, stationary ICE is any ICE in or on a piece of equipment that is:

- NOT portable or transportable (portable engines usually have wheels, skids, carrying handles, dolly, trailer, or platform).
- NOT self-propelled (e.g., tractors, cranes, and bulldozers are self-propelled).
- NOT propelled while performing their function (e.g., walk-behind lawnmowers are propelled while performing their function).

AND

- Stays in one location for more than twelve (12) full consecutive months, or for more than a full annual operating period if a seasonal source.
    - A seasonal stationary ICE remains in a single location on a permanent basis (i.e. at least two years) and operates at that single location approximately three consecutive months (or more) each year.

The term "location" is key to this definition; a location is any **single site** at a building, structure, facility, or installation (there is no definition for "site"). An engine that is moved from location to location, even within the same building, may be classified as a nonroad engine. For example, a generator used frequently at the flight line, and carried to and from and used at differing locations at that same flight line, is considered a nonroad engine and is not subject to the stationary ICE rules.

Examples of nonroad ICE (these are not subject to RICE NESHAP or the CI/SI NSPS rules):


Examples of stationary ICE (these are subject to RICE NESHAP and/or the CI/SI NSPS rules:



CAUTION: A nonroad engine can become stationary if it stays at one location for more than 12 consecutive months (even if it has a means of being transported, such as skids or wheels). For example, a generator with wheels providing power to a construction site office trailer is typically considered to be nonroad; however, if that generator remains attached to the trailer at that construction site for longer than 12 consecutive months, it is then a stationary ICE. Attempting to circumvent the rules by replacing the generator with another generator to power the construction trailer does not reset the 12-month clock.

Temporary Replacement of Engine: *Replacing one temporary engine with another to be used for the same purpose does not restart the 12-month consecutive period*. If an ICE replaces an engine to perform the same or similar function as the engine replaced, include the time-period of both engines in calculating the 12-consecutive month time-period [40 CFR §1068.30(2)(iii)].

NOTE: Be aware that nonroad (including portable) ICE may be subject to other rule(s), including, but not limited to the following:

- 40 CFR 89, New and In-Use Nonroad CI Engines (Tier Standards 1, 2, and 3).
- 40 CFR 89, Nonroad SI Engines <10 kilowatts (kW).
- 40 CFR 1039, New and In-Use Nonroad CI Engines (Tier standard 4).
- 40 CFR 1048, New Nonroad SI Engines >19 kW.
- 40 CFR 1054, New Small Nonroad SI Engines.

2.6 Applicability Variable Two: Determine if the Engine is Exempt

There are only four types of stationary ICE not subject to the rules:

- Combustion turbines.
- Stationary ICE at a test stand/cell.
- Engines with a National Security Exemption.
- Existing residential, commercial, and institutional ICE used only for emergencies.

Engines exempt from the stationary ICE rules are either subject to other standards (e.g., other NESHAP or NSPS) and/or the engine needs to meet specific criteria to meet the definition for the exemption.

If it is determined that the engine is not subject to the stationary ICE rule(s), document the finding and ensure that the determination is included in the records for that engine.

2.6.1 Combustion Turbines

Steam turbines and gas turbines are specifically excluded from the stationary ICE rules and are categorized separately. Refer to other rules concerning those engines for potential applicability (this is not a complete list):

- National Emission Standards for Hazardous Air Pollutants (NESHAP), 40 CFR Part 63:
  - Subpart YYYY (Combustion Turbines).
  - Subpart DDDDD and JJJJJJ (Steam Generators).
- New Source Performance Standards (NSPS), 40 CFR Part 60:
  - Subparts GG and KKKK (Stationary Gas Turbines).
  - Subparts Da, Db, and Dc (Steam Generating Units).

2.6.2 Stationary ICE Being Tested at a Stationary Engine Test Cell/Stand

Stationary ICE being tested at a stationary engine test cell/stand are excluded because they are often covered by another NESHAP (40 CFR Part 63 Subpart PPPPP). In general, testing of uninstalled engines are often performed following overhaul or repair of the engine to determine performance.

- An engine test stand is a facility used to develop, characterize and test engines. Subpart PPPPP defines an engine test cell/stand as "any apparatus used for testing *uninstalled* stationary or uninstalled mobile (motive) engines" (40 CFR 63, Subpart PPPPP, §63.9285). Refer to 40 CFR 63, Subpart PPPPP, for more details if possibly applicable to the engine. For example, the rule specifically exempts existing (commenced construction on or before 14 May 2002) sources and test

stands/cells used exclusively to test new or reconstructed combustion turbine engines (e.g., aircraft engines) [40 CFR 63.9290 (b) and 40 CFR 63.9290 (d)].

2.6.3 Engines Exempt Due to National Security

The stationary ICE rules may be disregarded if they conflict with the national security mission of the USAF. The National Security Exemption (NSE) is not a blanket exemption for all USAF activities. Declaring an engine exempt for national security reasons is complex. If there is reasonable cause to believe that compliance with one or more of the stationary ICE rules will compromise the USAF's national security mission, refer to the *NATIONAL SECURITY EXEMPTION* chapter in this Guide for further applicability analysis and contact the air quality Subject Matter Expert at AFCEC/CZTQ.

2.6.4 Existing Emergency Stationary RICE

NOTE: Other codes and regulations, such as building and fire codes, may have definitions and standards for emergency generators (or engines) which can be significantly different from the EPA regulatory definition in the stationary ICE rules. For the purpose of the stationary ICE rules, it is important to follow the specific definitions and conditions contained within each stationary ICE rule.

Existing residential, institutional, or commercial emergency stationary RICE are not subject to RICE NESHAP, and since the engines are not "new", they are also not subject to the SI/CI NSPS rules. These engines are not subject to emission limitations, management practices, and other requirements in RICE NESHAP; however, review the *EMERGENCY STATIONARY INTERNAL COMBUSTION Engine* section in this Guide because this is NOT a complete exemption. The regulations impose operating limitations and require records (e.g., run logs) demonstrating that the engine complies with those limitations. There is a four-prong test to determine if the engine fits into the exempt Area Source Existing Residential, Institutional, or Commercial Emergency-Use RICE Category. The stationary ICE must:

- **Test One**: Be located at an *area source* of HAPs.
- **Test Two**: Be a residential, institutional, or commercial stationary RICE.
- **Test Three**: Be an existing (not new) stationary RICE.
- **Test Four**: Meet the definition of "emergency" use.

Test One - The Engine MUST be Located at an Area Source of HAPs.

Most USAF facilities are considered area sources or have taken on limits to be a "synthetic minor source", but verify the status with the USAF facility's Air Quality Program Manager. Refer to *Applicability Variable Three: Determine if the Engine is at a Major or Area Source of HAPs for the definition of "Area Source", "Major Source", and "Synthetic Minor Source" of HAPs*.

Test Two – The Engine MUST Be Residential, Institutional, or Commercial.

- Residential emergency stationary RICE means an emergency stationary RICE used in residential establishments such as homes or apartment buildings.
- Commercial emergency stationary RICE means an emergency stationary RICE used in commercial establishments such as office buildings, hotels, stores, telecommunications facilities, restaurants, financial institutions such as banks, doctor's offices, and sports and performing arts facilities.
- Institutional emergency stationary RICE means an emergency stationary RICE used in institutional establishments such as medical centers, nursing homes, research centers, institutions of higher education, correctional facilities, elementary and secondary schools, libraries, religious establishments, police stations, and fire stations.

To assist with this determination, the EPA published guidance clarifying how to determine if a stationary ICE is residential, commercial, or institutional based on North American Industry Classification System (NAICS) codes. Per this guidance, for National Security (NAICS Code 928110), the determination depends upon the application of the engine*.

*For additional guidance, the 9 August 2010, memo titled "*Guidance Regarding Definition of Residential, Commercial, and Institutional Emergency Stationary RICE in the NESHAP for Stationary RICE*" provides direction (based on NAICS) to determine the types of engines that would be classified as residential, commercial, or institutional.

Test Three – The Engine MUST be "Existing."

Per RICE NESHAP, a stationary source is classified as either "new" or "existing" depending upon the date the stationary RICE commenced construction/reconstruction and that source's location within a major or area source of HAPs. Refer to Applicability Variable Four in this chapter: *Determine if the ICE is New or Existing*, for more information. For area sources, stationary RICE that commenced construction or reconstruction before 12 June 2006 are existing engines.

NOTE: There is a brief overlap in the applicability dates in the RICE NESHAP and CI NSPS. Although most existing engines under RICE NESHAP are not subject to the CI or SI NSPS rules because those rules apply to "new" engines, there may be a rare situation when a stationary CI ICE may be existing under RICE NESHAP and new under CI NSPS. These engines will be exempt from RICE NESHAP, but have requirements (although usually limited) under the NSPS rule. Under CI NSPS, "new" emergency stationary CI ICE (not exempt) are those stationary CI RICE that are:

- Ordered after 11 July 2005 and manufactured after 1 April 2006 (1 July 2006 for fire pump engines certified by the National Fire Protection Association), or

- Modified or reconstructed after 11 July 2005.

Test Four – The engine must meet the definition of "emergency use".

Carefully evaluate the number of hours the engine is used for non-emergency, maintenance, and readiness testing on a calendar year basis. To meet the definition of an "emergency-use engine", the engine **can only be used for**:

- An unlimited number of hours during a true emergency (e.g., fire suppression, flood mitigation, or during a power interruption due to grid failure, severe weather or natural disaster). This does not include starting up the engine in anticipation of an emergency (e.g., approaching storm).
- Maintenance and readiness testing for less than 100 operating hours per calendar year (50 of those 100 operating hours can be used for a non-emergency).
    - Emergency stationary ICE may be operated for required maintenance checks and readiness testing.
    - The EPA Administrator may be petitioned for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is NOT required providing that records are maintained documenting that the tests are recommended by federal, state or local government, the manufacturer, the vendor, the regional transmission organization or equivalent balancing authority and transmission operator, or the insurance company associated with the engine.
- The engine cannot be used for:
    - Power supply as part of a financial arrangement with another entity.
    - Local reliability.
    - Emergency demand response or to stabilize power line voltage (a program designed to relieve pressure on the local power grid by assuming a portion of the utility's load).

NOTE: Carefully consider whether the engine should be classified as emergency under this exemption. There are strict operating limitations and recordkeeping requirements for maintaining and validating the engine's exemption; therefore, it may be less restrictive and easier for the engine to be classified as non-emergency (particularly if the engine is likely to exceed the operational limits on a continual basis). However, keep in mind any impact a non-emergency classification may have on PTE for permitting or other purposes. The non-emergency classification option should be considered for the following existing residential, institutional, or commercial stationary RICE located at an area source of HAPs:

- CI RICE <300 bhp.
- Four-stroke (4S) RICE <500 bhp.

- Two-stroke (2S) RICE.
- 4S RICE >500 bhp at remote area sources.

2.7 Applicability Variable Three: Determine if the Engine is at a Major or Area Source of HAPs

The applicability of the emission standards depends on the classification of the source of air toxics emissions. Although stationary ICE located at both area and major sources of HAPs are subject to RICE NESHAP, the area source engines have less stringent requirements than engines at major sources of HAPs. Note that there is a difference in being a major/area source of HAPs and a major/area source of criteria pollutants.

- Major source of HAP emissions is a facility emitting or having the potential to emit any single HAP at a rate of ten (10) tons or more per year or any combination of HAPs at a rate of 25 tons or more per year.

- An area source of HAP emissions is any source that is not a major source of HAP emissions.

- Synthetic minor source of HAP emissions is a facility that has the potential to emit HAPs in amounts to qualify as a major source, but the facility has accepted enforceable permit limits to be classified as "area" or "minor" rather than "major" (synthetic area/minor source) for HAPs.

NOTE: If the engine has been relocated from the original location, the original date(s) of the engine should be used (do not use the installation date of the relocation to determine if the engine is new or existing unless the relocation meets the definition of reconstruction or modification of the engine).

If assistance is required in determining the appropriate engine dates, contact the Air Quality Subject Matter Expert; AFCEC Compliance Technical Support Branch (AFCEC/CZTQ).

2.8 Applicability Variable Four: Determine if the ICE is New or Existing

This applicability variable may be one of the more confusing aspects of the stationary ICE rules due to the difference between the rules for key definitions. RICE NESHAP applicability is based on the date construction or reconstruction "commences" whereas CI and SI NSPS applicability is based on the date the engine is ordered in conjunction with the date of manufacture, reconstruction, or modification, especially if the reconstruction or modification results in a date of manufacture change.

- Date construction (or reconstruction) is commenced. The definition of construction is different between RICE NESHAP and the NSPS rules (CI and SI NSPS):

    - The commencement of construction or reconstruction under RICE NESHAP (40 CFR 63, Subpart A - General Provisions, §63.2), is the date that "an owner or operator has undertaken a continuous program of construction or reconstruction or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or reconstruction." Construction is defined to mean "the on-site fabrication, erection, or installation of an affected source...". The date the contractual obligation was undertaken is the date the engine was ordered by the owner or operator.

    - The commencement of construction under CI and SI NSPS [40 CFR §§60.4200(a) and 60.4230(a), respectively] is the date the engine is ordered by the owner or operator.

- Reconstruction is defined as the replacement of components of an existing engine to such an extent that the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost of a comparable entirely new engine.

- Date of Manufacture (sometimes referred to as the model year) is the date the engine is originally produced. The date of manufacture is usually found on the engine's nameplate, sticker, or label. The date can also be obtained from the distributor or manufacturer using the serial number.

    - Change in the Date of Manufacture. For CI and SI NSPS, "reconstructed engines are assigned a new date of manufacture if the fixed capital cost of the new and refurbished components exceeds 75 percent of the fixed capital cost of a comparable entirely new facility." The date of manufacture does not change for engines that do not meet that definition (40 CFR §60.4219).

    - An engine that is produced from a previously used engine block does not retain the date of manufacture in which the engine block was previously used if the engine is produced using all new components except for the engine block. In these situations, the date of manufacture is the date of reconstruction or the date the new engine is produced.

- Modification. 40 CFR 60.14 (Subpart A, General Provisions of NSPS) defines an engine modification as any physical or operational change (including to control equipment) which results in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies. The original date of manufacture is retained.

2.9 Applicability Variable Five: Determine the Engine Design Type

Engine design type plays a central role in both rule applicability and requirement determination due to differing efficiencies and the amount and nature of the pollutants emitted.

2.9.1 Determine if the Engine is Spark or Compression Ignition

There are two basic types of stationary RICE - spark ignition (SI) and compression ignition (CI). The combustion process that occurs in CI and SI engines differ in how the engines supply and ignite the fuel. CI and SI engines are defined in the stationary ICE rules as follows:

- A compression ignition engine is defined as a type of stationary internal combustion engine that is not a spark ignition engine.
- A spark ignition engine is defined as a gasoline, natural gas, or liquefied petroleum gas (LPF) fueled engine or any other type of engine with a spark plug or sparking device. Spark ignition engines usually use a throttle to regulate intake air flow to control power during normal operation.
- Dual-fuel engines in which a liquid fuel (typically diesel fuel) is used for compression ignition and gaseous fuel (typically natural gas) is used as the primary fuel at an annual average ratio of less than two parts diesel fuel to 100 parts total fuel on an energy equivalent basis are spark ignition engines. ***Dual-fuel engines using two-percent (%) or more diesel on a total energy basis are compression ignition engines even if they have spark plugs.***

2.9.2 Determine if the Spark Ignition Engine is Two or Four Stroke

Spark ignition engines are further subdivided by power cycle (i.e., two-stroke vs. four-stroke) and the operating air/fuel ratio (“rich burn" vs. "lean burn"). The major difference between two-stroke engines and four-stroke engines is in their gas exchange process (the removal of the burned gases at the end of each expansion process and the induction of a fresh mixture for the next cycle). Two-stroke engines are a simpler design than four-stroke engines; however, most two-stroke engines are inefficient and pollute considerably more than a four-stroke engine. The majority of SI stationary engines at USAF installations are four-stroke engines. The definitions per the SI NSPS rule (40 CFR §60.4248 and 40 CFR §63.6675) are:

- Two-stroke engine means a type of engine which completes the power cycle in single crankshaft revolution by combining the intake and compression operations into one stroke and the power and exhaust operations into a second stroke. This system requires auxiliary scavenging and inherently runs lean of stoichiometric.
- Four-stroke engine means any type of engine which completes the power cycle in two crankshaft revolutions, with intake and compression strokes in the first revolution and power and exhaust strokes in the second revolution.

2.9.3 Determine if the Spark Ignition Engine is Rich or Lean Burn

The difference between a rich burn and lean burn engine is based upon the air/fuel ratio at which the engine operates at full load. The manufacturer can provide this information for the engine if the distinction is unknown. Note that the EPA developed specific definitions for rich burn and lean burn engines as given in 40 CFR §60.4248 and 40 CFR §63.6675:

- Lean burn engine (less fuel, more air) means any two-stroke or four-stroke spark ignited engine that does not meet the definition of a rich burn engine.
- Rich burn engine (more fuel, less air) means any four-stroke spark ignited engine where the manufacturer's recommended operating air/fuel ratio divided by the stoichiometric air/fuel ratio at full load conditions is less than or equal to 1.1.
    - Existing engines where there are no manufacturer's recommendations regarding air/fuel ratio will be considered a rich burn engine if the excess oxygen content of the exhaust at full load conditions is less than or equal to 2 percent.

2.9.3.1 Manufactured Rich Burn Engines Modified for NO_X

The following engines, originally manufactured as rich burn engines, will be considered lean burn engines (caution; the date varies by rule) if modified with passive emission control technology for NO_X (such as pre-combustion chambers):

- RICE NESHAP – Engines originally manufactured as rich burn engines, but modified prior to 19 December 2002.
- For SI NSPS – Engines originally manufactured as rich burn engines, but modified prior to 12 June 2006.

2.10 Applicability Variable Six: Determine the Engine Rating and Displacement

The engine power rating steers both rule and compliance requirement applicability. The engine power rating in engine brake horsepower (bhp) and engine displacement will be needed.

IMPORTANT NOTES: THE ENGINE POWER RATING IS BASED ON THE OUTPUT OF THE ENGINE; NOT OF ANY EQUIPMENT (e.g., GENERATOR, ALTERNATOR, DYNAMO) THAT THE ENGINE DRIVES.

- The nameplate bhp for the ENGINE is the information needed for stationary ICE rule applicability, not the kW rating on the alternator and/or equipment that is attached to the engine. If the engine drives a generator (e.g., alternator, dynamo), do NOT use the electrical kilowatt (kWe) rating or any other rating of the equipment as the rating for the engine. For example, the two major components of a generator set (engine and

generator) will have separate manufacturer's power ratings; use the engine's power rating and NOT the generator's power rating.

- Use a conversion factor for engine's bhp ONLY if the ENGINE'S nameplate power rating is in kW (mechanical power; for the engine, NOT the generator). The engine maximum power output is rated in units of hp (mechanical), while the equipment power output is typically rated in kW (electrical). However, for some boilers, particularly those constructed outside of North America, the unit kW is used for both mechanical power (kWm) of the engine as well as electrical power (kWe) of the generator which can cause confusion. However, it is the mechanical power of the engine, expressed in horsepower that is needed for the stationary ICE rules. For this reason, it is preferred that the ENGINE'S power rating in bhp be obtained from the engine's nameplate, manufacturer, or supplier. However, if this is not feasible, a conversion factor can be used for an approximation of the engine's bhp (using the kWm of the ENGINE); multiply the ENGINE's kW by 1.34 to calculate the bhp. For example, 300 kW equals 402 bhp. Further discussion on this topic is covered in this guide further below at subsection 2.10.1, *Difference Between Horsepower and Kilowatt*.

- Be aware that the manufacturer's usage definitions vary from the usage definitions in the stationary ICE rules and are usually based on four operational categories: emergency standby, prime power, limited, and continuous power. Further discussion of the manufacturer's definitions is available in Appendix A, *Engine Specification Sheets*.

- RICE NESHAP and CI/SI NSPS use different definitions for engine power. RICE NESHAP uses site-rated bhp, which allows for adjusting the maximum rating based on site conditions (de-rating), but CI and SI NSPS uses maximum engine power, which does not allow de-rating. The maximum engine power is sometimes referred to as gross engine power or nameplate engine power.

2.10.1 Difference Between Horsepower and Kilowatt

The term "horse power" comes from the historical practice of measuring the rate of work done by a horse, which is equal to 33,000 ft-lb of work done per minute. Traditionally, in North America, engine output is measured in hp and the electrical output of the generator in kW. Outside North America, the metric system is used, and the engine's output rating is expressed in kW (the same type of unit used to describe the electrical output of the generator, but it does not have the same meaning). However, increasingly, engines in North America are labeled using the same metric standards other countries are using. This can lead to confusion, especially when the engine is required to drive a generator set. For clarification:

- Brake horsepower (bhp) is the usable power output of the engine, not including the power required to fuel, lubricate, or heat the engine, circulate coolant to the engine, or to operate after treatment devices (40 CFR Part 1054 definition). This is normally the engine power

rating listed on the engine's nameplate in North America. Make note that bhp and hp are often used synonymously in the stationary ICE rules.

- The mechanical power is measured by the rate at which work is done. Similar to bhp, mechanical kilowatt output of the engine (kW or kWm) does not allow for efficiency losses in the generator. This is the power output from an engine driving a generator set. This power rating is sometimes included as the engine power rating on the engine's nameplate, particularly for newer engines. When both bhp and kWm are depicted on a nameplate or engine related document, parenthesis are often used for clarification; for example, bhp (kWm), kWm (bhp), or sometimes simply kW is used (which is mechanical and not electrical).

- Electrical power is measured by the rate at which electrical energy is transformed. Kilowatts (kW or kWe) is the power available at the generator terminals. This is the actual generator output after experiencing efficiency losses within the generator and is frequently found on the generator's nameplate. DO NOT USE THIS POWER RATING; THIS IS NOT TO BE CONFUSED WITH THE ENGINE'S bhp OR kWm.

To summarize, the mechanical power is measured by the rate at which work is done. On the other hand, electrical power is measured by the rate at which electrical energy is transformed. They are different forms of energy. For power generation, mechanical power is generated by the engine (e.g., piston-cylinders) and the electrical power to drive the equipment is generated by the alternator. For some generator sets, the unit kW is used for both mechanical power of the engine as well as electrical power of the generator component which can cause confusion. The mechanical power of the engine, expressed in bhp, is relevant for the stationary ICE rules.

2.10.2 Maximum Engine Power

The maximum rated engine output, also referred to as the nameplate engine power, is typically available on the nameplate(s) attached to the stationary ICE or can be obtained from the manufacturer. Both CI and SI NSPS requires the usage of maximum engine power.

2.10.3 Site Rated Horsepower (Engine De-Rating)

RICE NESHAP allows for site rated (or site-specific) bhp to adjust the maximum horsepower rating due to site conditions such as elevation and temperature. Generally, manufacturers test engines during optimal conditions and they are designed to run most efficiently at or near sea level. High altitude and high ambient temperatures can adversely affect engine power output; therefore, adjustments can be made to account for this reduction in power. A practice referred to as "de-rating" is used to determine the engine's performance under actual ambient operating conditions. The resulting reduced engine power is known as the site-rated bhp. As the elevation and temperature in which the stationary ICE will be operated increases, the amount of de-rating will likely increase as well.

In non-standard ambient air conditions, the manufacturer provided reduction factor is used to de-rate the engine. If the engine's reduction factor cannot be located in the engine's file (the information is normally found on the specification sheet), contact the manufacturer. Also, most manufacturers make their reduction factor tables available on their websites (the factor is engine specific). Some engine manufacturers, particularly for new engines, claim that their engines will operate effectively at elevations well above sea level (roughly 3300 feet) and do not give consideration to a reduction factor unless the engine is installed substantially above sea level and operated in extreme weather conditions.

The standard de-rating formula usually allows for a 2-3% reduction in power for every 1000 feet above sea-level a gasoline, diesel, or liquid propane generator is operated. For engines using natural gas, the derating factor is usually closer to 5%. The formula for calculating the site-specific bhp is straight forward:

$$\boldsymbol{Site\ specific\ bhp = bhp \times Reduction\ Factor}$$

NOTE: Although the capacity of a RICE may be limited by the equipment that it is driving, these limitations should not be considered when defining the site rated bhp for the stationary ICE.

2.10.3.1 Engine De-Rating Example

The following example demonstrates how engine ratings can make a significant difference in rule and requirement applicability:

A new diesel-fired stationary CI RICE is located at major source of HAPs and is used for non-emergency purposes in Denver, Colorado (elevation of 5280 feet). The engine has a maximum nameplate power of 520 bhp, but is connected to a compressor that limits the engine to 480 bhp. The manufacturer established the reduction factor for engines operated at Denver's altitude and temperature at 2.5 percent for every 1000 feet above 3300 feet (roughly 5 percent).

- If the CI ICE site-specific bhp is determined to be >500 bhp, the engine is subject to RICE NESHAP monitoring and other requirements and will also be subject to the CI NSPS provisions.
- If the CI ICE maximum engine power is determined to be ≤500 bhp, the engine is subject to RICE NESHAP, but will be directed to comply with CI NSPS to satisfy RICE NESHAP requirements.

Results:

- The engine is subject to CI NSPS because it is a new engine. The maximum engine power of the engine is 520 bhp, so the engine is subject to all requirements that apply to CI ICE with a maximum engine power >500 bhp under that rule.

- The engine is subject to RICE NESHAP, but since the site-rated bhp is approximately 494 bhp (520 * 0.05), which is less than 500 bhp, compliance with CI NSPS will satisfy the requirements of RICE NESHAP. *Note that the engine's performance limitation due to the compressor is not relevant.*

2.10.4 Engine Displacement

Engine displacement (also known as engine capacity or volumetric displacement) is the space available inside the cylinder to accommodate air-fuel mixture for burning. Engine displacement plays an important role in determining various engine outputs such as engine power; as the volume of the cylinders increases, the power output also increases. Keep in mind that although higher engine displacement generally relates to a higher horsepower figure, they do not measure the same mechanisms. This information is frequently located on the nameplate and/or in the engine file.

- CI ICE: The volumetric displacement is measured in units of liters per cylinder (liters/cylinder).
- SI ICE: The volumetric displacement is measured in units of cubic centimeters (cc).

If an engine has capacity of 1000cc, then the capacity of that engine is one liter (1000 cc = one liter).

2.11 Applicability Variable Seven: Determine the Intended Use of the Engine

The usage of the stationary ICE is another important factor in determining applicability, and most importantly compliance requirements. Some engines, such as emergency and black start, have far less stringent compliance requirements than a comparable non-emergency engine.

- Non-emergency engines are used as a primary or standby power source for equipment. Engines used in curtailment programs or load management are considered non-emergency engines.
- Black start engines are used only to start a combustion turbine.
- Fire pumps are emergency engines certified to National Fire Protection Association (NFPA) requirements to provide power to pump water for fire suppression or protection.
- Limited use engines operate less than 100 hours per year.
- Emergency engines are only operated in emergency situations or for required testing and maintenance. An emergency is an unforeseeable condition beyond the control of the owner or operator. An engine must meet the following definition to be considered an emergency engine.
    - Unlimited hours during emergencies (e.g., power outage, fire, flood).

- 100 hours per year allowed for manufacturer, federal, or state required maintenance and testing. 50 of those hours may be used for non-emergency purposes; however, the engine cannot be used for peak shaving, non-emergency demand response, or to generate income for a facility to an electric grid or otherwise supply power as part of a financial arrangement with another entity.

NOTE: Operating an emergency engine in expectation of an emergency counts towards the 50 hours non-emergency use allowance. For example, starting an emergency stationary ICE as a storm approaches and an outage is anticipated is not considered emergency use.

2.12 Applicability Variable Eight: Determine Type of Fuel(s) Used in the Engine

The type of fuel combusted in the stationary ICE is also a driver for stationary ICE rule compliance requirements. For example, most diesel fueled engines are subject to fuel standards (e.g., low sulfur content fuel). Stationary ICE can burn a wide variety of fuels including natural gas, light fuel oil, heavy fuel oil, biodiesel, biofuels, and crude oil. Generally, the engine type (CI or SI) determines which type of fuel is combusted in the engine.

- CI engines are usually fueled by diesel, or in the case of the USAF, also by kerosene based jet fuel, such as JP-8 or Jet A.
- SI engines are normally fueled by natural gas, gasoline, propane, landfill gas, or digester gas.

2.13 Applicability Variable Nine: Determine if the Stationary ICE is Reciprocating

The EPA, in the preamble to the 18 January 2008 final RICE NESHAP/SI NSPS final rule stated that "to our knowledge, no rotary or other types of stationary ICE exist at this time"; however, since the rules have been promulgated, innovative combustion technology has produced rotary ICE for power generation that may meet the definition of stationary ICE (currently, these engines are normally portable). Additionally, advancing technology can introduce a stationary ICE that cannot fit into any category and will meet the classification as "other stationary ICE". Therefore, this determination is included in this Guide in the event a rotary stationary ICE (or other stationary ICE) is encountered.

RICE NESHAP only applies to reciprocating stationary ICE, but SI and CI NSPS applies to reciprocating, rotary, and all other stationary ICE.

- A stationary RICE is any internal combustion engine, except combustion turbines, which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile. RICE can be SI or CI.

- However, a stationary ICE is any internal combustion engine, except combustion turbines, that converts heat energy into mechanical work and is not mobile. This includes reciprocating, rotary, and other stationary ICE as well.
    - Rotary internal combustion engine means any internal combustion engine which uses rotary motion to convert heat energy into mechanical work.

2.14 Applicability Variable Ten: Determine if the Engine is EPA Certified

The EPA's Certificate of Conformity is a document issued by the EPA that verifies an engine class (engine "family" or "test group") conforms to emission standards valid for the equipment manufacture date, maximum engine power, engine type and fuel.

- CI engine manufacturers must certify 2007 model year and later CI ICE with a displacement <30 liters/cylinder.
- SI engine manufacturers must certify engines the following types of SI ICE manufactured on/after 1 July 2008.
    - All SI ICE ≤ 25 hp.
    - Gasoline and rich burn SI ICE using LPG (e.g., propane).
- All other stationary CI or SI ICE can be voluntarily certified by the manufacturer.

The engine records should include the Certificate of Conformity for the engine. An example of a Certificate of Conformity is depicted below:

Figure 2-2. Example Certificate of Conformity

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2013 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT OF 1990

OFFICE OF TRANSPORTATION
AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: Deere & Company
(U.S. Manufacturer or Importer)
Certificate Number: DJDXL03.0208-017

Effective Date: 11/09/2012
Expiration Date: 12/31/2013

Byron J. Bunker, Acting Division Director
Compliance Division

Issue Date: 11/09/2012
Revision Date: N/A

Model Year: 2013
Manufacturer Type: Original Engine Manufacturer
Engine Family: DJDXL03.0208

Mobile/Stationary Indicator: Both
Emissions Power Category: 37<=kW<56
Fuel Type: Diesel
After Treatment Devices: No After Treatment Devices Installed
Non-after Treatment Devices: Engine Design Modification, Non-standard Non-After Treatment Device Installed, Smoke Puff Limiter, Electronic Control
FELs: PM 0.30 g/kW-hr

Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Parts 60 and 1039, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following engines, by engine family, more fully described in the documentation required by 40 CFR Parts 60 and 1039 and produced in the stated model year.

This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Parts 60 and 1039 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Parts 60 and 1039.

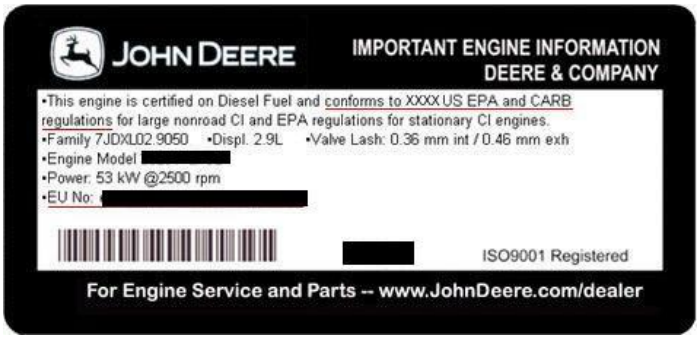
It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Parts 60 and 1039. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Parts 60 and 1039.

This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

This certificate of conformity is conditional upon compliance of said manufacturer with the averaging, banking and trading provisions of 40 CFR Part 1039, Subpart H. Failure to comply with these provisions may render this certificate void *ab initio*.

Engines are required to have a label stating whether the engine is certified. Below is an example of an engine's emission label for a certified engine. Note that this label indicates that the engine is certified to both EPA and California Air Resource Board (CARB) emission standards (California has stricter engine certification standards).

Figure 2-3. Example Emission Label for a Certified Engine



2.14.1 Tier Level of Certificate of Conformity

The engines can be certified for four different Tier Levels (Tier 1 through 4) of emissions, which were phased in over several years with increasing levels of stringency. Further discussion of EPA Tier Levels for stationary ICE is in Section 6.1 of this Guide. The engine's emissions certificate and label should include which year's standards the engine was certified.

2.14.2 Certified Versus Compliant Engines

It is important to understand the difference between a certified engine and a compliant engine:

- Certified means that the engine was tested by the EPA at the manufacturer's location and it was determined that the engine meets the emission standards for the appropriate Tier level; therefore, the engine does not require additional testing once installed.
- Compliant (also known as "verified") means that the manufacturer tested and internally validated compliance with the appropriate Tier level, but the engine must be tested by the EPA to verify compliance. *A compliant/verified engine is not a substitute for a certified engine.*

2.14.3 Certificate Expiration

Certificates of Conformity have expiration dates and/or warranty expiration dates and disclaimers that activate upon reaching a certain number of operating hours. However, based on the December 2007 rule preamble addressing the 11 July 2005 proposed rules, neither document expiration nor operation past warranty periods results in noncompliance with the NSPS regulations.

2.14.4 Locating a Missing Certificate of Conformity

If the Certificate of Conformity cannot be located and the engine was manufactured in 2007 or later, locate the emissions label on the engine (usually on the valve cover or engine block). With the information provided on the label, contact the manufacturer to obtain a copy of the Certificate, if there is one for the engine. If there isn't an emissions label on the engine, the manufacturer can assist in obtaining the correct certificate. Many manufacturers have searchable engine information databases on their websites which includes an option for obtaining a copy of the Certificate of Conformity (engine build year, EPA Family number, and/or engine serial number may be required to search for a certificate).

Additionally, EPA and CARB (California emission standards) maintains certification data from various engine manufacturers for past and current model years. The engine family number (found on the emission label) is required to obtain certification information from these databases:

- https://www.epa.gov/compliance-and-fuel-economy-data/engine-certification-data
- https://www.arb.ca.gov/msprog/offroad/cert/cert.php

NOTE: CI and SI NSPS require documentation from the "manufacturer that the engine is certified to meet the emission standards." This is normally achieved by the Certificate of Conformity. Also, many state and local regulators will require a copy of the Certificate of Conformity, often along with a picture of the engine's nameplate/emissions label.

STEP 2: DETERMINE WHICH STATIONARY ICE RULE(S) APPLY

NOTE: The flowchart to Step 1 (Figure 2-1, *Stationary Engine Rule Flowchart*) and the Stationary ICE Rule Applicability Questionnaire is available in Appendix C of this Guide to assist with rule applicability.

After determining the engine classification and verifying the engine is not exempt, use the engine information gathered from the applicability variables in Step 1 of this Guide and the rule applicability parameters in Table 3-1, *Stationary Internal Combustion Engine Rule Applicability*, to determine which stationary ICE rule(s) apply to the engine. Older engines are likely to be subject only to RICE NESHAP, while newer engines will be subject to RICE NESHAP and to one of the CI or SI NSPS rules. Due to the differing applicability dates in the CI/SI NSPS rules and the definition of "new" and "existing" in RICE NESHAP, an engine can be "new" for one rule and "existing" for another.

Table 3-1. Stationary Internal Combustion Engine Rule Applicability

STATIONARY INTERNAL COMBUSTION ENGINE RULE APPLICABILITY (Both RICE NESHAP and CI or SI NSPS can apply to the same engine.)	
If the engine is:	**The engine is subject to:**
New, existing, or reconstructed stationary RICE. • All RICE (except for RICE at a major source of HAP > 500 bhp) constructed or reconstructed on or after 12 June 2006 is new. • All RICE at a major source of HAP > 500 bhp constructed or reconstructed on or after 19 December 2002 is new.	RICE NESHAP (40 CFR 63 Subpart ZZZZ)
Stationary reciprocating SI ICE, rotary SI ICE, and other SI ICE: • Ordered after 12 June 2006 and manufactured on/after: - 1 July 2007 if ≥500 bhp (except lean burn 500≤bhp<1,350). - 1 January 2008 if lean burn 500≤bhp<1,350. - 1 July 2008 if <500 bhp. - 1 January 2009 if emergency engine >25 bhp. • Modified or reconstructed after 12 June 2006.	NSPS for SI ICE (40 CFR 60 Subpart JJJJ)
Stationary reciprocating CI ICE, rotary CI ICE, and other CI ICE: • Ordered after 11 July 2005 and manufactured after 1 April 2006 (1 July 2006 for fire pump engines certified by the National Fire Protection Association). • Modified or reconstructed after 11 July 2005.	NSPS for CI ICE (40 CFR 60 Subpart IIII)

3.1 Gap Engines

There are situations when a stationary ICE can fall into a regulatory gap; these are commonly referred to as “Gap Engines." This can happen due to the variability in the applicability dates. For example:

A stationary ICE is constructed (installed on site or contracted to be installed on site) after 12 June 2006 and RICE NESHAP directs the owner/operator of the engine to comply with CI/SI NSPS to fulfill the NESHAP requirements.

AND

The engine is manufactured/ordered prior to whichever of the NSPS applicability dates apply (varies by engine)

THEN

The engine is essentially not subject to ANY compliance requirements.

Recommendations for stationary ICE that falls within the “gap”: The EPA may address the regulatory gap in future promulgations; however, there is no indication of the agency doing so at this time. Regardless of the engine’s classification, all engines are required to be operated and maintained in accordance with either the manufacturer's recommendations, a manufacturer’s approved plan, or the minimum requirements acceptable for military installations maintenance and operations, whichever is more stringent.

NOTE: Contact AFCEC/CZTQ to confirm if the stationary ICE is a “Gap Engine” and to determine applicable requirements.

STEP 3: DETERMINE COMPLIANCE REQUIREMENTS

After determining which rule(s) govern the stationary ICE, refer to the appropriate chapters of this Guide that correspond to the applicable rule (RICE NESHAP and possibly CI or SI NSPS) to ascertain the specific management practices and emission standards that apply to the engine. The applicability variables from Step One in this Guide will play an integral role in this assessment.

4.1 USAF and DoD Requirements

Air Force Instruction (AFI) 32-1062, *Electrical Systems, Power Plants and Generators*, and the Department of Defense (DoD), *Unified Facilities Criteria (UFC); Operation and Maintenance – Generators*, include minimum requirements acceptable for USAF generator maintenance and operations. When conflicts exist between the USAF and DoD standards and/or the EPA standards, it is more prudent to follow the most rigorous requirement. In these situations, contact AFCEC/CZTQ for assistance.

The USAF has standardized forms to document the operation, maintenance, repair, and replacement of generators. This information must be recorded in APIMS within 30 days of the end of the month in which the activity occurred. Waivers or environmental permits, if any, also need to be recorded in APIMS. These documents form part of the official shop record. The standardized forms include, but are not limited to, the following:

- AF Form 719, *Historical Record - Diesel-Electric Generator and System*. Required to be maintained for the life of the generator.
- AF Form 487, *Generator Operating Log (Inspection and Testing)*. Required to be maintained for five years within the shop record.
- Generator authorization letter from AFCEC/COSM.
- Approved generator design from AFCEC/COSM (if installed after 1 Nov 2011).

4.2 Regulated Pollutants

The operation of stationary ICE results in exhaust emissions of criteria pollutants and a variety of HAPs. The actual concentration of these pollutants and air toxics vary from engine to engine and is strongly related to the type of fuel used. For example, natural gas and propane emit relatively low PM emissions, whereas diesel engines have relatively high PM emissions. SI ICE usually run on natural gas or propane and CI ICE usually run on diesel; therefore, PM is much more of a concern for CI ICE and is a regulated pollutant for those engines.

Testing for CO emissions has many advantages over testing for emissions of HAPs; therefore, most of the emission standards have been finalized in terms of CO as the only regulated pollutant (CO as a surrogate for HAPs).

Table 4-1, *Regulated Stationary ICE Pollutants*, breaks down the regulated pollutants for each stationary ICE rule:

Table 4-1. Regulated Stationary ICE Pollutants

REGULATED STATIONARY INTERNAL COMBUSTION ENGINE POLLUTANTS		
RICE NESHAP	**CI NSPS**	**SI NSPS**
HAPs	**Criteria Pollutants (and/or Precursors)**	
CH_2O and CO as surrogates for Total HAPs	NMHC/HC*	VOC
	NO_X	CO
	PM	NO_X
	CO	

HAPs = Hazardous Air Pollutants
NMHC = Non-Methane Hydrocarbon
NO_X = Nitrogen Oxides
VOC = Volatile Organic Compound; precursor to ozone
CO = Carbon Monoxide
HC = Hydrocarbon
PM = Particulate Matter
CH_2O = Formaldehyde
*Not a criteria pollutant. Used as the metric for measuring VOCs to simplify testing.

4.3 General Duty Clause

Stationary ICE, including associated air pollution control equipment and monitoring equipment, must be operated and maintained at all times in a manner consistent with safety and good air pollution control practices for minimizing emissions. The general duty to minimize emissions does not require any further efforts to reduce emissions if levels required by the standards have been achieved. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Administrator which may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the source (40 CFR §63.6605).

4.4 Notifications

RICE NESHAP and CI/SI NSPS contains a variety of notification requirements that can be easily overlooked. After the engine information has been gathered and the exemption status and rule applicability for the engine has been determined, initial compliance steps must be taken, including submitting appropriate notifications to the regulatory agencies (state, local, and EPA regional office as applicable). The following table provides a summary of the most common notification requirements for stationary ICE (notifications are engine specific, so one or more of these notifications may not apply to the engine):

Table 4-2. Stationary Internal Combustion Engine Notification Deadlines

STATIONARY INTERNAL COMBUSTION ENGINE NOTIFICATION DEADLINES (These notification requirements do not apply to all engines.)		
Notification	**Deadline**	**Regulatory Citation (40 CFR)**
Notification of Actual Start-up	15 days after start-up	63.9(b)(4)(v) and 60.7(a)(3)
Initial Notification of Applicability	120 days after start-up	63.6645, 63.9(b), 60.4214(a)(1), 60.4245(c), and 60.4245(e)
Modification	60 days prior to modification	60.7(a)(4) and 60.14
Reconstruction	60 days prior to reconstruction	60.15(d), 60.15, and 63.5
Performance Test	RICE NESHAP; 60 days prior to testing	63.7(b), 63.9(e), 63.6645(a) and 63.6645(d)
	CI/SI NSPS; 30 days prior to testing	60.8(d)
Compliance Status	30 days after initial compliance demonstration (60 days if performance testing was conducted)	63.7(b), 63.9(h), and 60.6645(h)

4.4.1 Certification of Notifications and Reports

Notifications and reports submitted in accordance with the stationary ICE rules require certification to accuracy and completeness signed by a responsible official as defined in 40 CFR §70.2 (which for USAF purposes is normally the Commanding Officer for the installation). It is imperative that data be reviewed and that any inconsistencies be resolved before notifications and reports are submitted.

4.4.2 Initial Notification of Applicability

RICE NESHAP and CI/SI NSPS requires owners and operators of certain stationary ICE to report to their state, local, and/or regional EPA office if the stationary ICE falls under the rule(s). Initial notifications are not required for existing engines less than 100 hp, existing emergency engines, or existing engines not subject to numerical emission limits. Existing engines should have already filed initial notifications. An initial notification is required for the following new or reconstructed stationary ICE within 120 days of startup:

- RICE NESHAP:
  - At major sources of HAP:
    - All non-emergency engines >500 bhp.
    - Existing non-emergency engines >100 and <500 bhp.
    - New or reconstructed emergency and limited use engines >500 bhp.
    - New or reconstructed non-emergency four-stroke lean burn (4SLB) engines >250 hp.

  - At area sources of HAP:
    - Existing non-emergency compression ignition engines >300 hp.
    - Existing non-emergency spark ignition 4SLB and four-stroke rich burn (4SRB) engines >500 bhp that operate >24 hours per year.
- SI NSPS: New SI ICE ≥500 bhp that have not been certified by an engine manufacturer.
- CI NSPS: New non-emergency stationary CI ICE that are greater than 2,237 kW (3,000 hp), or have a displacement of ≥10 liters per cylinder, or are pre-2007 model year engines that are greater than 130 kW (175 hp) and not certified (40 CFR 60.4214).

Limited use or emergency engines must continue to meet the definition and operate as limited use or emergency engines, or a new applicability determination and initial notification of applicability will be required within 120 days of becoming subject to the rule(s).

The Initial Notification must include at least the following information (the state or local agency may have a preferred format or form):

- The owner or operator's name and address.
- The address where the affected source is physically located.
- The relevant standard which requires submission of a notification, and the compliance date.
- A short description of the engine, including its size, nature, design, method of operation, and the types of emission points within the affected source that are subject to the applicable standard, along with the hazardous air pollutants emitted.
- An indication as to whether the engine is located at an area or major source of hazardous air pollutants.
- A statement indicating that the unit has no additional requirements along with an explanation of the exclusion (if the engine operates as an emergency or limited use engine with a site rating of greater than 500 horsepower at a major source).
- A brief description of the unit, size, combustion type, commenced construction date of the engine (i.e., date ordered) and type of fuel used.
- Engine information including make, model, engine family, serial number, model year, maximum engine power, and engine displacement.
- Optionally, some state and local agencies require or suggest that a photograph of the engine's nameplate(s) be included with the notification to ensure all the information is accurately captured and submitted.

RICE NESHAP COMPLIANCE REQUIREMENTS

NOTE: RICE NESHAP compliance deadlines have already passed. Newly constructed and reconstructed engines must comply at start-up.

Overview. RICE NESHAP regulates HAP emissions from stationary RICE at both major and area sources of HAPs. All sizes of stationary RICE are subject to RICE NESHAP.

- Most new engines are technically subject to RICE NESHAP, but are referred to their respective NSPS and will not have any further requirements under this rule.
- Some new engines can have requirements under both RICE NESHAP and CI or SI NSPS.
- Existing engines under RICE NESHAP may have basic maintenance requirements and/or emissions limitations.

NOTE: Certain engines are subject to the stationary ICE rules; however, technically, they do not have any compliance requirements. As with "gap" engines, these engines are required to be operated and maintained in accordance with either the manufacturer's recommendations, a manufacturer's approved plan, or the minimum requirements acceptable for military installation maintenance and operations, whichever is more stringent. The following existing stationary RICE > 500 bhp and located at a Major Source of HAPs are subject to the stationary ICE rules, but do not have requirements:

- SI 2SLB
- SI 4SLB
- Emergency
- Limited use (LU)
- Landfill or digester gas (>10% gross heat input annually).

5.1 Stationary ICE that Meet RICE NESHAP by Complying with NSPS

The following stationary ICE satisfy stationary RICE NESHAP requirements by meeting the applicable NSPS requirements (CI or SI NSPS):

Table 5-1. Engines that Satisfy RICE NESHAP by Complying with NSPS

ENGINES THAT SATISFY RICE NESHAP BY COMPLYING WITH NSPS	
The following New and Reconstructed RICE located at a Major Source of HAPs:	
CI ICE ≤ 500 bhp	SI ICE 4SRB ≤ 500 bhp
SI ICE 2SLB ≤ 500 bhp	SI landfill or digester gas ≤ 500 bhp
SI ICE 4SLB < 250 bhp	≤ 500 bhp, emergency or limited use
The following New and Reconstructed RICE located at an Area Source of HAPs:	
All RICE regardless of bhp, fuel, or use	

5.2 Remote Locations

Complying with RICE NESHAP could be prohibitively costly and potentially infeasible for sources in remote areas; therefore, the EPA made allowances for those sources. Stationary RICE located in remote areas of Alaska, the Outer Continental Shelf (OCS), and other qualified remote locations are subject to decreased compliance obligations. Basically, qualified stationary RICE are not subject to numerical emission limits, but are subject to management practices such as prescribed preventative maintenance at certain intervals, maintaining the RICE according to the manufacturer's instructions (or develop and follow an approved maintenance plan using good air pollution prevention practices to minimize emissions), minimizing startup times, and maintaining records to demonstrate that applicable requirements have been completed. Additionally, existing stationary CI RICE located in remote areas of Alaska are exempt from the diesel fuel requirements contained in RICE NESHAP (40 CFR §63.6604).

It is the owner or operator's responsibility to ensure the engine continues to meet the definition for "remote location" each year. Records of the initial and annual evaluation of the engine's status must be maintained.

5.2.1 Remote Alaska

Stationary RICE qualify for reduced compliance requirements if the stationary RICE is in an area of Alaska that is not accessible by the Federal Aid Highway System (FAHS) (e.g., primary power generator located at a remote USAF satellite station). Also, stationary RICE in Alaska that meet all the following criteria are also qualified for the reduced compliance requirements [per 40 CFR §63.6603(b)]:

- Located at an area source;
- The only connection to the FAHS is through the Alaska Marine Highway System (AMHS), or the stationary RICE operation is within an isolated grid in Alaska that is not connected to the statewide electrical grid referred to as the Alaska Railbelt Grid*;

- At least 10 percent of the power generated by the stationary RICE on an annual basis is used for residential purposes; and
- The generating capacity of the area source is less than 12 megawatts, or the stationary RICE is used exclusively for backup power for renewable energy.

* The Alaska Railbelt Grid is defined as the service areas of the six regulated public utilities that extend from Fairbanks to Anchorage and the Kenai Peninsula. These utilities are Golden Valley Electric Association; Chugach Electric Association; Matanuska Electric Association; Homer Electric Association; Anchorage Municipal Light & Power; and the City of Seward Electric System.

5.2.2 Outer Continental Shelf

The Outer Continental Shelf (OCS) means "all submerged lands lying seaward and outside of the area of lands beneath navigable waters" (Title 43, Chapter 29, Subchapter I, Section 1331). Navigable waters refer to all submerged land, its subsoil, and seabed that belongs to the United States, but does not fall within the jurisdiction of any individual state (Title 43, Chapter 29, Subchapter I, Section 1301). Per the EPA, an OCS source is further defined in 40 CFR 55.2 and means any equipment, activity, or facility which:

- Emits or has the potential to emit any air pollutant;
- Is regulated or authorized under the Outer Continental Shelf Lands Act ("OCSLA") (43 U.S.C. §1331et seq.); and
- Is located on the OCS or in or on waters above the OCS.

5.2.3 Other Remote Locations

Previously, to be "remote", a stationary RICE would have been required to be in Alaska and not on the FAHS. However, the EPA broadened the definition of remote to include additional sources. A remote location is:

- Located in an offshore area that is beyond the line of ordinary low water along that portion of the coast of the United States that is in direct contact with the open seas and beyond the line marking the seaward limit of inland waters; **or**
- Located on a pipeline segment with 10 or fewer buildings intended for human occupancy and no buildings with 4 or more stories within 220 yards on either side of a continuous one-mile length of pipeline (Department of Transportation Class 1 area), and the pipeline segment is not within 100 yards of a building or small well-defined outside area (e.g., park, outdoor theater, playground, etc.) occupied by 20 or more persons on at least five days a week for 10 weeks in any 12-month period; **or**
- Not located on a pipeline and having five or fewer buildings intended for human occupancy and no buildings with four or more stories within a 0.25-mile radius around the engine (40 CFR §63.6675).

Additionally, an existing non-emergency SI 4SLB and 4SRB stationary RICE with a site rating of more than 500 bhp located at area sources of HAP must have met the definition of remote stationary RICE on 19 October 2013 to be considered as such [40 CFR §63.6603(f)].

5.3 Change in HAP Status

RICE NESHAP initially applied to stationary RICE at Major Sources of HAPs, but the rule was amended to pull in stationary RICE at Area Sources.

5.3.1 Changing from Area Source to Major Source

An Area Source of HAPs that becomes a Major Source is provided three years to comply with the major source requirements, including RICE NESHAP. However, stationary RICE constructed or reconstructed after the date the Area Source becomes a Major Source must be in compliance with RICE NESHAP upon startup [40 CFR §63.6595(b)(1)].

5.3.2 Changing from Major Source to Area Source

Contact the Subject Matter Expert for Air Quality at AFCEC/CZTQ for assistance.

5.4 RICE NESHAP Requirement Summary

Stationary RICE may be subject to one or more management (work) practices, numerical emission limits, and operating limits. Additionally, the stationary RICE may be subject to notification, monitoring, record keeping, and reporting requirements. The RICE NESHAP requirements vary depending on criteria such as engine age, size, fuel type, usage (non-emergency or emergency), and the source (major or area).

The following tables in this section condenses compliance requirements from Tables 1 through 6 of the RICE NESHAP rule and are designed to provide an "at glance" summary of stationary RICE requirements. The tables contain a general summary of the initial notification, compliance status notification (Comp), work practices (Work Prac.), emission limits, initial and subsequent performance testing, control device operating limits, and non-resettable hour meter requirements that apply per engine category. As indicated in the summary tables below, many new engines are directed to the CI or SI NSPS rule, as applicable. For those engines, the RICE NESHAP requirements are met by fulfilling the appropriate NSPS requirements.

- A dot, "●", in a table field indicates that the engine is subject to that requirement.
- If all the fields in the table are empty for an engine category, this indicates that the engine does not have requirements other than the general duty to operate and maintain the engine in accordance to good emission practices and per the manufacturer's recommendations (fuel requirements may also apply).

- The emission limits are expressed as parts per million by volume dry basis (ppmvd) or as parts per billion by volume dry basis (ppbvd).
- Control Device Operating Limits –Demonstrating compliance with an emission limit using emissions control devices, such as a Non-Selective Catalytic Reduction system, requires operating limits to ensure that the device is operating properly. Operating limits (e.g., catalyst pressure drop and inlet temperature) apply mostly for engines >500 hp and new 4SLB SI ICE ≥250 hp at a major source. Section 5.8, *Operating Limits*, in this Guide contains more details.

Table 5-2. Requirements for New and Existing Area Source CI RICE

REQUIREMENTS FOR NEW AND EXISTING AREA SOURCE CI RICE (40 CFR 63, Subpart ZZZZ, Tables 1 through 6)									
Engine Category	**Rating (bhp)**	**Notice**		**Work Prac.**	**Emission Limits**	**Performance Testing**		**Control Device Oper. Limits**	**Hour Meter**
		Initial	**Comp**			**Initial**	**Sub-Sequent**		
Existing									
Non-emergency non-black start	>500	●	●		EL1	●	●	OC	
	300<hp≤500	●	●		EL2	●			
	≤300			WP1					
Black Start	ALL			WP2					
Emergency	ALL			WP2					●
New									
ALL	ALL	Comply with CI NSPS							

WP1 = Oil/filter change and inspect air cleaner every 1,000 hours of operation or annually. Inspect hoses/belts and replace if necessary every 500 hours of operation or annually. Oil analysis program eligible.

WP2 = Oil/filter change and inspect hoses and belts every 500 hours of operation or annually. Inspect air cleaner every 1,000 hours of operation or annually. Oil analysis program eligible.

EL1 = Limit CO in exhaust to ≤23 ppmvd at 15 percent O_2 or ≥70 percent CO emission reduction.

EL2 = Limit CO in exhaust to ≤49 ppmvd at 15 percent O_2 or ≥70 percent CO emission reduction.

OC = Oxidation Catalyst (reduces CO and VOC).

Table 5-3. Requirements for New Major Source CI RICE

REQUIREMENTS FOR NEW MAJOR SOURCE CI RICE (40 CFR 63, Subpart ZZZZ, Tables 1 through 6)									
Engine Category	**Rating (bhp)**	**Notices**		**Work Prac.**	**Emission Limits**	**Performance Testing**		**Control Device Oper. Limits**	**Hour Meter**
		Initial	**COMP**			**Initial**	**Sub-Sequent**		
Non-emergency non-black start	>500	●	●		EL4	●	●	OC	
	≤500	Comply with CI NSPS							
Limited Use	>500	●							●
	≤500	Comply with CI NSPS							
Emergency	>500	●							●
	≤ 500	Comply with CI NSPS							

EL4 = CO emission reduction ≥70 percent or limit CH_2O in exhaust to ≤580 ppbvd at 15 percent O_2.

OC = Oxidation Catalyst (reduces CO and VOC).

Table 5-4. Requirements for Existing Major Source CI RICE

REQUIREMENTS FOR EXISTING MAJOR SOURCE CI RICE (40 CFR 63, Subpart ZZZZ, Tables 1 through 6)									
Engine Category	**Rating (bhp)**	**Notices**		**Work Prac.**	**Emission Limits**	**Performance Testing**		**Control Device Oper. Limits**	**Hour Meter**
		Initial	**COMP**			**Initial**	**Sub-Sequent**		
Non-emergency non-black start	>500	●	●		EL1	●	●	OC	
	300 < hp ≤ 500	●	●		EL2	●			
	100 ≤ hp ≤ 300	●	●		EL3	●			
	<100			WP1					
Black Start	≤500			WP2					
Limited Use*	>500								
Emergency	≤500			WP2					●
	>500								

*There is no separate category for existing major source Limited Use CI RICE ≤500 bhp.

WP1 = Oil/filter change and inspect air cleaner every 1,000 hours of operation or annually. Inspect hoses/belts and replace if necessary every 500 hours of operation or annually. Oil analysis program eligible.

WP2 = Oil/filter change and inspect hoses and belts every 500 hours of operation or annually. Inspect air cleaner every 1,000 hours of operation or annually. Oil analysis program eligible.

EL1 = Limit CO in exhaust to ≤23 ppmvd at 15 percent O_2 or ≥70 percent CO emission reduction.

EL2 = Limit CO in exhaust to ≤49 ppmvd at 15 percent O_2 or ≥70 percent CO emission reduction.

EL3 = Limit CO in exhaust to ≤230 ppmvd at 15 percent O_2.

OC = Oxidation Catalyst (reduces CO and VOC).

Table 5-5. Requirements for New and Existing Area Source SI RICE

REQUIREMENTS FOR NEW AND EXISTING AREA SOURCE SI RICE (40 CFR 63, Subpart ZZZZ, Tables 1 through 6)									
Engine Category	**Rating (bhp)**	**Notices**		**Work Prac.**	**Emission Limits**	**Performance Testing**		**Control Device Oper. Limits**	**Hour Meter**
		Initial	**COMP**			**Initial**	**Sub-Sequent**		
Existing									
4SLB	>500	●	●	WP3		●	●	OC	
	≤500			WP6					
4SLB Remote or Operates <24hrs/yr	>500			WP4					
4SRB	>500	●	●	WP3		●	●	NSCR	
	≤500			WP6					
4SRB Remote or Operates <24hrs/yr	>500			WP4					
2SLB	ALL			WP5					
Landfill/Digester	ALL			WP6					
Black Start	ALL			WP4					
Emergency	ALL			WP4					●
New									
ALL	ALL	Comply with SI NSPS							

WP3 = Oil/filter change and inspect hoses, belts, and sparkplugs every 2160 hours of operation or annually. Oil analysis program eligible.

WP4 = Oil/filter change and inspect hoses and belts every 500 hours and inspect spark plugs every 1000 hours of operation or annually. Oil analysis program eligible.

WP5 = Oil/filter change and inspect hoses, belts, and sparkplugs every 4320 hours of operation or annually. Oil analysis program eligible.

WP6 = Oil/filter change and inspect hoses, belts, and sparkplugs every 1440 hours of operation or annually. Oil analysis program eligible.

NSCR = Non-Selective Catalytic Reduction (reduces NO_X, CO, and VOC).

OC = Oxidation Catalyst (reduces CO and VOC).

Table 5-6. Requirements for Existing Major Source SI RICE

REQUIREMENTS FOR EXISTING MAJOR SOURCE SI RICE (40 CFR 63, Subpart ZZZZ, Tables 1 through 6)									
Engine Category	Rating (bhp)	Notices		Work Prac.	Emission Limits	Performance Testing		Control Device Oper. Limits	Hour Meter
		Initial	COMP			Initial	Sub-Sequent		
4SRB	>500	●	●		EL7	●	●	NSCR	
	100 ≤ hp ≤ 500	●	●		EL8	●			
	<100			WP6					
4SLB	>500								
	100 ≤ hp ≤ 500	●	●		EL9	●			
	<100			WP6					
2SLB	>500								
	100 ≤ hp ≤ 500	●	●		EL10	●			
	<100			WP5					
Landfill/ Digester	>500								
	100 ≤ hp ≤ 500	●	●		EL11	●			
	<100			WP6					
Black Start	>500								
	≤500			WP4					
Emergency	>500								
	≤500			WP4					

WP4 = Oil/filter change and inspect hoses and belts every 500 hours and inspect spark plugs every 1000 hours of operation or annually. Oil analysis program eligible.

WP5 = Oil/filter change and inspect hoses, belts, and spark plugs every 4320 hours of operation or annually. Oil analysis program eligible.

WP6 = Oil/filter change and inspect hoses, belts, and spark plugs every 1440 hours of operation or annually. Oil analysis program eligible.

EL7 = CH_2O Reduction ≥76 percent or Limit CH_2O in exhaust to ≤350 ppbvd at 15 percent O_2.

EL8 = Limit CH_2O in exhaust to ≤10.3 ppmvd at 15 percent O_2.

EL9 = Limit CO in Exhaust to ≤47 ppmvd at 15 percent O_2.

EL10 = Limit CO in Exhaust to ≤225 ppmvd at 15 percent O_2.

EL11 = Limit CO in Exhaust to ≤177 ppmvd at 15 percent O_2.

NSCR = Non-Selective Catalytic Reduction (reduces NO_X, CO, and VOC).

OC = Oxidation Catalyst (reduces CO and VOC).

Table 5-7. Requirements for New Major Source SI RICE

REQUIREMENTS FOR NEW MAJOR SOURCE SI RICE (40 CFR 63, Subpart ZZZZ, Tables 1 through 6)									
Engine Category	**Rating (bhp)**	**Notices**		**Work Prac.**	**Emission Limits**	**Performance Testing**		**Control Device Oper. Limits**	**Hour Meter**
		Initial	**COMP**			**Initial**	**Sub-Sequent**		
4SRB	>500	●	●		EL7	●	●	NSCR	
	≤500	Comply with SI NSPS							
4SLB	>500	●	●		EL12	●	●	OC	
	250 - 500 Manf'd ≥ 01/01/08	●	●		EL12	●	●	OC	
	250 - 500 Manf'd < 01/01/08								
	<250	Comply with SI NSPS							
2SLB	>500	●	●		EL13	●	●	OC	
	≤500	Comply with SI NSPS							
Landfill/ Digester	>500	●							
	≤500	Comply with SI NSPS							
Limited Use	>500	●							●
	≤500	Comply with SI NSPS							
Black Start	>500	●							
	≤500								
Emergency	>500	●							●
	4SLB 250 - 500 Manf'd ≥ 01/01/08								●
	≤500	Comply with SI NSPS							

WP4 = Oil/filter change and inspect hoses and belts every 500 hours and inspect spark plugs every 1000 hours of operation or annually. Oil analysis program eligible.

WP5 = Oil/filter change and inspect hoses, belts, and spark plugs every 4320 hours of operation or annually. Oil analysis program eligible.

WP6 = Oil/filter change and inspect hoses, belts, and spark plugs every 1440 hours of operation or annually. Oil analysis program eligible.

EL7 = CH_2O Reduction ≥76 percent or Limit CH_2O in exhaust to ≤350 ppbvd at 15 percent O_2.

EL12 = CO emission reduction ≥93 percent or limit CH_2O in exhaust to ≤14 ppmvd at 15 percent O_2.

EL13 = CO emission reduction ≥58 percent or limit CH_2O in exhaust to ≤12 ppmvd at 15 percent O_2.

NSCR = Non-Selective Catalytic Reduction (reduces NO_x, CO, and VOC).

OC = Oxidation Catalyst (reduces CO and VOC).

5.5 Management (Work) Practice Standards

Each stationary RICE must be installed, maintained, and operated in a satisfactory manner. The EPA Administrator or delegated local/state authority may be petitioned, pursuant to the requirements of 40 CFR §63.6(g), for alternative work practices if necessary. As summarized in the previous tables, the oil/filter changes and the inspections must be conducted no later than the prescribed schedule (operating hours or annually, whichever comes first). If an inspection is required (spark plugs, belts, air cleaner, hoses, etc.), those items need to be replaced if the inspection indicates that replacement is necessary.

5.5.1 Maintenance Records

Stationary RICE subject to work practice standards must keep maintenance records which include oil and filter change dates and the corresponding hour on the hour meter, inspection and replacement dates for air cleaners, hoses and belts, and records of other emission-related repairs and maintenance performed per the manufacturer's instructions or the owner developed maintenance plan. Records must be kept for five years. At a minimum, the most recent two years must be stored on site while the remaining three years may be stored off-site, but readily available.

5.5.2 Maintenance During Emergency Operations

If an emergency engine is operating during an emergency and it is not possible to shut down the engine to perform the work practice requirements on the schedule required, or if performing the management practice on the required schedule would otherwise pose an unacceptable risk under federal, state, or local law, the management practice can be delayed until the emergency is over or the unacceptable risk under federal, state, or local law has abated. The management practice should be performed as soon as practicable after the emergency has ended or the unacceptable risk under federal, state, or local law has abated. Sources must report any failure to perform the management practice on the schedule required and the federal, state or local law under which the risk was deemed unacceptable (footnote to Tables 2c and 2d of 40 CFR 63, Subpart ZZZZ).

5.5.3 Oil Analysis Program

Oil in RICE becomes progressively contaminated and the rate of contamination can vary based on fuel type, amount of usage, age, duty cycle, and environmental conditions (e.g., hot weather). Oil will deteriorate to the point the oil and additive combination can no longer adequately protect the engine and it must be changed to prevent catastrophic failure. However, sometimes good oil gets changed unnecessarily when conducted on a fixed operating hour or calendar-based interval, such as required by RICE NESHAP. The EPA acknowledged the environmental (disposal and recycling of used oil) and operating cost benefits of extended intervals between oil changes. Therefore, an oil analysis program may be utilized to extend the specified oil change requirement for stationary RICE if the following criteria are met:

- The oil analysis must be performed at the same frequency specified for changing the oil.

- If the engine is not in operation when the results of the analysis are received, the engine owner or operator must replace the oil within two business days or before commencing operation, whichever is later.

- The owner or operator must keep records of the parameters that are analyzed as part of the program, the results of the analysis, and the oil changes for the engine. The analysis program must be part of the maintenance plan for the engine.

- If ANY of the condemning limits are exceeded, the oil MUST be replaced within two business days of receiving the results of the analysis. If ALL the condemning limits are not exceeded, the oil is NOT required to be replaced.

- The following parameters must be analyzed (make sure that the field test kit and/or laboratory report meets the EPA standards for RICE NESHAP applicability) [40 CFR §63.6625(j)].

Table 5-8. Oil Analysis Condemning Limits

OIL ANALYSIS PROGRAM	
Parameter	**Condemning Limits**
Total Base Number (CI RICE only)	<30 percent of the Total Base Number of the oil when new
Total Acid Number (SI RICE only)	Increased by more than 3.0 mg of potassium hydroxide per gram from Total Acid Number of the oil when new.
Viscosity	Changed by more than 20 percent from the viscosity of the oil when new.
Percent Water Content by volume	>0.5

NOTE: Always weigh the cost-benefit of changing the oil versus an oil analysis. Generally, it makes sense to use an oil analysis to prolong the time between oil changes for an engine that requires a large quantity of oil. However, there are situations when it is prudent to forgo the oil analysis and change the oil on schedule (e.g., a small engine requiring a few liters/quarts of oil).

5.5.4 Startup (Idling) Limits

The engine's time spent at idle during startup must be minimized for existing stationary CI ICE (non-emergency and emergency). Engine startup time must be limited to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the required emission standards applicable to the engine apply (40 CFR §63.6625).

Engine startup is defined as the time from initial start until applied load and engine and associated equipment, including the catalyst if applicable, reach steady state or normal operation.

5.5.5 Crankcase Emission Control

Existing stationary, non-black start, non-emergency CI ICE greater than 300 hp are required to control crankcase emissions to reduce HAP emissions (40 CFR 63.6625[g]). Owner/operators of existing non-emergency, non-black start CI engines greater than 300 hp that are not equipped with a closed crankcase ventilation system must:

- Install a closed crankcase ventilation system that prevent crankcase emissions from being emitted to the atmosphere, or
- Install an open crankcase filtration system that reduces emissions from the crankcase by filtering the exhaust stream to remove oil mist, particulates, and metals.

Manufacturer's requirements must be followed for operating and maintaining either type of system and for replacing the crankcase filters. The Administrator can be petitioned to approve different maintenance requirements that are as protective as the manufacturer requirements. Keep records of the manufacturer's recommended maintenance procedures (and Administrator approved procedures, if applicable) and records of maintenance performed on the system.

5.6 Fuel Requirements

All diesel fuel is required to be ultra-low sulfur (ULSD) after 2014 (CARB ULSD in California). Older engines may need adjustments (e.g., replacement of gaskets) to accommodate ULSD. Newer engines (model year 2007 and newer) are normally equipped with advanced pollution-control technology designed for ULSD and fuels with high sulfur content may damage the engine and/or equipment. Some military stationary ICE are designed to be JP-8 or Kerosene Jet-fuel compatible and will need an NSE or permission from the EPA or local authority to use any fuel other than ULSD (or CARB ULSD). Check with the manufacturer and/or engine instructions for potential fuel compatibility issues if there is a reason for concern. The following table summarizes fuel requirements for RICE NESHAP:

Table 5-9. Fuel Requirements for Stationary CI RICE

FUEL REQUIREMENTS FOR STATIONARY CI RICE [40 CFR §63.6604 and 40 CFR §80.510(b)]		
Engine type (Displacement < 30 liters per cylinder)	**Beginning Date**	**Fuel Requirement**
Existing non-emergency, non-black start CI RICE > 300 bhp	1 June 2010	Ultra-Low Sulfur Diesel (ULSD) - Sulfur content is 15 ppm or less, minimum cetane index of 40 or a maximum aromatic content of 35 percent by volume.
Existing emergency CI RICE >100 bhp used for Demand Response or Local Reliability Programs	1 January 2015	
New emergency CI RICE >500 bhp used for Demand Response or Local Reliability Programs		
Existing CI stationary RICE located in Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, at area sources in remote Alaska, or are on offshore vessels that meet are exempt from these requirements.		

5.7 Compliance Testing

Compliance with the numerical emission standards in the preceding tables in this Chapter is demonstrated through performance testing. Performance testing measures the concentration and/or quantities of pollutants emitted from the stationary RICE. Each pollutant is measured using a specific EPA approved test method. A test method is a standardized technique of conducting a test to ensure that results are scientifically defensible. Prior to testing, the EPA or delegated authority (usually the local air district) needs to be notified to review the test plans, witness the testing, and review/approve the test results. The complete table of RICE NESHAP performance testing methods is in Table 4 of 40 CFR 63, Subpart ZZZZ. The table is also provided in Appendix D located in the back of this Guide.

If performance testing is required to demonstrate compliance with the emission limit, testing must be conducted within six months of installation. Engines greater than 500 bhp also need subsequent testing every 8,760 hours of operation or every three years, whichever comes first. The resulting data needs to be logged and reported to demonstrate the standard is being met (RICE NESHAP also requires all notifications to be submitted to EPA at least 60 days after completing a performance testing).

- A Notification of Performance Testing is required to be submitted to the state, local, or EPA administrator at least 60 days prior to testing. The purpose of the notification is to give the agency the opportunity to review and approve the site-specific test plan [40 CFR 63.7(c)]. The test plan must include a test program summary, the test schedule, data quality objectives, and both an internal and external quality assurance program.

- Performance testing to demonstrate compliance must be conducted within either 180 or 240 days of the stationary ICE's installation, depending on the stationary RICE's classification.
- Compliance with the numerical emission limitations established is based on the results of testing the average of three one-hour runs.
- Most stationary ICE are only required to have an initial performance test without further testing.
- The data needs to be logged and reported to demonstrate that the standard is being met.
- The RICE rule requires all compliance status notifications to be submitted to EPA at least 60 days after completing performance testing.
- Owners and operators of a non-operational engine or emergency engines can conduct the performance test when the engine is started up again or when the emergency is over.

5.7.1 Previous Performance Test

An initial performance test on stationary RICE is not required if a performance test has been previously conducted on the engine, but the test must meet all the following conditions [40 CFR 63.6610(d)]:

- The test must have been conducted using the same methods specified in RICE NESHAP, and these methods must have been followed correctly.
- The test must not be older than 2 years.
- The test must be reviewed and accepted by the Administrator.
- Either no process or equipment changes must have been made since the test was performed, or the owner or operator must be able to demonstrate that the results of the performance test, with or without adjustments, reliably demonstrate compliance despite process or equipment changes.
- The test must be conducted at any load condition within plus or minus 10 percent of 100 percent load.

5.7.2 Subsequent Performance Test

After the initial performance test, subsequent performance tests are required for the following stationary ICE:

Table 5-10. Subsequent Performance Test Schedule

SUBSEQUENT PERFORMANCE TEST SCHEDULE (40 CFR 63.6615 and 63.6620 and Table 3 to 40 CFR 63, Subpart ZZZZ)		
Stationary RICE	**Complying with this requirement**	**Conduct subsequent performance tests**
New or reconstructed 2SLB stationary RICE >500 bhp located at major sources	Reduce CO emissions and not using a Continuous Emissions Monitoring System (CEMS)	Semiannually[1]
New or reconstructed 4SLB stationary RICE ≥250 bhp located at major sources		
New or reconstructed CI stationary RICE >500 bhp located at major sources		
4SRB stationary RICE ≥500 bhp located at major sources	Reduce formaldehyde emissions	Semiannually[1]
Stationary RICE >500 bhp located at major sources	Limit the concentration of formaldehyde in the stationary RICE exhaust	Semiannually[1]
New or reconstructed 4SLB stationary RICE 250≤bhp≤500 located at major sources		
Existing non-emergency, non-black start CI stationary RICE >500 bhp that are not limited use stationary RICE	Limit or reduce CO emissions and not using a CEMS	Every 8,760 hours or 3 years, whichever comes first.
Existing non-emergency, non-black start CI stationary RICE >500 bhp that are limited use stationary RICE	Limit or reduce CO emissions and not using a CEMS	Every 8,760 hours or 5 years, whichever comes first.

[1]After compliance has been demonstrated for two consecutive tests, the frequency of subsequent performance tests may be reduced to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or if there is any deviation from the applicable operating limitations, semiannual performance tests must resume.

5.8 Operating Limits

In general, RICE NESHAP emission limits are intended to be met using emissions control devices, such as:

- Non-Selective Catalytic Reduction (NSCR) provides effective NOx-reduction technology for RB SI ICE, and generally applies to 4SRB SI RICE >500 bhp.
- Oxidation Catalyst (OC) is an effective control method for CO, NMHCs, VOCs, and formaldehyde, and generally applies to large 2SLB, 4SLB, and CI RICE.

Demonstrating compliance with an emission limit using emissions control devices requires operating limits to ensure that the device is operating properly. If the engine is subject to an emission limit (i.e., reduction of CO emissions and/or limit formaldehyde concentration in exhaust) and is not using an OC or NSCR to comply with the limit, comply with the operating limitations approved by the Administrator.

Table 5-11 provides a summary of the operating limits for certain stationary RICE. Sources can petition the EPA Administrator pursuant to the requirements of 40 CFR 63.8(f) for a different temperature range.

Table 5-11. Operating Limitations for RICE

RICE NESHAP OPERATING LIMITS (40 CFR 63, Subpart ZZZZ, Tables 1b and 2b)				
Source Status	**Engine Type**	**Rating (bhp)**	**Control Device**	**Operating Limit (applies at all times, except during periods of startup)**
Major Source – Existing, New, and Reconstructed	SI 4SRB	>500	NSCR	a. Maintain the catalyst so that the pressure drop across the catalyst does not change by more than two inches of water at 100 percent load plus or minus 10 percent from the pressure drop across the catalyst measured during the initial performance test; and b. Maintain the temperature of your stationary RICE exhaust so that the catalyst inlet temperature is greater than or equal to 750 °F and less than or equal to 1250 °F.
Major Source – New and Reconstructed	SI 2SLB*	>500	OC	a. Maintain the catalyst so that the pressure drop across the catalyst does not change by more than two inches of water from the pressure drop across the catalyst that was measured during the initial performance test (*at 100 percent load plus or minus 10 percent); and b. Maintain the temperature of the stationary RICE exhaust so that the catalyst inlet temperature is greater than or equal to 450 °F and less than or equal to 1350 °F.
	SI 4SLB*	≥250		
Major and Area Source - Existing, New, and Reconstructed	CI RICE	>500		

5.9 Tier 1 and Tier 2 Certified Engines Scheduled for Replacement

Some states, such as California, require certain model years certified to Tier 1 or Tier 2 standards to be replaced (most have now been replaced). Therefore, the EPA allows existing non-emergency CI RICE >300 HP at area sources certified to Tier 1 or Tier 2 and subject to an enforceable state and/or local rule that requires replacement to comply with management practices until 1 January 2015 (or 12 years after installation date, whichever is later, but not later than 1 June 2018) [40 CFR §63.6603(d)]. The notification, including the identification of the state and/or local regulation requiring replacement of the engine, must have been submitted by 3 March 2013 to take this option. The management practices that will apply to the engine are:

- The same management practices applicable for stationary non-emergency CI RICE with a site rating of less than or equal to 300 hp.
- Operating limitations in Table 2b of RICE NESHAP.
- Crankcase ventilation system requirements in §63.6625(g).

Additionally, RICE NESHAP states that existing stationary area source Tier 3 certified CI engines (Tier 2 for engines ≥560 kW) installed before 12 June 2006 that comply with CI NSPS, are in compliance with RICE NESHAP [40 CFR §63.6603(d)].

Additional information regarding the Tier Levels is available in the beginning of Chapter 6, *Compliance with SI/CI NSPS*.

5.10 Monitoring and Data Collection Requirements

If the stationary RICE is subject to emission and operating limits, data must be monitored and collected to demonstrate continuous compliance.

- Except for monitor malfunctions, associated repairs, required performance evaluations, and required quality assurance or control activities, the stationary RICE must be monitored continuously while operating at all times.
    - A monitoring malfunction is any sudden, infrequent, not reasonably preventable failure of the monitoring to provide valid data. Monitoring failures that are caused in part by poor maintenance or careless operation are not malfunctions.
- Do not use data recorded during monitoring malfunctions, associated repairs, and required quality assurance or control activities in data averages and calculations used to report emission or operating levels.

5.11 Demonstrating Initial Compliance

RICE NESHAP establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations. Compliance with the required emission reduction or limitation is demonstrated in the initial performance test. During the initial performance test, the applicable operating limitations must also be established.

Depending on the specific emission limits that apply to the engine, the installation of a CEMS or a Continuous Parametric Monitoring System (CPMS) to demonstrate compliance with the applicable emission limits may also be required. The EPA must be petitioned for operating limits (or for approval of no operating limits) if the engine is not using an OC or NSCR to comply with the emission limits. The initial performance test cannot be conducted until the petition has been approved.

The methods for demonstrating initial compliance to the emission and operating limits, as well as other requirements, are available in Table 5 of 40 CFR 63, Subpart ZZZZ, and also can be found in Appendix E of this Guide. The testing must be conducted according to the requirements in Table 4 of 40 CFR 63, Subpart ZZZZ, which can also be found in Appendix F of this Guide.

5.12 Demonstrating Continuous Compliance

The stationary RICE must be in compliance with the applicable emission limitations and operating limitations at all times during operation [40 CFR §63.6605 (a)]. Continuous compliance must be demonstrated with the emission limits, operating limits, and other requirements are required after initial testing is conducted. Each instance the engine did not meet these requirements is required to be reported. These instances of noncompliance are referred to as deviations [40 CFR §63.6640(b) and (e)].

NOTE: For new, reconstructed, and rebuilt stationary RICE, deviations from the emission or operating limitations that occur during the first 200 hours of operation from engine startup (engine burn-in period) are not violations [40 CFR §63.6640(d)].

The requirements for demonstrating continuous compliance with emission limits, operating limits, and other requirements are contained in Table 6 of 40 CFR 63, Subpart ZZZZ and in Appendix F of this Guide. (as always, check the e-CFR, CFR, or FR for updates).

5.13 Annual and Semiannual Compliance Reporting Requirements

Compliance reports are required to be submitted either annually or semiannually (one semiannual and one annual report) to the EPA Administrator and state or local regulatory agency. These reports may be combined with other annual and semiannual report submittal schedules and/or submitted on a different schedule than prescribed for the engine, if agreed upon by the regulatory agency. Also, the installation can combine reports for multiple affected facilities (e.g., Title V reports) [40 CFR §63.6650 and §63.10(a)].

The reports must be retained for at least five years following the date of each occurrence, measurement, maintenance, corrective action, report, or record. At a minimum, the most recent two years of data are required to be retained on site. The remaining three years of data may be retained off site. Such files may be maintained on microfilm, on a computer, on computer floppy disks, on magnetic tape disks, or on microfiche [40 CFR §63.10(a)].

Table 5-12, *Engines Subject to RICE NESHAP Reporting*, summarizes which engines are required to submit an annual and/or semiannual report and the type of report required:

Table 5-12. Engines Subject to RICE NESHAP Reporting

RICE NESHAP ENGINES SUBJECT TO ANNUAL AND SEMIANNUAL REPORTING			
Report	**Engine Type**	**Area Source Engines Required to Report**	**Major Source Engines Required to Report**
Semiannual Compliance Report (deviations)	Existing non-emergency, non-black start engines	CI engines >300 bhp	Engines 100≤ hp ≤500, CI engines >500 bhp, 4SRB >500 hp
	New or reconstructed non-emergency engines	N/A	Engines >500 bhp, 4SLB engines 250≤ hp ≤500
Semiannual Compliance Report (results of annual compliance demonstration, if conducted within reporting period)	Existing non-emergency, non-black start engines	4SLB and 4SRB engines >500 bhp that are not remote engines and that operate more than 24 hours per calendar year	N/A
Annual Report (digester gas and landfill gas fuel use, metering, and deviations)	New or reconstructed non-emergency engines	Engines that combust landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis	Engines that combust landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis
NOTE: State and local regulatory agencies may have more stringent compliance regulations and reporting requirements for stationary RICE.			

5.13.1 Annual and Semiannual Report Deadlines

Unless the Administrator has approved a different schedule for submission of reports, the deadlines for the semiannual and annual compliance reports are as follows:

- Semiannual compliance reports
    - The first compliance report must cover the period beginning on the compliance date for the engine and ending on 30 June or 31 December, as applicable.
    - Subsequent compliance reports must cover the semiannual reporting period from 1 January through 30 June or the period from 1 July through 31 December.

  - Must be postmarked or delivered on or before 31 July or 31 January (one month after the end of the applicable reporting period).

- Annual compliance reports
  - The first compliance report must cover the period beginning on the compliance date for the engine and ending on 31 December.
  - Subsequent compliance reports must cover the annual reporting period from 1 January through 31 December.
  - Must be postmarked or delivered on or before 31 January (1 month after the end of the reporting period).

5.13.2 Annual and Semiannual Report Submission

The annual and semiannual compliance reports must be submitted to the EPA Regional Office, State, and/or Local regulatory agency in the format requested by the particular agency. Some regional, state, and local regulatory agencies require electronic submission of reports and test results.

- The reports must be submitted to the appropriate EPA Regional Office (The addresses for EPA Regional Offices can be found at the following website: www.epa.gov/ttn/atw/area/table_state_contacts.doc).
- If the state has been delegated the authority for RICE NESHAP under section 112(l) of the Clean Air Act, also submit the report(s) to the appropriate State agency. Contact the appropriate EPA Regional Office to determine whether the State has been delegated the authority for this RICE NESHAP.
- Furthermore, the state or local regulatory agency may require a copy of the report(s).
- Any new or existing emergency stationary ICE with a maximum engine power greater than 100 HP that operates (or is contractually obligated to operate) for demand response and/or local reliability 15 or more hours per year must submit their reports online through EPA's Compliance and Emissions Data Reporting Interface (CEDRI). Currently, the EPA has templates for reporting information in CEDRI. However, if the reporting form specific to RICE NESHAP is not available in CEDRI at the time that the report is due, the written report must be submitted to the EPA at the appropriate regional address found in 40 CFR §63.13. *Emergency engines should not be operating for demand response and/or local liability due to the 1 May 2016 vacatur of those allowances.*

NOTE: The EPA started to promulgate regulations to expand electronic reporting (E-Reporting) for stationary ICE; however, EPA withdrew the Final Rule from the Office of the Federal Register until further notice.

5.13.3 Compliance Report Contents

Each compliance report must include the following information as applicable to the engine:

- The installation name and address.
- A statement by the responsible official (i.e., USAF installation Commanding Officer) including the official's name, title, and signature, certifying the accuracy of the content of the report.
- The date of the report and the beginning and end dates of the reporting period.
- Additional information typically required in semiannual reports:
    - If there was a malfunction during the reporting period, include the number, duration, and a brief description for each type of malfunction which caused or may have caused any applicable emission limitation to be exceeded, and the corrective action taken to minimize emissions and correct the malfunction.
- Deviations:
    - If there were no deviations from any emission or operating limitations, a statement that there were no deviations from the emission limitations or operating limitations during the reporting period.
    - If a deviation has occurred during the reporting period:
        - The total operating time of the engine at which the deviation occurred during the reporting period.
        - Information on the number, duration, and cause of deviations (including unknown cause, if applicable), and the corrective action taken.
    - Fuel requirement deviations:
        - If there were no deviations from applicable fuel requirements, a statement that there were no deviations from the fuel requirements during the reporting period.
        - If there were deviations from applicable fuel requirements, information on the number, duration, and cause of deviations, and the corrective action taken.
    - CEMS or CPMS equipment deviations, out-of-control periods, or malfunctions:
        - If there were no periods during which the CEMS or CPMS was out of control, a statement that there were not periods during which the CEMS or CPMS was out of control during the reporting period.

        - If there were deviations, out-of-control periods, or malfunctions, include the following:
            - Date and time (both start and stop) of each malfunction, deviation, or out- of-control period, and the total duration as a percent of the total engine operating time during the reporting period.
            - The date, time, and duration that the CPMS or CEMS was inoperative, except for zero (low-level) and high-level checks.
            - Cause of the deviation (including unknown cause, if applicable).
            - Duration and percent of total operating time that the CEMS or CPMS was down.
            - The parameters and pollutants being monitored.
            - Brief description of the engine.
            - Brief description of the CEMS or CPMS.
            - Date of the latest CEMS or CPMS certification or audit.
            - Any changes in the CEMS or CPMS process or controls since the last reporting period.
    - For existing non-emergency, non-black start 4SLB and 4SRB stationary engines >500 hp located at an area source of HAP that are not remote stationary RICEs and that operate more than 24 hours per calendar year, the results of the annual compliance demonstration, if performed during the reporting period.

- Additional information typically required in annual reports:
    - All information required for semiannual reports as shown above.
    - For new and reconstructed engines that combust landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis:
        - The fuel flow rate of each fuel and the heating values that were used in the calculations.
        - Demonstration that the percentage of heat input provided by landfill gas or digester gas is equivalent to 10 percent or more of the gross heat input on an annual basis.
        - Any problems or errors suspected with the meters.

GENERAL NEW SOURCE PERFORMANCE STANDARDS COMPLIANCE

NOTE: Compliance deadlines have already passed. Newly constructed, reconstructed, and modified engines must comply at start-up.

EPA, under the authority of the CAA, maintains regulations in 40 CFR Part 60 referred to as New Source Performance Standards (NSPS). Each NSPS regulation establishes emission limits and/or work practice requirements for a specific equipment category, including stationary CI and SI ICE. NSPS require manufacturers of new engines to build cleaner engines by setting limits on emissions based on EPA's assessment of available technologies. Since the focus on the regulations is on new engines, NSPS regulation is triggered when a stationary CI or SI ICE is constructed, reconstructed, or modified after an effective date.

For most engines, compliance with NSPS is the responsibility of the manufacturer which must certify those engines will meet emission standards for its full, regulatory useful lives. As a result, anyone that purchases an EPA-certified stationary CI or SI ICE is automatically compliant with the applicable NSPS standard. However, the EPA does not require the manufacturer to certify certain engines. For those engines, the responsibility of meeting the emission standards falls on the engine's owner/operator by either:

- Complying by purchasing an engine voluntarily certified by the manufacturer.
- Complying by meeting emission limits for an engine not certified by the manufacturer.

NOTE: Compliance testing or other standards may apply if the state or local air quality authority imposes more stringent standards than the Federal NSPS regulations.

6.1 Tier Levels

The first set of emission regulations, known as Tier 1, was published in 1996; ever since then, the EPA promulgated progressively more stringent Tiers. With each successive Tier of regulations, manufacturers employed technology to meet the standards. The EPA allows two years from the date of each Tier-level change to install an engine certified to comply with the previous tier to accommodate manufacturer's depletion of existing inventory.

Currently, Tier 4 emission standards are the final and strictest emission requirement and is the standard that most stationary CI ICE must now meet. For most of the stationary ICE power range, the final version of Tier 4 was phased in after an interim period (known as Tier 4i). Emergency engines that are not certified to Tier 4 must be labeled to indicate that they are to be used for emergency use only. The following tables depict the emission Tier implementation schedule for non-emergency and emergency (diesel) stationary ICE (the certification Tier of the engine may not be the same between two manufacturers):

Table 6-1. Non-Emergency Stationary ICE Emission Tier Implementation Timeline

Non-Emergency Stationary ICE Tier Level Timeline															
Engine Power Rating		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
(HP)	kWm														
(0 - 11)	0 ≤ P < 8	Tier 1	Tier 2			Tier 4 Final									
(11 - 25)	8 ≤ P < 19														
(25 - 50)	19 ≤ P < 37	Tier 2				Tier 4 Interim					Tier 4 Final				
(50 - 75)	37 ≤ P < 56														
(75 - 100)	56 ≤ P < 75					Tier 3				Tier 4 Interim			Tier 4 Final		
(100 - 174)	75 ≤ P < 130	Tier 2				Tier 3									
(174 - 302)	130 ≤ P < 225	Tier 2			Tier 3				Tier 4 Interim			Tier 4 Final			
(302 - 603)	225 ≤ P < 450	Tier 2	Tier 3												
(603 - 750)	450 ≤ P < 560														
(750 - 1206)	560 ≤ P < 900	Tier 1	Tier 2						Tier 4 Interim				Tier 4 Final		
(>1206)	> 900														

Table 6-2. Emergency (Diesel) Stationary ICE Tier Implementation Timeline

Emergency (Diesel) Stationary ICE Tier Level Timeline												
Engine Power Rating		April 2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
(HP)	kWm											
≤25	≤18	Tier 1	Tier 2	Tier 4 Final								
25 ≤ hp ≤ 48	19 ≤ hp ≤ 36			Tier 4 Interim								
49 ≤ hp ≤ 74	37 ≤ hp ≤ 55			Tier 3*				Tier 3				
75 ≤ hp ≤ 99	56 ≤ hp ≤ 74			Tier 3								
100 ≤ hp ≤ 173	75 ≤ hp ≤ 129		Tier 3									
174 ≤ hp ≤ 751	130 ≤ hp ≤ 560		Tier 3									
752 ≤ hp ≤ 1207	561 ≤ hp ≤ 900		Tier 2									
1208 ≤ hp ≤ 3000	901 ≤ hp ≤ 2237		Tier 2									
>3000	>2237		Tier 1				Tier 2					

*Compliance with optional 0.30 g/kW-hr PM limit in 2008 allows 1-year delay of T4 until 2013 (Option 1). Option 1 engines in 2008 are T4i engines, not T3 engines.

NOTE: Generally, emission standards for fire pumps 2007 and older were delayed three years.

6.2 Compliance with a Certificate of Conformity

For many engines, the simplest method of complying with the CI and SI NSPS, is to purchase engines for which the manufacturer has received a Certificate of Conformity from the EPA. The only other compliance requirement for operators of such engines is to properly install, configure, operate, and maintain the engine per manufacturer's instructions or manufacturer-approved procedures (and keep records documenting doing so). Some engines are required to be certified by the EPA, while other engines may be voluntarily certified by the EPA at the manufacturer's request.

NOTE: The owner/operator of the engine can only change those settings that are permitted by the manufacturer. If a certified stationary ICE is NOT installed, configured, operated, or maintained per the manufacturer's instructions or manufacturer-approved procedures, a performance test is required to demonstrate compliance to the emission standards. In addition, the owner/operator is required to develop and "keep a maintenance plan and records of conducted maintenance to demonstrate compliance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions" [40 CFR §60.4211(g)].

6.2.1 Maintenance and Replacement Parts for Certified Engines

Some engine manufacturers and part suppliers assert that all maintenance and replacement parts (e.g., spark plugs) must be purchased from the certifying manufacturer or the certification is voided. The EPA does NOT require the use of original OEM parts or certified components when replacing emission-related parts. Using certified parts may be ideal, but as indicated in the 2007 regulatory preamble, there is no requirement to do so. However, the EPA disallows tampering with the engine and control devices (including the installation of clearly inadequate replacement components).

6.3 Compliance without a Certificate of Conformity

Most non-certified Engines will require at least an initial performance test.

NOTE: If a performance test is conducted, stationary CI ICE with a displacement of less than 30 liters per cylinder meet the not-to-exceed (NTE) standards of 1.25 × the applicable manufacturer's certification emission standard [40 CFR §60.4204(d)]. The NTE standards do not apply to stationary CI ICE greater or equal to 30 liters per cylinder.

The following options are available for:

- Stationary SI ICE has a maximum engine power greater than or equal to 500 HP that is manufactured after 1 2007 and before 1 July 2008.

- A pre-2007 model year stationary CI ICE.
- A stationary CI fire pump engine that is manufactured prior to the model years in Table 3 of 40 CFR 63, Subpart IIII (and in Table 6-3, *Certification Requirements for Stationary Fire Pump Engines*, below):

For the above listed stationary ICE that are not certified, compliance with the CI and SI NSPS rules can be achieved by [40 CFR §60.4211(b) and §60.4243(h)]:

- Using emission test results from a test conducted on a similar engine.
- Using data from the engine manufacturer.
- Using data from the control device vendor.
- Conducting an in-use performance test.

Table 6-3. Certification Requirements for Stationary Fire Pump Engines

CERTIFICATION REQUIREMENTS FOR STATIONARY FIRE PUMP ENGINES (Table 3 of 40 CFR 60, Subpart IIII)	
Engine power	**Starting model year engine manufacturers must certify new stationary fire pump engines**
KW<75 (HP<100)	2011
75≤KW<130 (100≤HP<175)	2010
130≤KW≤560 (175≤HP≤750)	2009
KW>560 (HP>750)	2008

COMPLIANCE WITH COMPRESSION IGNTION NSPS

Reminder: If an engine is a dual fuel engine (i.e. one that burns both natural gas and diesel), then, for the purposes of the stationary ICE rules, the engine is considered CI if two percent or more of the energy is obtained from burning diesel in the engine on an annual average.

CI NSPS applies to stationary CI ICE:

- Ordered after 11 July 2005 and manufactured after 1 April 2006 (or 1 July 2006 for a fire pump certified by the NFPA).
- Modified or reconstructed after 11 July 2005.

7.1 Compliance Requirement Options for CI ICE

Both emissions limits and fuel standards may apply to engines subject to CI NSPS. However, most of the burden of compliance is on the manufacturer. Manufacturers are required to certify their 2007 model year and later stationary engines below 30 liters per cylinder to the respective standards, as applicable for the model year and maximum engine power (and displacement per cylinder in nonroad or marine standards). While emission certification requirements also apply to stationary emergency engines, the certification levels for these are less stringent. Engines not certified by the manufacturer must be brought into compliance with the regulations by the owner/operator. There are two approaches for compliance:

Option One:

1) Purchase a stationary CI ICE that was tested and EPA certified (Certificate of Conformity) to meet the emission standards that apply to that model year.
    - Engine manufacturers must certify their 2007 model year and later stationary CI ICE with a displacement <30 liters/cylinder.
    - Engine manufacturers must also certify their stationary fire pump engines model years 2008 through 2011 and later, depending on the engine size.
    - Engine manufacturers can voluntarily certify pre-2007 model year stationary engines or stationary engines with a displacement ≥30 liters/cylinder.
2) Install, configure, operate, and maintain stationary CI ICE and any emission control devices per the manufacturer's emission-related written instructions or manufacturer approved procedures. Only change settings that are permitted by the manufacturer.
3) Comply with fuel requirements.

4) Maintain records demonstrating that the engine has an EPA Certificate of Conformity and that the engine is installed, configured, operated, and maintained as required (the engine name plate indicates proof of engine certification and the certified tier level).

Option Two:

This option is for stationary CI ICE that are not required to be certified (or not voluntarily certified) by the manufacturer.

1) If the engine is pre-2007, employ one of the following methods to demonstrate compliance with the emission standards:

   - Keep records of a performance test conducted on a similar engine,
   - Keep records of engine manufacturer data indicating compliance,
   - Keep records of control device vendor data indicating compliance, or
   - Conduct an initial performance test. Conduct performance to meet the NTE standards of 1.25 times the manufacturer's standard.

2) If the engine has a displacement of ≥30 liters per cylinder, an initial and annual performance test must be conducted, and operating parameters must be continuously monitored.
3) Install, configure, operate, and maintain the stationary CI ICE and any emission control devices per the manufacturer's emission-related written instructions or manufacturer approved procedures. Only change settings that are permitted by the manufacturer.
4) Comply with fuel requirements.
5) All standards must be met for the life of the engine.

7.1.1 Requirements for CI ICE Not Operated in Certified Manner

If a certified stationary CI ICE (including control devices) is not installed, configured, operated or maintained according to the manufacturer's emission-related written instructions or the emission-related settings are changed in a way that is not permitted by the manufacturer, the owner/operator is required to demonstrate compliance as follows:

- Keep a maintenance plan and records of conducted maintenance and maintain and operate the engine in a manner consistent with good air pollution control practice to minimize emissions.

AND

- For CI ICE less than 100 hp: Conduct an initial performance test within one year of such action [§60.4211(g)(1)].

- For CI ICE greater than or equal to 100 hp and less than or equal to 500 hp: Conduct an initial performance test within one year of engine startup, or within one year after an engine and control device is no longer installed, configured, operated and maintained per the manufacturer's emission-related written instructions, or within one year after emission-related settings are changed in a way that is not permitted by the manufacturer [§60.4211(g)(2)].

- For CI ICE greater than 500 hp: Conduct an initial performance test within one year of engine startup, or within one year after an engine and control device is no longer installed, configured, operated, maintained in accordance with the manufacturer's emission-related written instructions, or within one year after emission-related settings are changed in a way that is not permitted by the manufacturer. Subsequent performance testing must be conducted every 8,760 hours or 3 years, whichever comes first, thereafter to demonstrate compliance [§60.4211(g)(3)].

7.2 Remote Locations

The EPA promulgated unique standards for areas where the normal standards are unreasonable due to geographical, meteorological, and economic factors, such as remote areas with limited or no access to low-sulfur fuel.

7.2.1 CI ICE used in Remote Alaska

The definition of remote areas of Alaska are aligned with the definition currently used in RICE NESHAP. Remote areas of Alaska are defined in 40 CFR §60.4219 of the CI NSPS rule and in Section 5.2.1 of this Guide.

Remote communities in Alaska are located in the most severe arctic environments in the United States which are typically not accessible by the FAHS. These communities are often connected to an isolated power grid (i.e., Alaska Railbelt Grid) and rely on stationary ICE for electricity. CI NSPS allow for special compliance rules for stationary ICE, including (40 CFR §60.4216):

- No requirement to use after treatment devices for NO_X, in particular, SCR.
- The blending of used lubricating oil is allowed (in volumes of up to 1.75 percent of the total fuel, if the sulfur content of the used lubricating oil is less than 200 ppm and the used lubricating oil meets specifications).
- Pre-2014 model year engines are exempted from diesel fuel sulfur requirements (no Ultra-Low Sulfur Diesel, also known as ULSD).
- The use of engines certified to marine engine standards and Tier 3 nonroad industrial engine "emergency" standards is allowed; however; PM after treatment devices for 2014 and later model years are required.

7.2.2 CI ICE used in Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands

There are two significant exemptions to the NSPS that pertain specifically to stationary CI ICE used in the Commonwealth of the Northern Mariana Islands (CNMI), Guam, and American Samoa (40 CFR §60.4215).

- The maximum sulfur content for diesel fuel used remains at 0.50% or 5000 parts per million by weight (local fuel suppliers those areas currently supply this grade of diesel).
- Stationary CI ICE with a displacement of less than 30 liters per are required to meet the applicable emission standards in §§60.4202 and 60.4205.
- Stationary CI ICE with a displacement of greater than or equal to 30 liters per cylinder are required to meet the following emission standards:

  (1) For engines installed prior to 1 January 2012, limit the emissions of NO_X in the stationary CI internal combustion engine exhaust to the following:

  (i) 17.0 g/kW-hr (12.7 g/HP-hr) when maximum engine speed is less than 130 revolutions per minute (rpm);

  (ii) 45 * n−0.2 g/kW-hr (34 * n−0.2 g/HP-hr) when maximum engine speed is 130 or more but less than 2,000 rpm, where n is maximum engine speed; and

  (iii) 9.8 g/kW-hr (7.3 g/HP-hr) when maximum engine speed is 2,000 rpm or more.

  (2) For engines installed on or after 1 January 2012, limit the emissions of NO_X in the stationary CI internal combustion engine exhaust to the following:

  (i) 14.4 g/KW-hr (10.7 g/HP-hr) when maximum engine speed is less than 130 rpm;

  (ii) 44 * n−0.23 g/KW-hr (33 * n−0.23 g/HP-hr) when maximum engine speed is greater than or equal to 130 but less than 2,000 rpm and where n is maximum engine speed; and

  (iii) 7.7 g/KW-hr (5.7 g/HP-hr) when maximum engine speed is greater than or equal to 2,000 rpm.

  (3) Limit the emissions of PM in the stationary CI internal combustion engine exhaust to 0.40 g/KW-hr (0.30 g/HP-hr).

7.3 Install and Import Deadlines

NOTE: Installed means the engine is placed and secured at the location where it is intended to be operated. Installation deadline requirements DO NOT apply to owners/operators of CI ICEs

that have been modified or reconstructed and do not apply to engines that are removed from one location and reinstalled at a new location.

NSPS rules have restrictions on installing and importing engines produced in previous model (refer to the following table for specifics). Additionally, it is prohibited to import stationary CI ICE with a displacement of less than 30 liters per cylinder that do not meet the applicable requirements specified in the table below.

Table 7-1. Deadlines for Importing or Installing Stationary CI ICE

DEADLINES FOR IMPORTING OR INSTALLING STATIONARY CI ICE PRODUCED IN PREVIOUS MODEL YEARS (40 CFR §60.4208)	
CI ICE Engine size	**Stop installing and/or importing CI ICE after this Date:**
Any size CI ICE that does not meet 2007 model year engine requirements (excludes fire pump engines).	31 December 2008
Stationary CI ICE with a maximum engine power <25 hp (19 kW) that does not meet 2008 requirements (excludes fire pump engines).	31 December 2009
Non-emergency stationary CI ICE with a maximum engine power ≥25 hp (19 kW) and <75 hp (56 kW) that does not meet 2013 requirements for non-emergency engines.	31 December 2014
Non-emergency stationary CI ICE with a maximum engine power ≥75 (56 kW) and <175 hp (130 kW) that does not meet 2012 requirements for non-emergency engines.	31 December 2013
Non-emergency stationary CI ICE with a maximum engine power ≥175 hp (130 kW), including CI ICE above 750 hp (560 kW), that does not meet 2011 requirements for non-emergency engines.	31 December 2012
Non-emergency stationary CI ICE greater than 750 hp (560 kW) that does not meet 2015 requirements for non-emergency engines.	31 December 2016
Non-emergency stationary CI ICE with a maximum engine power ≥600 KW (804 hp) and <2,000 KW (2,680 hp) and a displacement of ≥10 liters per cylinder and <30 liters per cylinder that do not meet 2017 requirements for non-emergency engines.	31 December 2018

7.4 Fuel Requirements

All diesel fuel is required to be ultra-low sulfur (ULSD) after 2014 (CARB ULSD in California). EPA phased-in more stringent regulations to lower the amount of sulfur in diesel fuel to 15 parts per million (ppm). The timeline transitions fuel usage in stationary engines to low sulfur diesel (LSD) in 2007, followed by a transition to ultra-low sulfur diesel (ULSD) in 2010. For Alaska, there is no 2007 transition to low sulfur diesel for remote areas.

Table 7-2. Fuel Requirements for Owners/Operators of Stationary CI ICE

FUEL REQUIREMENTS FOR OWNERS/OPERATORS OF NEW STATIONARY CI ICE [40 CFR 60.4207, 80.510(a), and 80.510(b)]		
Engine type	**Fuel Requirements**	**Beginning**
CI ICE using diesel fuel	Low Sulfur Diesel (LSD) - Sulfur content 500 ppm or less, minimum cetane index of 40 or a maximum aromatic content of 35 percent by volume.	1 October 2007
CI ICE with a displacement less than 30 liters/cylinder	Ultra-Low Sulfur Diesel (ULSD) - Sulfur content is 15 ppm or less, minimum cetane index of 40 or a maximum aromatic content of 35 percent by volume.	10 October 2010
CI ICE with a displacement 30 liters/cylinder and above	Must use fuel that meets a maximum per-gallon sulfur content of 1,000 parts per million (ppm).	1 June 2012

7.4.1 Alternative Fuel

Per §60.4217, "owners and operators of stationary CI ICE that do not use diesel fuel may petition the Administrator for approval of alternative emission standards, if they can demonstrate that they use a fuel that is not the fuel on which the manufacturer of the engine certified the engine and that the engine cannot meet the applicable standards required in 40 CFR §60.4204 or §60.4205 using such fuels and that use of such fuel is appropriate and reasonably necessary, considering cost, energy, technical feasibility, human health and environmental, and other factors, for the operation of the engine.

7.5 CI ICE Equipped with Auxiliary Emission Control Device

NOTE: EPA predicts Auxiliary Emission Control Devices (AECDs) will be rarely activated. Due to strict operating, reporting, and recordkeeping requirements associated with AECD's, contact the Air Quality Subject Matter Expert for AFCEC/CZTQ if the CI ICE is equipped with an AECD. **THERE ARE PENALTIES FOR MISUSE AND OVERUSE OF AECDs**.

Effective 6 September 2016, a stationary CI ICE certified to Tier 4 standards AND equipped with an Auxiliary Emission Control Device (AECD) can meet Tier 1 emission standards (that applies to the engine's rated power) during a qualified emergency situation ONLY. The emergency MUST fall within EPA's definition of an emergency situation as defined in 40 CFR §1039.665; "in which the condition of an engine's emission controls poses a significant direct or indirect risk to human life." An example of a qualified emergency is a power outage at a hospital.

New CI ICEs are manufactured to automatically limit or shutdown an engine when its operating control system cannot confirm that the exhaust emissions controls are engaged or functioning properly, which can have catastrophic consequences during an emergency; however once activated, an AECD can disable those emission controls and circumvent an engine shutdown during an emergency. The engine must resume meeting the standards applicable to that engine when the emergency has ended [40 CFR §60.4201(h)]. A manufacturer can request the EPA's approval to install approved AECD to engines and equipment that have already been placed into service.

40 CFR §1039.665 specifies stringent criteria for AECDs to prevent misuse and ensure that any adverse environmental impacts are minimized. These criteria are cross-referenced in the stationary CI ICE NSPS and are summarized as follows:

- The manufacturer must be contacted each time the AECD is activated.
- The AECD deactivates emission controls (such as inducement strategies) only to the extent necessary to address the qualified emergency situation.
- The AECD will likely have one or more persistent visible and/or audible alarms that are active from the point when the AECD is activated to the point when it is reset.
- The AECD must be designed so that it cannot be activated more than once without the specific permission of the certificate holder (manufacturer). Reactivation of the AECD must require the input of a temporary code or equivalent security feature.
- The AECD must become inactive within 120 engine hours of becoming active. The engine must also include a feature that allows the operator to deactivate the AECD once the emergency is over.
    - The engine controls must be configured to record in non-volatile electronic memory the total number of activations of the AECD for each engine.
- The manufacturer must take appropriate additional steps to induce operators to report AECD activation and request resetting of the AECD.
- The manufacturer must provide purchasers with instructions on how to activate the AECD in emergency situations, as well as information about penalties for overuse.

7.6 Emissions Standards

Reminder:

- g/kW-hr = grams per kilowatt-hour.

- g/hp-hr = grams per horsepower-hour.
- HC + NOx = hydrocarbons + nitrogen oxide.
- CO = carbon monoxide

CI NSPS emissions standards apply to emissions of NO_X, PM, CO, and Non-Methane Hydrocarbon (NMHC). Emission standards are expressed in units of g/kW-hr and smoke standards as a percentage. No new emission limits were developed for stationary engines. Rather, the engines are required to meet existing emission standards for nonroad and marine engines, depending on the engine size and model year:

- Engines with a displacement of less than 10 liters per cylinder must meet Tier 1 through Tier 4 emission standards for mobile nonroad diesel engines (The majority of stationary CI ICE in the US belong to this size category). Engines used only for emergencies (e.g., stand-by generator sets) are exempted from Tier 4 emission requirements.
- Engines with a displacement of greater than or equal to 10 liters per cylinder must meet emission standards for marine engines.

Table 7-3, *Certification Tier Levels for Non-Emergency CI ICE*, summarizes manufacturer's emission standards by type and Tier based on model years and engine displacement:

Table 7-3. Certification Tier Levels for Non-Emergency Stationary CI ICE

SUMMARY OF CERTIFICATION EMISSION TIERS FOR NON-EMERGENCY STATIONARY ENGINES			
Displacement (D) Liter per cylinder	**Power (bhp)**	**Year**	**Emission Standard**
D<10	≤3000	2007+	Nonroad Tier (Tiers 2, & 3 in 89.112, Tier 4 in 1039.102) Emergency engines exempt from Tier 4 standards
	>3000	2007-2010	Nonroad (Tier 1 in 89.112)
		2011+	Nonroad (Tier 2 and 4)
10≤D<30	All	2007+	Marine (Tier 2 in Part 94; Tiers 3 and 4 in Part 1042). Emergency engines exempt from Tier 4 standards
D≥30	All	2010-2011	Large Marine (Tier 1)
		2012+	Large Marine (Tier 2 and 3)

Table 7-4, *CI NSPS Summary of Emission Standards*, on the next page of this Guide summarizes the emission standards for CI NSPS. More detailed tables are located in Appendix G of this Guide.

- The emission standards apply to engines whose construction, modification, or reconstruction commenced after 11 July 2005 (the date the proposed rule was published in the Federal Register).
- The manufacturer's certification requirement on the emissions standards (EPA Certificate of Conformity) applies to CI ICE manufactured in model year 2007 or later with a displacement of <30 liters/cylinder.
- The emission limits that apply to a stationary CI ICE will depend upon a combination of the following parameters:
    - Engine type (i.e., emergency, non-emergency, fire-pump).
    - Rated engine power (kWm or bhp) and Displacement (liters/cylinder).
    - Rated engine speed [rpm or Hertz (Hz)).
    - Engine model year.

Table 7-4. CI NSPS Summary of Emission Standards

SUMMARY OF CI NSPS EMISSION STANDARDS (40 CFR 60 SUBPART IIII)			
Engine Type	**Model Year**	**Displacement (l/cyl)**	**CI NSPS Standards**
Non-emergency engines	Pre-2007	<10	Meet emission standards equivalent to Tier 1 standards for nonroad CI engines in Table 1 of 40 CFR 60, Subpart IIII.
		≥10, <30	Meet emission standards equivalent to Tier 1 standards for marine compression ignition engines [40 CFR 94.8(a)(1)].
	2007 and later	<30	Engine must be certified to the emission standards for new non-emergency engines 2007 model year or later (40 CFR 60.4201).
	All engine years	>30	For engines installed prior to 1 January 2012, limit the emissions of NO_X in the engine exhaust to the following: (i) 17.0 g/kW-hr (12.7 g/hp-hr) when maximum in-use engine speed is less than 130 rpm; (ii) $45.0N^{-0.2}$ g/kW-hr ($33.56N^{-0.2}$ g/hp-hr) when 130≤N<2000 rpm, where N is maximum in-use engine speed; and (iii) 9.8 g/kW-hr (7.3 g/hp-hr) when maximum in-use engine speed is 2000 rpm or greater. For engines installed on or after 1 January 2012 but before 1 January 2016, limit the emissions of NO_X in the engine exhaust to the following: (i) 14.4 g/kW-hr (10.7 g/hp-hr) when maximum in-use engine speed is less than 130 rpm; (ii) $44.0N^{-0.23}$ g/kW-hr ($32.8N^{-0.23}$ g/hp-hr) when 130≤N<2000 rpm, where N is maximum in-use engine speed; and (iii) 7.7 g/kW-hr (5.7 g/hp-hr) when maximum in-use engine speed is 2000 rpm or greater. For engines installed on or after 1 January 2016, limit the emissions of NOx in the engine exhaust to the following: (i) 3.4 g/kW-hr (2.5 g/hp-hr) when maximum in-use engine speed is less than 130 rpm; (ii) $9.0N^{-0.20}$ g/kW-hr ($6.7N^{-0.20}$ g/hp-hr) when 130≤N<2000 rpm, where N is maximum in-use engine speed; and (iii) 2.0 g/kW-hr (1.5 g/hp-hr) when maximum in-use engine speed is 2000 rpm or greater. **All engines in this category reduce PM 60 percent or limit PM in exhaust to 0.15 g/kW-hr (0.11 g/hp-hr).**
Emergency engines	Pre-2007	<10	Meet emission standards equivalent to Tier 1 standards for nonroad CI engines.
		≥10, <30	Meet emission standards equivalent to Tier 1 standards for marine compression ignition engines [40 CFR 94.8(a)(1)].
	2007 or later	<30	Emergency engines 2007 model year or later must be manufactured to comply with emission standards in 40 CFR 60.4202.

SUMMARY OF CI NSPS EMISSION STANDARDS (40 CFR 60 SUBPART IIII)			
Engine Type	**Model Year**	**Displacement (l/cyl)**	**CI NSPS Standards**
	Fire pump engines	<30	Separate requirements for fire pump engines [40 CFR 60.4202(d), 60.4205(c), and 60.4210(g)].
	All engines	≥30	Achievable with use of Selective Catalytic Reduction (SCR) & electrostatic precipitator (ESP). For engines installed prior to 1 January 2012, limit the emissions of NO_X in the engine exhaust to the following: (i) 17.0 g/kW-hr (12.7 g/hp-hr) when maximum in-use engine speed is less than 130 rpm; (ii) $45.0N^{-0.2}$ g/kW-hr ($33.56N^{-0.2}$ g/hp-hr) when 130≤N<2000 rpm, where N is maximum in-use engine speed; and (iii) 9.8 g/kW-hr (7.3 g/hp-hr) when maximum in-use engine speed is 2000 rpm or greater. For CI ICE installed on or after 1 January 2012, limit the emissions of NOx in the engine exhaust to the following: (i) 14.4 g/kW-hr (10.7 g/hp-hr) when maximum in-use engine speed is less than 130 rpm; (ii) $44.0N^{-0.23}$ g/kW-hr ($32.8N^{-0.23}$ g/hp-hr) when 130≤N<2000 rpm, where N is maximum in-use engine speed; and (iii) 7.7 g/kW-hr (5.7 g/hp-hr) when maximum in-use engine speed is 2000 rpm or greater. **All engines limit the emissions of PM in the stationary CI internal combustion engine exhaust to 0.40 g/kW-hr (0.30 g/hp-hr).**

7.6.1 Performance Testing

If the engine displacement is ≥30 liters/cylinder, performance testing may be required if the engine has not been voluntarily certified by the manufacturer. In the event that performance testing is required, the test must be conducted by an EPA approved method [NOx is measured using EPA Method 7E, PM using EPA Method 5 (40 CFR part 60, Appendix A)].

- Owners and operators of non-emergency stationary CI ICE with a displacement of less than 30 liters per cylinder who conduct performance tests in-use must meet the not-to-exceed (NTE) standards. Reminder: the NTE standards do not apply to engines ≥ 30 liters per cylinder.

NTE for each pollutant = 1.25 multiplied by the standard

- Each performance test must be conducted within 10 percent of 100 percent peak (or highest achievable) load. For example, if the max allowable load is to be full load, the unit must be tested at 90 percent of full load. If the unit is tested at 70 percent load, operation is limited to 80 percent of full load until next test.
- Performance tests may not be conducted during periods of startup, shutdown, or malfunction.
- Three separate test runs of at least one hour in duration must be conducted.

Requirements for performance tests for stationary CI ICE with a displacement of ≥30 liters per cylinder are available in Table 7 of 40 CFR 60, Subpart IIII and in Appendix H of this Guide.

7.7 Monitoring Requirements

A stationary CI ICE equipped with a diesel particulate filter that is used to comply with emission standards must be installed with a backpressure monitor that notifies the owner/operator when the high backpressure limit of the engine is approached [40 CFR §60.4209(b)].

7.7.1 Monitoring Requirements for Emergency Stationary CI ICE

Emergency stationary CI ICE that do not meet the emission standards applicable to non-emergency engines must have a tamper-proof, non-resettable hour meter installed prior to startup of the engine [40 CFR §60.4209(a)].

7.8 Notification, Reporting, and Recordkeeping Requirements

The following notification, reporting, and recordkeeping requirements are driven by CI ICE regulations:

- If performance testing is not required for the ICE (i.e., the engine has a displacement of less than 30 liters per cylinder), the facility must confirm that the manufacturer-provided engine is designed to meet Subpart IIII emission limits.
- Except for emergency CI ICE, all facilities must submit an initial notification of rule applicability. The contents of the initial notification will depend on engine size and engine model year.
- Installations must maintain records of manufacturer documentation specifying that applicable engines meet Subpart IIII emission limits.
- Installations must maintain records of maintenance performed on the engine.

The following table summarizes the notification and recordkeeping requirements for CI ICE:

Table 7-5. Notification and Recordkeeping Requirements

NOTIFICATION AND RECORDKEEPING REQUIREMENTS [40 CFR §60.4214 and 40 CFR §60.7(a)(1)]		
Type of Engine	**Initial Notification Requirements**	**Recordkeeping Requirements**
Any stationary CI ICE equipped with a diesel particulate filter		Keep records of any corrective action taken after backpressure monitor has alerted or alarmed notice that high backpressure limit of engine is approached or exceeded.
Non-emergency CI ICE greater than 3,000 hp (2,237 kW) or displacement greater than 10 L/cylinder	Initial notification must be submitted within 30 days of start-up and include: ➢ Name and address of owner/operator and location of engine. ➢ Engine information (make, model, engine family, serial number, model year, max engine power, engine displacement) Emission control equipment. ➢ Fuel used.	➢ All notifications and supporting documentation. ➢ Maintenance conducted on engine. ➢ If certified, documentation from engine manufacturer that engine is certified to emission standards. ➢ If uncertified, documentation that the engine meets emission standards.
Non-emergency CI ICE, pre-2007 model year engine greater than 175 hp (130 kW) that isn't certified		
Emergency CI ICE		Records of operation must be recorded using the non-resettable hour meter. Record time of operation and reason engine was in operation at that time (emergency, maintenance, or testing).

COMPLIANCE WITH SPARK IGNITION NSPS

In general, owners and operators of certain types of stationary SI ICE manufactured on or after 1 July 2008 are not required to conduct performance testing. Performance tests of these engines are typically performed by the engine manufacturer and are valid for the lifetime of the engine (unless modified or reconstructed). The SI ICE engine types that are required to be manufactured certified after 1 July 2008 include:

- ≤25 hp,
- Gasoline engines >25 hp, and
- Rich burn LPG engines >25 hp.

8.1 Compliance Requirement Options for SI NSPS

Both emissions limits and fuel standards may apply to engines subject to SI NSPS. However, most of the burden of compliance is on the manufacturer. While emission certification requirements also apply to stationary emergency engines, the certification levels for these are less stringent. Engines not certified by the manufacturer must be brought into compliance with the regulations by the owner/operator. There are two approaches for complying with SI NSPS:

Option One:

1) Purchase a stationary SI ICE verified (EPA Certificate of Conformity) to meet the emissions for NO_X, CO, PM, HC that apply to that model year (all engines 25 bhp and less and all gasoline and rich burn LPG engines manufactured after 1 July 2008 are required to be certified).
    - The engine must be installed and configured according to the manufacturer's specifications. Additional requirements include:
        - Operate and maintain the engine according to the manufacturer's written instructions must keep records of required maintenance.
        - Owners and operators must keep a record from the manufacturer that the engine meets the emission standards.
        - Engines that are not operated and maintained according to manufacturer's written instructions are non-certified engines.

Option Two:

1) If the SI ICE is not required to be certified by the manufacturer and the manufacturer does not voluntarily certify the engine, compliance can be achieved by conducting performance testing (if required) to demonstrate that the engine meets the applicable emission limits.

- Keep a maintenance plan and records of conducted maintenance and maintain and operate the engine in a manner consistent with good air pollution control practice to minimize emissions.

AND

- An initial performance test is required for SI ICE > 25 hp using fuels other than gasoline and that are not rich burn LPG engines.
  - SI ICE ≥ 100 hp and ≤ 500 hp conduct an initial performance test within one year of engine startup.
  - SI ICE > 500 hp conduct an initial performance test within one year of engine startup and every three years or 8,760 hours, whichever comes first.

8.1.1 Requirements for CI ICE Not Operated in Certified Manner

If a certified stationary SI ICE (including control devices) is not installed, configured, operated or maintained according to the manufacturer's emission-related written instructions or approved procedures, the engine will be considered a non-certified engine and the owner/operator will be required to demonstrate compliance as follows:

- Keep a maintenance plan and records of conducted maintenance and maintain and operate the engine in a manner consistent with good air pollution control practice to minimize emissions.

AND

- For non-certified SI ICE less than 100 hp: No performance testing is required [40 CFR §60.4243(a)(2)(i)].
- For non-certified SI ICE greater than or equal to 100 hp and less than or equal to 500 hp: Conduct an initial performance test within one year of engine startup [40 CFR §60.4243(a)(2)(ii)].
- The requirements of a non-certified SI ICE greater than 500 hp: Conduct an initial performance test within one year of engine startup. Subsequent performance testing must be conducted every 8,760 hours or 3 years, whichever comes first, thereafter to demonstrate compliance [40 CFR §60.4243(a)(2)(iii)].

8.2 Install and Import Deadlines

NOTE: Installed means the engine is placed and secured at the location where it is intended to be operated. Installation deadline requirements DO NOT apply to owners/operators of CI ICEs that have been modified or reconstructed and do not apply to engines that are removed from one location and reinstalled at a new location.

Table 8-1. Deadlines for Importing or Installing Stationary SI ICE

DEADLINES FOR IMPORTING OR INSTALLING STATIONARY CI ICE PRODUCED IN PREVIOUS MODEL YEARS (40 CFR §60.4236)	
SI Engine Size	**Stop installing and/or importing SI ICE after this Date:**
Stationary SI ICE with a maximum engine power <500 hp that do not meet the applicable requirements in §60.4233	1 July 2010
Stationary SI ICE with a maximum engine power ≥500 hp that do not meet the applicable requirements in §60.4233 (except lean burn engines with a maximum engine power 500≤hp<1,350 that do not meet the applicable requirements in §60.4233)	1 July 2009
Lean burn engines with a maximum engine power 500≤hp<1,350 that do not meet the applicable requirements in §60.4233	1 January 2010
Emergency Stationary ICE with a maximum engine power >25 hp (19kW)	1 January 2011

8.3 Fuel Requirements

SI NSPS includes sulfur limits for all SI ICE that use gasoline. Owners and operators who use gasoline in their stationary SI engine must use gasoline that meets the requirements of 40 CFR 80.195, which include a gasoline sulfur per gallon cap of 80 ppm.

8.3.1 Alternate Fuels

Propane may be used as an emergency fuel in natural gas-fired stationary SI ICE for a maximum of 100 hours without having to certify the emissions of the engine when using propane. A record must be kept of when propane is used as an emergency fuel. Any usage above 100 hours will require that the engine be certified (i.e., a performance test will be required) to meet the applicable emission standards while using propane unless it is already certified to those standards [40 CFR §60.4243(e)].

8.4 Emissions Standards

Reminder:

- g/kW-hr = grams per kilowatt-hour.
- g/hp-hr = grams per horsepower-hour.
- HC + NOx = hydrocarbons + nitrogen oxide.
- CO = carbon monoxide

If an engine is not required to be certified and the manufacturer does not voluntary certify the SI ICE, demonstration that the SI ICE meets the emission standards for the model year is required.

- The majority of SI NSPS standards are based on non-road emission standards for the corresponding non-stationary SI engine categories (i.e., mobile or portable).
- Owners and operators of stationary non-certified SI engines have a choice on whether to comply with the emission standards in units of either g/HP-hr or ppmvd at 15 percent O_2.
    - Some of the in-use standards are also expressed in terms of volumetric concentrations (such as volume ppm, dry, corrected to 15% O_2).
- The emission limits and percent reduction requirements that apply to a stationary SI ICE will depend upon a combination of the following parameters:
    - Engine type (i.e., rich burn or lean burn).
    - Rated engine power (kW or hp).
    - Fuel usage (i.e., gasoline, liquefied petroleum gas, natural gas, wellhead gas, landfill/digester gas).
    - Date of engine manufacture/modification/reconstruction.
- The SI NSPS emission standards are structured as follows:
    - Engines ≤ 25 hp (19 kW), *must be certified by manufacturer*.
    - Engines > 25 hp (19kW).
        - Non-emergency engines:
            - Gasoline and rich burn liquefied petroleum gas (LPG) engines, *must be certified by manufacturer*.
            - Natural gas and lean burn LPG engines.
            - Landfill/digester gas engines.
        - Emergency engines.

The released pollutants from SI ICE that are regulated by the EPA are: NOx, CO, and VOCs. These emission standards are based on both the horsepower and the manufacture date of that particular engine and become progressively more stringent with later model years. The SI NSPS emission standards for owners and operators of non-certified SI ICE are summarized in the following tables:

Table 8-2. NSPS Emission Standards for Non-Emergency SI Engines ≥100 hp and Stationary Emergency Engines >25 hp

SI NSPS NOX, CO, AND VOC EMISSION STANDARDS FOR STATIONARY NON-EMERGENCY SI ENGINES ≥100 hp (EXCEPT GASOLINE AND RICH BURN LPG), STATIONARY SI LANDFILL/DIGESTER GAS ENGINES, AND STATIONARY EMERGENCY ENGINES >25 hp (40 CFR 60, Subpart JJJJ, Table 1)									
Engine Type and Fuel	**Maximum Engine Power**	**Manufacture Date**	**Emission Standards[a]**						
			g/hp-hr			**ppmvd at 15 percent O_2**			
			NO_X	**CO**	**VOC[d]**	**NO_X**	**CO**	**VOC[d]**
Non-Emergency SI Natural Gas[b] and Non-Emergency SI Lean Burn LPG[b]	100≤hp<500	1 July 2008	2.0	4.0	1.0	160	540	86
		1 Jan. 2011	1.0	2.0	0.7	82	270	60
Non-Emergency SI Lean Burn Natural Gas and LPG	500≤hp<1,350	1 Jan. 2008	2.0	4.0	1.0	160	540	86
		1 July 2010	1.0	2.0	0.7	82	270	60
Non-Emergency SI Natural Gas and Non-Emergency SI Lean Burn LPG (except lean burn 500≤hp<1,350)	hp≥500	1 July 2007	2.0	4.0	1.0	160	540	86
		1 July 2010	1.0	2.0	0.7	82	270	60
Landfill/Digester Gas (except lean burn 500≤hp<1,350)	hp<500	1 July 2008	3.0	5.0	1.0	220	610	80
		1 Jan. 2011	2.0	5.0	1.0	150	610	80
	hp≥500	1 July 2007	3.0	5.0	1.0	220	610	80
		1 July 2010	2.0	5.0	1.0	150	610	80
Landfill/Digester Gas Lean Burn	500≤hp<1,350	1 Jan. 2008	3.0	5.0	1.0	220	610	80
		1 July 2010	2.0	5.0	1.0	150	610	80
Emergency	25<hp<130	1 Jan. 2009	[c]10	387	N/A	N/A	N/A	N/A
	hp≥130		2.0	4.0	1.0	160	540	86

[a] 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_2.

[b] Owners and operators of new or reconstructed non-emergency lean burn SI stationary engines with a site rating of greater than or equal to 250 brake hp located at a major source that are meeting the requirements of 40 CFR part 63, subpart ZZZZ, Table 2a do not have to comply with the CO emission standards SI NSPS.

[c] The emission standards applicable to emergency engines between 25 hp and 130 hp are in terms of NO_X + HC.

[d] For purposes of SI NSPS, when calculating emissions of VOCs, emissions of formaldehyde should not be included.

Table 8-3. Emission Standards Natural Gas and Lean Burn LPG SI ICE 25<hp<100

GASOLINE AND LEAN BURN LPG SI NSPS EMISSION STANDARDS FOR NON-EMERGENCY SI ICE 25<hp<100 (19-75 kW) [Table 3 of 40 CFR 1048.101(c)]			
Maximum Engine Power	**Manufacture Date**	**Emission Requirement in g/kW-hr (g/hp-hr)**	
		HC+NOx[a]	**CO[b]**
25<hp<100	1 July 2008	3.8 (2.8)	6.5 (4.8)
	1 July 2008 Severe Duty[c]	3.8 (2.8)	200.0 (149.2)

[a]If (HC+NOx) × CO0.791 ≤ 16.78, alternative standards of HC+NOx = 3.8 g/kWh and CO = 31.0 g/kWh may be used.

[b]For natural gas engines, owners/operators can assume HC=0 during compliance testing

[c]Severe-duty engines are engines used in severe applications where air-cooled engines must be used.

Table 8-4. NSPS Emission Standards for Natural Gas and Lean Burn LPG SI ICE ≥ 100 hp

SI NSPS EMISSION STANDARDS FOR NG AND LEAN BURN LPG SI ICE ≥ 100 hp (75 kW)								
			Emission Standards[c]					
Engine Type	**Maximum Power**	**Manufactured Date**	**NOx**	**CO[a]**	**VOC[b]**	**NOx**	**CO[a]**	**VOC[b]**
			g/hp-hr			ppmvd @ 15% O_2		
SI natural gas and SI lean burn LPG	100 ≤ bhp < 500	1 July 2008	2.0	4.0	1.0	160	540	86
		1 January 2011	1.0	2.0	0.7	82	270	60
SI lean burn natural gas and LPG	500 ≤ bhp < 1350	1 January 2008	2.0	4.0	1.0	160	540	86
		1 July 2010	1.0	2.0	0.7	82	270	60
SI natural gas and SI lean burn LPG (except lean burn 500 ≤ P < 1350)	bhp ≥ 500	1 July 2007	2.0	4.0	1.0	160	540	86
		1 July 2010	1.0	2.0	0.7	82	270	60

[a]Engines with a site rating ≥ 250 bhp located at a major source that are meeting the NIESHAP requirements (40 CFR part 63, subpart ZZZZ, Table 2a) do not have to comply with the CO standards.

[b]VOC emissions do not include formaldehyde.

[c]Engine owners/operators may choose to comply with the emission standards in units of either g/hp-hr or ppmvd at 15% O2.

8.4.1 Performance Testing Requirements

USAF installations that must comply with SI NSPS via performance testing (also referred to as field testing) instead of purchasing a certified SI ICE must do so in accordance with EPA test methods (or petition the Administrator for approval of an alternative method):

- Each performance test must be conducted within 10 percent of 100 percent peak (or highest achievable) load. For example, if the max allowable load is to be full load, the unit must be tested at 90 percent of full load. If the unit is tested at 70 percent load, operation is limited to 80 percent of full load until next test.
- Performance tests may not be conducted during periods of startup, shutdown, or malfunction.
- Three separate test runs of at least one hour in duration must be conducted.
- The requirements for determining compliance with the mass per unit output emission limitations for NO_X, CO, and VOC must be followed.
- For units 25<hp<500, an initial performance test shall be conducted within 180 days of start-up. This is a one-time test that is good for the life of the engine even if it is moved to another location. Subsequent performance tests are not required unless the engine is modified or reconstructed.
- For units >500 hp, an initial performance test shall be conducted within 180 days of start-up. Subsequent performance testing must be conducted every 8,760 operating hours or 3 years, whichever comes first.

8.4.2 Monitoring Requirements

- Beginning 1 July 2010, if the emergency stationary SI ICE is greater than or equal to 500 hp and built on or after 1 July 2010 and does not meet the standards applicable to non-emergency engines, the owner or operator must install a non-resettable hour meter.
- Beginning on 1 January 2011, if the emergency stationary SI ICE greater than or equal to 130 hp and less than 500 hp was built on or after 1 January 2011 and does not meet the standards applicable to non-emergency engines, the owner or operator must install a non-resettable hour meter.
- If the emergency stationary SI ICE is less than 130 hp and was built on or after 1 July 2008 and does not meet the standards applicable to non-emergency engines, the owner or operator must install a non-resettable hour meter upon startup of the emergency engine.

8.4.3 Notification, Reporting, and Recordkeeping Requirements

Table 8-5. Notification and Recordkeeping Requirements

NOTIFICATION AND RECORDKEEPING REQUIREMENTS [40 CFR §60.4245 and 40 CFR §60.7(a)(1)]		
Type of Engine	**Initial Notification Requirements**	**Recordkeeping Requirements**
All Stationary Emergency ICE that do not meet the standards applicable to non-emergency engines.		➢ Keep records of the hours of operation of the engine that is recorded through the non-resettable hour meter. The hours spent for emergency operation, including what classified the operation as emergency and how many hours were spent for non-emergency operation must be documented.
Stationary SI ICE ≥500 hp that have not been certified by an engine manufacturer to meet the emission standards in §60.4231.	Initial notification must be submitted within 30 days of start-up and include: ➢ Name and address of owner/operator and location of engine. ➢ Engine information (make, model, engine family, serial number, model year, max engine power, engine displacement) ➢ Emission control equipment. ➢ Fuel used.	➢ All notifications and supporting documentation. ➢ Maintenance conducted on engine. ➢ If certified, documentation from engine manufacturer that engine is certified to emission standards. ➢ If uncertified, documentation that the engine meets emission standards.

EMERGENCY STATIONARY INTERNAL COMBUSTION ENGINES

NOTE: Emergency use stationary ICE (typically diesel engines) built after the effective date of the Tier 4 regulation for its power class will display a permanent label indicating that the engine (and the generator it drives) is for emergency use only.

Contrary to popular belief, the stationary ICE rules do apply to emergency engines; however, regulations are often more relaxed than those required for a similar non-emergency engine. Even though existing residential, commercial, and institutional, stationary ICE at an Area Source of HAPs are specifically called out in RICE NESHAP as exempt, those engines also have requirements, so technically, it is not a full exemption. All non-exempt emergency generators are subject to one or more general requirements such as (refer to the applicable rule, RICE NESHAP and/or CI/SI NSPS, for additional information):

- Regular maintenance such as oil and filter replacement.
- Installation of a non-resettable hour meter.
- Using low or ultra-low sulfur diesel fuel.
- Monitoring and recording hours of operation.
- Recordkeeping and reporting.
- Certification to an emissions Tier Level.

9.1 Emergency versus Non-Emergency Classification

It may be less restrictive to classify an emergency engine as non-emergency. Classifying an emergency engine as non-emergency means that the engine can be ran for all emergency and non-emergency applications, with no concerns about exceeding allowable run times. Many emergency stationary ICE are subject to the installation of a non-resettable hour meter, reporting and recordkeeping, and regular maintenance (although on a less frequent basis). On the other hand, for quite a few non-emergency engines, the only requirement is regular maintenance (which should be conducted on every engine as a matter of good practice). This option may be considered for the following stationary ICE:

- Existing compression ignition (CI) RICE <300 hp at area sources.
- Existing four-stroke (4S) RICE <500 hp at area sources.
- Existing two-stroke (2S) RICE at area sources.
- Existing 4S RICE >500 hp at remote area sources.
- Existing RICE <100 hp at major sources.

9.2 Requirements for Exempt Emergency Stationary ICE

Even "exempt" existing residential, institutional, and commercial stationary ICE have operating usage and recordkeeping requirements (refer to Applicability Variable Two in Chapter 2 of this Guide to determine if the engine qualifies for the exemption). This exemption relies upon the accuracy and completeness of engine information, so engine-specific records must be maintained. The operating log (run-time logs) must contain the following information to demonstrate that the emergency stationary ICE has not exceeded the operation and hour limitations as described in this Guide:

- The monthly total operating time from the engine's non-resettable hour meter.
- The purpose, dates, and operating time (include start-up/shut-down times) for EVERY time the engine is operated.

Engine operation log(s) must be retained for a minimum of five calendar years (at least the most recent two years on-site) and readily made available to the federal, state, or local regulating authority on request.

Also, although these engines are technically exempt, there is still a general duty to maintain and operate the engine and control equipment in a manner, to the extent practicable, that is consistent with good air pollution control practices for minimizing emissions at all times, including periods of start-up, shutdown, and malfunction.

9.3 Emergency Stationary ICE Operating Limits

The operating limitations for a stationary ICE to qualify as "emergency" are identical for all three rules; RICE NESHAP [§63.6650(h)], CI NSPS [§60.4214(d)], and SI NSPS [§60.4245(e)]. Essentially, any operation other than emergency operation, required maintenance and testing, and operation in non-emergency situations for 50 hours per year is prohibited (non-emergency, maintenance, and testing hours cannot exceed a total of 100 hours in a calendar year). The strict criteria are:

- There is no time limit on the use (provides electrical power or mechanical work) of emergency stationary ICE during true emergency situations. The stationary ICE rules do not provide a specific definition of an "emergency situation", but the rules do give examples. Generally, an emergency includes the following situations:
    - Primary power source (local power utility or normal source of power) is disrupted or disconnected due to failure of the electrical grid, on-site disaster, or severe weather.
    - Public service emergencies such as flood, fire, natural disaster, or severe weather.

- Emergency stationary ICE may be operated for up to 100 hours per calendar year for maintenance checks and readiness testing, provided that the tests are recommended by the federal, state or local government, the NFPA (fire-pumps), the manufacturer, the vendor, or the insurance company associated with the engine (or an equivalent authority).
    - The EPA Administrator may be petitioned for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the owner or operator maintains documents that federal, state, or local standards require maintenance and testing of emergency stationary ICE beyond 100 hours per calendar year.
- Emergency stationary ICE may be operated for up to 50 hours per calendar year in non-emergency situations. The 50 hours of operation in non-emergency situations are counted as part of the 100 hours per calendar year for maintenance and testing.
    - The 50 hours per year for non-emergency situations cannot be used for peak shaving or non-emergency demand response, or to generate income for a facility to supply power to an electric grid, or to otherwise supply power as part of a financial arrangement with another entity.

NOTE: State or local air quality regulators may have more stringent restrictions on emergency use than those contained in the stationary ICE rules, such as a limit on the number of hours an engine can be used during an emergency situation.

9.3.1 Emergency Operations

Emergency stationary ICE can only be started when the emergency begins and must cease to operate when the emergency ends. Operating for storm avoidance, peak shaving, voltage support, or any other reason beyond a true emergency is prohibited for emergency engines. Storm avoidance is engaging the generator in anticipation of an incoming storm to minimize disruption in the event of power failure.

For example, if a stand-by emergency generator is utilized 42 hours during the year for storm avoidance, those hours are counted towards the 50 allowable hours for non-emergency use and the 100 allowable hours for required maintenance. This means that there are only eight hours remaining for non-emergency use and 58 hours remaining for maintenance and readiness testing.

9.3.2 Exceedance of Emergency Operating Limits

All three stationary ICE rules (RICE NESHAP, CI NSPS, and SI NSPS) stipulate that an emergency engine will no longer be considered an emergency engine if it exceeds the required

operational hour and usage limits. Thereafter, the engine is subject to all the requirements for non-emergency engines [40 CFR §§60.4211(f), 60.4243(d), and 63.6640(f)]. However;

- Per the EPA's Response to Comments (RTC) which was incorporated into the preamble of the rule(s), EPA's intent is to handle emergency engine operational exceedances on a case-by-case basis. The EPA was contacted, and the agency confirmed that this is indeed their position on operational exceedances for emergency stationary ICE. Therefore, the exceedance will be a violation; however, regulators may allow the ICE to remain classified as an emergency stationary ICE. The exceedance does need to be recorded and reported to the appropriate air quality authority for a case-by-case action determination. Do keep in mind that if the emergency ICE exceeds the permissible number of running hours, fines and penalties may be imposed

- The EPA struck out the "once a non-emergency engine, always a non-emergency engine" clause of the proposed rule, clearly demonstrating that they have no intention for a non-emergency engine to be classified as such for the life of that engine.

NOTE: Emergency ICE operating limits are based on a calendar year (January through December). In the event that the emergency engine is reclassified from emergency to non-emergency due to operational exceedances, the engine must demonstrate compliance (work practices, emission standards, etc.…) as a non-emergency engine. However, reclassification back to an emergency ICE is possible if the engine meets the definition of an emergency use stationary ICE for a full calendar year.

NATIONAL SECURITY EXEMPTION

NOTE: Contact the Subject Matter Expert for Air Quality at AFCEC/CZTQ if the stationary ICE needs a National Security Exemption (NSE).

The USAF is required to comply with CAA requirements and related federal, state, and local regulations in the same manner and to the same extent as any nongovernmental entity. This results in a delicate balancing act between national security/defense and environmental protection when it comes to compliance with environmental laws. However, there are situations when compliance with the stationary ICE rules will create unacceptable critical mission limitations or delays that can jeopardize national security. There is no clear or established definition of national security to maintain flexibility, speaking only in general terms, national security is the protection of the existence of the nation from foreign aggression or espionage and protection of the nation's territorial integrity or political independence against force or threat of force.

All three stationary ICE rules specifically exempt engines with an NSE and direct the owner/operator to the same regulation for the NSE requirements; 40 CFR Part 1068, Subpart C. This exemption is for engines where the equipment in which it will be installed has armor, permanently attached weaponry, or other substantial features typical of military combat and is

owned and/or operated by an agency of a federal government with responsibility for national defense. Engines meeting these requirements do not have to request the exemption from EPA. For engines that do not meet the criteria for an automatic NSE, the regulations also contain provisions to request an NSE on a case-by-case basis. Another important aspect to point out is that the engine itself does not have to be the driving element for the NSE; the NSE may be considered if the equipment and/or facility the ICE is supporting plays a critical role in the USAF's national security mission.

In general, engines that have an NSE will be easily identified by a label stating in block letters (in English): "THIS ENGINE HAS AN EXEMPTION FOR NATIONAL SECURITY…" Additionally, EPA maintains a list of models of non-road engines that have been granted a national security exemption by the manufacturer.

NOTE: Inconvenience of compliance with environmental regulations is not a valid reason to obtain an NSE; there must be a bona fide reason for taking or requesting an NSE. Carefully evaluate the situation to determine if compliance with one or more of the stationary ICE rules would compromise the USAF's ability to execute its national security mission or minimize readiness.

There may be alternatives to an NSE. Consider if the situation can be resolved by other means such as the following: **If seeking an alternative to an NSE, contact the Subject Matter Expert for Air Quality at AFCEC/CZTQ to determine which alternative is appropriate for the circumstances and to ensure appropriate compliance activities are observed (e.g., courtesy letter to regulator, petition for additional hours and/or alternative work practices**).

- Petitioning the EPA Administrator or delegated local/state authority for alternative work practices pursuant to the requirements of 40 CFR §63.6(g).
- If an emergency generator and the hours for maintenance and testing operation will exceed the 100 hours per calendar year allotted, consider petitioning the regulatory authority for additional maintenance and testing hours. A petition is not necessary if records are maintained indicating that federal, state, or local standards require maintenance and testing beyond 100 hours per calendar year. [40 CFR §63.6640(f)(ii)]
    - For example, the USAF facility is required by DoD to participate in regular emergency and disaster preparedness exercises to ensure all systems, including emergency generators, will perform as required in a true emergency situation. However, the mandated exercises will cause the emergency generator to exceed the 100 hours per calendar year allocation. Contact the Subject Matter Expert for Air Quality at AFCEC/CZTQ for support.
- The NSE may not be necessary for an engine that is certified to meet the applicable emission limits. Performance testing is not required for appropriately certified engines.

The engine only needs to be operated according to the manufacturer's emissions-related written instructions, with emissions-related settings only changed as specified by the manufacturer.

10.1 National Security Exemption Engine Label

To prevent confusion during regulatory agency inspections and to verify the exemption, it is essential that the USAF facility document which engines have the NSE. Additionally, NSE engines MUST be permanently labeled with at least the following information:

1) The label heading "EMISSION CONTROL INFORMATION".
2) Corporate name and trademark (in most cases, "United States Air Force").
3) Engine displacement, family identification, and model year of the engine/equipment (as applicable), or whom to contact for further information.
4) One of these statements (as applicable):
   i. "THIS ENGINE HAS AN EXEMPTION FOR NATIONAL SECURITY UNDER 40 CFR 1068.225."
   ii. "THIS EQUIPMENT HAS AN EXEMPTION FOR NATIONAL SECURITY UNDER 40 CFR 1068.225."

10.2 National Security Exemption from Fuel Standards

To simplify fuel operations, the DoD adopted a single-fuel concept that requires the USAF to use only one fuel while deployed. Generally, one fuel is easier to manage than multiple fuels (i.e., fuel transportation, storage, and distribution) and lessens the possibility of dispensing the wrong fuel. JP-8 or Jet A is usually the fuel used during deployment due to enhanced long-term storage stability, improved cold weather vehicle operation, and reduced fuel system corrosion problems. However, ULSD fuel is now required to be used in on-road and non-road internal combustion engines in the United States and many countries. Consequently, problems can arise when engines designed to burn ULSD are not compatible with JP-8/Jet A (or any other non-ULSD). Therefore, to retain combat readiness, an engine/equipment is automatically exempt if it would need sulfur-sensitive technology to comply with emission standards and it is intended to be used in areas outside the United States where ULSD fuel is unavailable [40 CFR §1068.225(a)(4)].

Additionally, there is a specific NSE for fuels in 40 CFR Part 80, Subpart I: *Motor Vehicle Diesel Fuel; Nonroad, Locomotive, and Marine Diesel Fuel; and ECA Marine Fuel*. Per 40 CFR §80.606 - *What national security exemption applies to fuels covered under this subpart?*, the standards for certain fuels do not apply to fuel that is produced, imported, sold, offered for sale, supplied, offered for supply, stored, dispensed, or transported for use in any of the following:

1) Tactical military motor vehicles or tactical military nonroad engines, vehicles or equipment, including locomotive and marine, having an EPA national security exemption

from the motor vehicle emission standards under 40 CFR 85.1708, or from the nonroad engine emission standards under 40 CFR Part 89, 92, 94, 1042, or 1068.

2) Tactical military motor vehicles or tactical military nonroad engines, vehicles or equipment, including locomotive and marine, that are not subject to a national security exemption from vehicle or engine emissions standards as described above but, for national security purposes (for purposes of readiness for deployment oversees), need to be fueled on the same fuel as the vehicles, engines, or equipment for which EPA has granted such a national security exemption.

The exempt fuel must meet any of the following:

- The motor vehicle diesel fuel standards of § 80.520(a)(1), (a)(2), and (c).
- The nonroad, locomotive, and marine diesel fuel standards of §80.510(a), (b), and (c).
- The 1,000 ppm Emission Controlled Area (ECA) marine fuel standards of § 80.510(k).

The exempt fuel must meet all the following conditions:

- It must be accompanied by product transfer documents as required under §80.590.
- It must be segregated from non-exempt highway, nonroad, or locomotive and marine (MVNRLM) diesel fuel and ECA marine fuel at all points in the distribution system.
- It must be dispensed from a fuel pump stand, fueling truck or tank that is labeled with the appropriate designation of the fuel, such as “JP-5”, “Jet A”, or “JP-8”.
- It may not be used in any motor vehicles or nonroad engines, equipment or vehicles, including locomotive and marine, other than the vehicles, engines, and equipment referred to in paragraph (a) of this section.

10.3 Revocation of National Security Exemption

If an NSE stationary ICE is removed from a situation critical to national security or combat support, the NSE is no longer applicable and the engine immediately becomes subject to RICE NESHAP and/or one of the NSPS Subparts and will need to demonstrate that the engine can meet the applicable standards.

STEP FOUR: COMPLY WITH STANDARDS

After the requirements, standards, and compliance timeline applicable to the engine are determined, compliance is necessary. Noncompliance with the stationary ICE rules may result in the EPA, state, or local air district issuing a field citation or notice of violation. At the Federal level, non-compliance can be up to $37,500 per day under the CAA Stationary Civil Penalty Policy. Engines that are not in compliance with Federal stationary ICE rules may also be in noncompliance with state and/or local regulations for stationary ICE and subject to state fines and penalties. While monetary penalties are civil in nature, willful and intentional negligence can give rise to criminal liability. Generally, the longer the period of violation, the higher the penalty imposed.

NOTE: If is determined that a stationary ICE is operating outside of compliance, contact AFCEC/CZTQ to discuss how the noncompliance is best addressed and resolved.

11.1 State and Local Stationary ICE Regulations and Permits

It is essential to note that the stationary ICE rules do not require permits; the rules simply establish requirements for covered engines. However, the USAF facility and/or engine may need permits for other reasons (e.g., construction, operation, Title V) which will need to include the stationary ICE. Also, be aware that state and/or local air quality program and permitting agencies may have more stringent emission requirements and policies than the EPA for stationary ICE (the standards can be more, but not less stringent than those promulgated by the EPA). Likewise, state and/or local registration of stationary ICE is required in some states as well. Contact the state and/or local agency to verify requirements of any applicable stationary ICE program. For example, the state and/or local air quality agency may have additional requirements for stationary ICE which may include:

- Tougher emission standards, such as work practices or emission control technology, may apply.
- Fuel usage limits and stricter sulfur content limits.
- Extra requirements for emergency generators: State and local authorities can require and enforce more stringent regulations for emergency stationary ICE than the EPA (especially in areas that have not attained EPA air quality standards). These may include more restrictive operating limits for emergency generators (usually 500 hours for emergency use per year) and/or a higher Tier level for emission standards than RICE NESHAP and CI/SI NSPS.
- Other requirements: Some state and local programs include stack height requirements or capacity limits.

Even though a local or state regulatory agency may not require permits and/or registration for stationary ICE, the engines are still required to meet all applicable federal standards. Also, although a permit may mirror or reference the RICE NESHAP and/or NSPS regulations, it does not provide an exemption from the rule(s).

If a permit is required, make note that most permit writers are expected to be knowledgeable on many rules, including those affecting stationary ICE; however, permitting mistakes can happen. Permits should be clear and accurate (reference the correct applicable stationary ICE rule(s) provisions) regarding which standard and/or non-standard compliance requirements are applicable to the engine.

11.2 Waiver for Stationary ICE Emissions Testing

If emission testing is required for several very similar stationary ICE, a petition may be filed with the Administrator to limit testing to a representative unit. All stationary ICE subject to emission testing for initial compliance must be tested unless a waiver has been granted by the Administrator pursuant to 40 CFR §§60.8(b)(4), 61.13(h)(1)(iii), or 63.7(h). To summarize 40 CFR §63.7(e)(2)(iv): emission tests shall be conducted unless the Administrator waives the requirement for emission testing because the owner or operator of a source has demonstrated by other means to the Administrator's satisfaction that the source complies with the standard. Also, 40 CFR §63.7(h)(2) states: individual performance tests may be waived upon written application to the Administrator if, in the Administrator's judgment, the source is meeting the relevant standard(s) on a continuous basis, or the source is being operated under an extension of compliance, or the owner or operator has requested an extension of compliance and the Administrator is still considering that request.

A waiver may be appropriate on a case-by-case basis in the following situations:

- A facility has identical stationary ICE (same manufacturer, model number or other manufacturer’s identifier, rated capacity, and specifications) and each unit is operated and maintained in a similar manner. The assumption is the performance test results for one tested unit are representative of all identical units located at the facility if the units are performing under the same conditions on an ongoing basis; therefore, the facility may request that the administrator waive the requirement to the other units in the group if the tested unit demonstrates compliance with the standards. The expected emissions from the stationary ICE should comply with applicable limits by a substantial margin. If the margin is not substantial, other factors may be considered, if there is sufficient emissions data to determine that the variability of emissions for identical tested units is low enough for confidence that the untested unit(s) will also be in compliance.
- Technical or economic infeasibility, or when the impracticality of the affected source’s performing the required test is demonstrated.

- If the facility is operating under an extension of compliance pursuant to §63.6(i), or has requested such an extension and the request is under consideration by the delegated agency. The Administrator may request for the request for a waiver and extension be submitted simultaneously.
- Force majeure; an event caused by circumstances beyond the control of the owner/operator, the testing company, or any contractor controlled by the affected source that prevents the owner/operator from complying with the regulatory requirement to conduct or complete performance tests within the specified time frame despite the affected source's best efforts to fulfill the obligation.

This page intentionally left blank

APPENDIX A: UNDERSTANDING ENGINE SPECIFICATION SHEETS

NOTE: Stationary ICE and the equipment they support can be equipped with options and features that may differ from the specification sheets (aka spec sheets) and technical manuals that are provided by the manufacturer. This discussion is concerned with only those elements of the spec sheets that are relevant to the stationary ICE rules.

Stationary ICE spec sheets can vary significantly in content and format, but along with marketing and promotional material regarding the product, these sheets include an abundance of essential information, including model number, engine power rating, power de-rating factors, and other pertinent data. Often, the spec sheets are designed to be used in conjunction with the owner's manual and other technical documents to facilitate procurement, installation, operation, and maintenance of the engine and attached equipment. The spec sheets are considered to be a permanent part of the unit (the documents are normally kept in the specific engine's file at PowerPro).

Although the task of reading a spec sheet may seem challenging, once the basics are understood, deciphering the document is not nearly as daunting as it may initially appear. Spec sheets usually segment the specifications separately in a table format for the generator set, the engine, and the alternator. <u>The spec sheet information needed for the stationary ICE rules are specific to the engine, not the generator or any equipment that the engine is supporting</u>.

DO NOT USE THE GENERATOR SPECIFICATIONS!

Generator Specifications	
Design	Revolving field, self-ventilated Drip-proof, single bearing
No. of Poles	4-pole
Excitation	Brushless with AVR
Standby Output	22 KW (27.5 kVA)
Prime Output	20 KW (25 kVA)
Generator RPM	1800
Voltage—1Ø	120/240
Armature Connection	Series
Voltage Regulation (No load to full load)	± 0.5%
Power Factor	1
Frequency	60 Hz
Frequency Regulation: No Load to Full Load	Isochronous under varying loads from no load to 100% rated load
Frequency Regulation: Steady State	± 0.25% of mean value for constant loads from no load to full load
Insulation	Class H
Sound Level dB(A) Full load at 23 feet	65

Important information to look for in spec sheets include (manufacturer's spec sheet designs can vary significantly in format and content, but basic information is typically provided):

Engine Specifications		
Make / Model	Anybrand / XXX123	<<<<< **Engine Make and Model**
Emissions	EPA Tier 4 Final Certified	<<<<< **EPA Certified Tier Level**
EPA Emissions Compliance	Stationary, Stand-by	<<<<< **Engine Usage Rating**
Fuel System	Electronic Unit Injection	
Design	6 Cylinder, in-line, Turbocharged/Aftercooled	<<<<< **Engine Design**
Displacement	15.2 L	<<<<< **Engine Displacement**
Bore - mm (in)	137 (5.39)	
Gross Engine Power Output – hp (kWm)	40.2 (30)	<<<<< **Engine Power Rating**
Stroke - mm (in)	171 (6.73)	
Piston Type	Aluminum	
Compression Ratio	16.0:1	
Crankcase Capacity - L (Gal)	60 (15.8)	<<<<< **Oil and Fuel Information**
Oil Filter Type	Full-Flow Cartridge	
Fuel Type	Ultra Low Sulfur Diesel #2	
Fuel Specification	American Society for Testing and Materials (ASTM)	

Engine Power Rating: Engines are available in a broad range of power capacities. The spec sheets provide engine power ratings based on how the generator is designed to be used. An engine can be designed to deliver more power for fewer hours per year or designed to deliver less power continuously. For example, emergency generator sets must be capable of quickly delivering sufficient power for an unknown number of run hours per year, while a generator set providing power on a continuous basis to a remote training facility usually operates in relative steady-state on a known schedule.

Frequently, multiple engine power ratings are provided which can include one or more of the following industry standard ratings based on usage: standby, limited, continuous, and prime power ratings. Definitions for each type of power rating are provided in the spec sheets for clarity. Keep in mind, the spec sheet engine usage definitions are similar, but not consistent, with "emergency" and "non-emergency" use definitions in the stationary ICE rules. To provide consistency, manufacturers generally use the International Standards Organization (ISO) developed guidelines for common rating definitions; however, some manufacturers are using differing specifications.

Knowing the specifics of the engine's application is important because in some circumstances, the same engine can qualify for different ratings. Carefully compare the engine's intended or actual usage to the manufacturer's power rating definitions when selecting the power rating for the engine. Additionally, using the engine outside of the parameters of the rated engine usage can result in shortened engine life, engine malfunction or failure, and is likely to void the warranty.

The table in the previous engine spec sheet example is for a single usage generator (rated for use as a stand-by generator). The following is an example of an engine spec sheet table and definitions for a generator set that can be used for either stand-by or prime purposes:

Engine Power Output	**Standby**	**Prime**
Gross Engine Power Output, bhp (kWm)	2220.0 (1656.1)	1855.0 (1383.8)
BMEP at Rated Load, psi (kPa)	313.0 (2158.1)	263.0 (1813.3)
Bore, in. (mm)	6.25 (158.8)	6.25 (158.8)
Stroke, in. (mm)	6.25 (158.8)	6.25 (158.8)
Piston Speed, ft/min (m/s)	1875.0 (9.5)	1875.0 (9.5)
Compression Ratio	13.9:1	13.9:1
Lube Oil Capacity, qt. (L)	160.0 (151.4)	151.0 (142.9)
Fuel Flow		
Maximum Fuel Flow w/c180, US Gal/hr (L/hr)	193.0 (730.5)	193.0 (730.5)
Maximum Fuel Flow w/c174, US Gal/hr (L/hr)	260.0 (984.1)	260.0 (984.1)
Maximum Inlet Restriction, in. Hg (mm Hg)	4.0 (101.6)	4.0 (101.6)
Maximum Return Restriction, in. Hg (mm Hg)	6.5 (165.1)	6.5 (165.1)
Air Cleaner		
Maximum Air Cleaner Restriction, in. H_2O (kPa)	25.0 (6.2)	25.0 (6.2)
Exhaust		
Exhaust Flow at Rated Load, cfm (m^3/min)	10505.0 (297.3)	8330.0 (235.7)
Exhaust Temperature, ^oF (^oC)	870.0 (465.6)	850.0 (454.4)
Max Back Pressure, in. H_2O (kPa)	41.0 (10.2)	41.0 (10.2)

- Standby Rating based on: Applicable for supplying emergency power for the duration of normal power interruption. No sustained overload capability is available for this rating. (Equivalent to Fuel Stop Power in accordance with ISO3046, AS2789, DIN6271 and BS5514). Nominally rated.

- Prime (Unlimited Running Time) Rating based on: Applicable for supplying power in lieu of commercially purchased power. Prime power is the maximum power available at a variable load for an unlimited number of hours. A 10% overload capability is available for limited time. (Equivalent to Prime Power in accordance with ISO8528 and Overload Power in accordance with ISO3046, AS2789, DIN6271, and BS5514). This rating is not applicable to all generator set models.

- Base Load (Continuous) Rating based on: Applicable for supplying power continuously to a constant load up to the full output rating for unlimited hours. No sustained overload capability is available for this rating. Consult authorized distributor for rating. (Equivalent to Continuous Power in accordance with ISO8528, ISO3046, AS2789, DIN6271, and BS5514). This rating is not applicable to all generator set models.

Engine Power De-Rating Factors: Reminder: RICE NESHAP and CI/SI NSPS use different definitions of engine power. RICE NESHAP uses "site-rated hp", which allows for adjusting the maximum horsepower rating based on site environments such as altitude, but the NSPS regulations uses "maximum engine power", which does not allow for engine de-rating for any reason. The following is an example of an engine power de-rating factor statement commonly found in a spec sheet:

- Site Derating Factors - Rated power available up to 4000 ft (1220 m) at ambient temperatures up to 104°F (40°C). Above 4000 ft (1220 m), derate at 4% per 1000 ft (305 m) and 1% per 10°F (2% per 11°C) above 104°F (40°C).

EPA Emissions Compliance Statement: It is important to pay attention to the engine's compliance standards in order to ensure they fit into the EPA's regulations for the engine's model year. The EPA Emissions Compliance Statement will either be included as part of the spec sheet and/or as a separate document. The statement contains information, such as:

- Engine Information and EPA Engine Family Name: Pertinent engine information is included in the compliance statement, including the engine power rating, and other engine features that identify the engine and are relevant to emissions compliance testing. The EPA also assigns a family name to the engine. The engine family name is 11 or 12 digits long and also found on the engine label. As the name suggests, this is a group of engines with similar characteristics for emissions testing.

- EPA Certification Tier Level, compliance standards, and emission certifications: These are the emission standards the engine is certified to meet. Pay attention to compliance standards in order to ensure they fit into the EPA's current regulations

- Emission Control Technology: The type of technology used to achieve an emissions rating certification, if applicable.

- EPA Emissions Testing Information: Emission related test results, test conditions, and test methods are provided in the statement. If an engine is also certified to meet the California Air Resource Board (CARB) emission standards, this is also included in the statement.

The following is an example of an engine emissions compliance statement (make note that this engine is both EPA and CARB certified):

2013 EPA Tier 3 Exhaust Emission
Compliance Statement
12ABCDE Stationary Emergency
60 Hz Diesel Generator Set

Compliance Information: The engine used in this generator set complies with Tier 3 emissions limit of U.S. EPA New Source Performance Standards for stationary emergency engines under the provisions of 40 CFR 60 Subpart IIII when tested per ISO8178 D2.

Engine Manufacturer: Any Generator, Inc
EPA Certificate Number: 123456789102-003
Effective Date: 05/01/2012
Date Issued: 05/01/2012
EPA Engine Family: 123456789102

Engine Information:

Model: XXX4.5 / XXX5 / XXAB5-G3 AA3 Bore: 4.21 in. (107 mm)
Engine Nameplate HP: 145 Stroke: 4.88 in. (124 mm) Type: 4
Cycle, In-line, 4 Cylinder Diesel
Displacement: 272 cu. in. (4.5 liters)
Aspiration: Turbocharged and CAC
Compression Ratio: 17.3:1
Exhaust Stack Diameter: 3 in.

Diesel Fuel Emission Limits D2 Cycle Exhaust Emissions	**Grams per BHP-hr**			**Grams per kWm-hr**		
	NOx + NMHC	**CO**	**PM**	**NOx + NMHC**	**CO**	**PM**
Test Results - Diesel Fuel (300-4000 ppm Sulfur)	2.8	0.7	0.11	3.8	0.9	0.15
EPA Emissions Limit	3.0	2.6	0.15	4.0	3.5	0.20
Test Results - CARB Diesel Fuel (<15 ppm Sulfur)	2.6	0.7	0.10	3.5	0.9	0.13
CARB Emissions Limit	3.0	2.6	0.15	4.0	3.5	0.20

The CARB emission values are based on CARB approved calculations for converting EPA (500 ppm) fuel to CARB (15 ppm) fuel.

Test Methods: EPA/CARB Nonroad emissions recorded per 40CFR89 (ref. ISO8178-1) and weighted at load points prescribed in Subpart E, Appendix A for Constant Speed Engines (ref. ISO8178-4, D2).

Diesel Fuel Specifications: Cetane Number: 40-48. Reference: ASTM D975 No. 2-D.

Reference Conditions: Air Inlet Temperature: 25°C (77°F), Fuel Inlet Temperature: 40°C (104°F). Barometric Pressure: 100 kPa (29.53 in Hg), Humidity: 10.7 g/kg (75 grains H2O/lb) of dry air; required for NOx correction, Restrictions: Intake Restriction set to a maximum allowable limit for clean filter; Exhaust Back Pressure set to a maximum allowable limit.

Tests conducted using alternate test methods, instrumentation, fuel or reference conditions can yield different results. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels

This page intentionally left blank

APPENDIX B: DECIPHERING ENGINE LABELS

Engine variants can vary significantly and the engine labels/nameplates (data tags) can offer clues to the engine type and emissions certification applicable to that specific engine. The labels/nameplates are permanently attached to the engine (usually on the valve cover or engine block). There is usually an engine identification plate that contains the serial number (typically, a metal plate) and a separate engine emissions label which contains the emission related information for the engine.

Engine's Serial Number: The letters and numbers in an engine's unique identifier (i.e., serial number) are a series of codes that contain information such as the manufacturer, model year, engine family, the number of cylinders, the emissions standard, and the type of ignition. The actual code will vary depending on the manufacturer. The majority of engine manufacturers have a serial number "decoder" on their website. This example pertains to a John Deere 13.5L industrial diesel engine (EPA certified) with serial number RG6135L123456 (the last six numbers are fictional):

RG 6135 L 123456

Position 1-2: Factory/Manufacturer Code. "RG" is a Manufacturer Code that means that the engine was manufactured by "John Deere Power Systems; Waterloo, Iowa, USA." There are numerous Factory/Manufacturer Codes, such as: TY (John Deere Merchandise Division), CD (Saran, France), TO (Dubuque, Iowa), PE (Torreon, Mexico), and JO (Rosario, Argentina).

Position 3-6: Engine model. The engine model designation includes the number of cylinders and displacement in liters. The first number represents the cylinders and the remaining three numbers represent the displacement in cylinders. Some examples: a John Deere engine with model number 4045 will have four cylinders and a displacement of 4.5 liters and an engine with model year 6068 will have six cylinders and a displacement of 6.8 liters. For the model number (6135) in this example, the engine is six cylinders and the engine displacement is 13.5 liters.

Position 7: Emission level. John Deere assigned a letter code to identify which Tier level or emission standard the engine is certified to meet: B means the engine is not certified; C, E or F is Tier 1; G, J or K is Tier 2; L, M, N or P is Tier 3; R is Interim Tier 4; and U, V, W, X, Y, Z is Tier 4. The engine in this example is coded with an "L" which means it is certified to Tier 3 standards. Generally, John Deere engines with a 13-number serial number are newer engines and most will be certified. Older, non-certified John Deere engines will have a 17-number serial number.

Position 8-13: Numbering sequence. This is the unique number/letter combination sequentially assigned to identify the specific engine. This number may also be extended with engine option codes.

Engine's Family Number: Engines certified by the EPA to meet Tier 1 emission standards or higher usually have an emissions label (usually engine model years 2005 and newer). An engine family is used by the EPA to identify a group of engines for certification and compliance

purposes. The emissions label will depict which EPA "engine family" represents the engine based on the specific model year and manufacturer. From there, the Certificate of Conformity associated with that engine family will provide the precise engine emission standards the engine is certified for (the engine emission label will also include an emissions statement stating which engine tier or engine model year the engine is certified to meet).

NOTE: Be aware, the engine label may also list the manufacturer's production "engine family" which should be easily distinguished from the EPA engine family because the EPA engine family is 11 to 12 numbers in length, while the manufacturer's engine family number normally contains less than 10 letters/numbers.

Engines are certified annually; therefore, the engine family names change with every model year. The EPA has the family naming conventions and correlated codes available on their website: *https://www.epa.gov/vehicle-and-engine-certification/nonroad-compression-ignition-engines-family-naming-conventions*.

As an example, this is the break-down of an engine family name for a model year 2017 John Deere Nonroad Compression-Ignition Engine belonging to the engine family HJDXL02.9121 (after letter/number position 5, there can be slight industry specific variances from this example):

H JDX L 02.9 121

Position 1: The first digit correlates to the code for the model year. For this example, "H" represents all model year 2017 engines.

Positions 2-4: The next three numbers/letters correlate to the manufacturer code. This is a three-character, alpha-numeric code that EPA assigns to each company that wants to certify their engines with EPA. Only one manufacturer code is assigned to each company. In this example, "JDX" is the manufacturer's code for all John Deere engine products.

Position 5: The fifth number correlates to the Industry Sector Code (e.g., Nonroad Compression-Ignition Engine are "L").

Positions 6-9: These numbers/letters correlate to the engine displacement code (reminder, this can vary depending on the Industry Sector Code). For the Nonroad Compression-Ignition Engine the letter/number positions 6-9 (in this example, the engine displacement is 2.9 liters):

- XX.X or .XXX represents the engine displacement in liters Engine displacement units in liters (the decimal point counts as a digit and each 'X' represents an integer).
- XXXX represents the engine displacement units in cubic inches (each 'X' represents an integer). If there is no decimal, the displacement is listed in cubic inches and should be converted to liters by multiplying it by 0.0164

Positions 10-11 (or 12): The remaining numbers/letters correlate to family type descriptor code. This is an arbitrary combination of valid characters to provide the manufacturer with a unique identification for the family name.

APPENDIX C: STATIONARY ICE RULE APPLICABILITY QUESTIONNAIRE

Instructions: Completion of this Questionnaire is intended to assist with determining applicability to federal New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP) for stationary Internal Combustion Engines.

1. Is the engine in a motor vehicle or in equipment that is portable or temporary? (designed to be portable and will remain at a location less than 12 months or operates less than 3 months per year as part of a seasonal source).

   ☐ No. Go to question 2.
   ☐ Yes. Stop Here. This engine is NOT subject to the stationary ICE rules.

2. Is the stationary ICE located at a major source of HAP emissions AND the engine's site rated horsepower > 500?

   ☐ No. Go to question 4.
   ☐ Yes. Go to question 3.

3. Did the construction or reconstruction of this stationary ICE commence on or after 19 December 2002?

   ☐ No. Stop Here. This stationary ICE is "existing" and subject to RICE NESHAP only.
   ☐ Yes. This engine is "new" and subject to RICE NESHAP and possibly Subpart IIII or JJJJ. Go to question 6.

4. Did the construction or reconstruction of this stationary ICE commence on or after 12 June 2006?

   ☐ No. Stop Here. This stationary ICE is "existing" and subject to RICE NESHAP only.
   ☐ Yes. This stationary ICE is "new" and subject to RICE NESHAP and Subpart IIII or JJJJ. Go to question 5.

5. Is the stationary ICE located at an Area Source of HAPs?

   ☐ No. This engine may have requirements under both RICE NESHAP and NSPS.
   ☐ Yes. This engine fulfills compliance with RICE NESHAP by complying with Subpart IIII or JJJJ, as applicable.

Yes or No, Go to question 6

6. Is the stationary ICE compression ignition?

   ☐ No. This stationary ICE is spark ignition (SI ICE). Go to question 10.
   ☐ Yes. This stationary ICE is compression ignition (CI ICE). Go to question 7.

7. Is the stationary CI ICE a fire pump certified by the National Fire Protection Association and was ordered after 11 July 2005 and manufactured after 1 July 2006?

☐ No. Go to question 8.
☐ Yes. Stop Here. The CI ICE fire pump is subject to Subpart IIII.

8. Was the stationary CI ICE modified or reconstructed after 11 July 2005? (Modification is a physical or operational change that can significantly increase the emissions of a regulated air pollutant. Reconstruction is replacing the components on an existing engine and the cost of the replacement components exceeds 50% of the cost of a new engine. See 40 CFR 60.14 and 60.15 for complete definitions.)

☐ No. Go to question 9.
☐ Yes. Stop Here. This CI ICE is subject to Subpart IIII.

9. Was the stationary CI ICE ordered after 11 July 2005 and manufactured after 1 April 2006?

☐ No. Stop Here. Contact AFCEC/CZTQ (the CI ICE may be a "Gap Engine").
☐ Yes. Stop Here. The CI ICE is subject to Subpart IIII.

10. Was the stationary SI ICE modified or reconstructed after 12 June 2006? (Modification is a physical or operational change that can significantly increase the emissions of a regulated air pollutant. Reconstruction is replacing the components on an existing engine and the cost of the replacement components exceeds 50% of the cost of a new engine. See 40 CFR 60.14 and 60.15 for complete definitions)

☐ No. Go to question 11.
☐ Yes. Stop Here. This SI ICE is subject to Subpart JJJJ.

11. Was the stationary SI ICE ordered after 12 June 2006 and manufactured on/after:
    - 1 July 2007 if ≥500 bhp (except lean burn 500≤bhp<1,350).
    - 1 January 2008 if lean burn 500≤bhp<1,350.
    - 1 July 2008 if <500 bhp.
    - 1 January 2009 if emergency engine >25 bhp.

☐ No. Stop Here. Contact AFCEC/CZTQ (the SI ICE may be a "Gap Engine").
☐ Yes. Stop Here. The SI ICE is subject to Subpart JJJJ.

APPENDIX D: RICE NESHAP METHODS AND REQUIREMENTS FOR PERFORMANCE TESTS

Requirements for Performance Tests (40 CFR 63.6610, 63.6611, 63.6612, 63.6620, and 63.6640 and Table 4 of RICE NESHAP)				
For each	**Complying with the requirement to…**	**Must…**	**Using…**	**According to the following requirements...**
2SLB, 4SLB, and CI stationary RICE	Reduce CO emissions	i. Measure the O_2 at the inlet and outlet of the control device; and	(1) Method 3 or 3A or 3B of 40 CFR part 60, appendix A, or ASTM Method D6522-00 (Reapproved 2005)[a]	(a) Measurements to determine O_2 must be made at the same time as the measurements for CO concentration.
		ii. Measure the CO at the inlet and the outlet of the control device	(1) ASTM D6522-00 (Reapproved 2005)[abc] or Method 10 of 40 CFR part 60, appendix A	(a) The CO concentration must be at 15 percent O_2, dry basis.
4SRB stationary RICE	Reduce formaldehyde emissions	i. Select the sampling port location and the number of traverse points; and	(1) Method 1 or 1A of 40 CFR part 60, appendix A § 63.7(d)(1)(i)	(a) sampling sites must be located at the inlet and outlet of the control device.
		ii. Measure O_2 at the inlet and outlet of the control device; and	(1) Method 3 or 3A or 3B of 40 CFR part 60, appendix A, or ASTM Method D6522-00 (Reapproved 2005)[a]	(a) measurements to determine O_2concentration must be made at the same time as the measurements for formaldehyde or THC concentration.
		iii. Measure moisture content at the inlet and outlet of the control device; and	(1) Method 4 of 40 CFR part 60, appendix A, or Test Method 320 of 40 CFR part 63, appendix A, or ASTM D 6348-03[a]	(a) measurements to determine moisture content must be made at the same time and location as the measurements for formaldehyde or THC concentration.
		iv. If demonstrating compliance with the formaldehyde percent reduction requirement, measure formaldehyde at the inlet and the outlet of the control device	(1) Method 320 or 323 of 40 CFR part 63, appendix A; or ASTM D6348-03[a], provided in ASTM D6348-03 Annex A5 (Analyte Spiking Technique),	(a) formaldehyde concentration must be at 15 percent O_2, dry basis. Results of this test consist of the average of the three 1-hour or longer runs.

Requirements for Performance Tests (40 CFR 63.6610, 63.6611, 63.6612, 63.6620, and 63.6640 and Table 4 of RICE NESHAP)				
For each	**Complying with the requirement to…**	**Must…**	**Using…**	**According to the following requirements...**
			the percent R must be greater than or equal to 70 and less than or equal to 130	
		v. If demonstrating compliance with the THC percent reduction requirement, measure THC at the inlet and the outlet of the control device	(1) Method 25A, reported as propane, of 40 CFR part 60, appendix A	(a) THC concentration must be at 15 percent O_2, dry basis. Results of this test consist of the average of the three 1-hour or longer runs.
Stationary RICE	Limit the concentration of formaldehyde or CO in the stationary RICE exhaust	i. Select the sampling port location and the number of traverse points; and	(1) Method 1 or 1A of 40 CFR part 60, appendix A § 63.7(d)(1)(i)	(a) if using a control device, the sampling site must be located at the outlet of the control device.
		ii. Determine the O_2 concentration of the stationary RICE exhaust at the sampling port location; and	(1) Method 3 or 3A or 3B of 40 CFR part 60, appendix A, or ASTM Method D6522-00 (Reapproved 2005)[a]	(a) measurements to determine O_2 concentration must be made at the same time and location as the measurements for formaldehyde or CO concentration.
		iii. Measure moisture content of the stationary RICE exhaust at the sampling port location; and	(1) Method 4 of 40 CFR part 60, appendix A, or Test Method 320 of 40 CFR part 63, appendix A, or ASTM D 6348-03.[a]	(a) measurements to determine moisture content must be made at the same time and location as the measurements for formaldehyde or CO concentration.
		iv. Measure formaldehyde at the exhaust of the stationary RICE; or	(1) Method 320 or 323 of 40 CFR part 63, appendix A; or ASTM D6348-03[a], provided in ASTM D6348-03 Annex A5 (Analyte Spiking Technique), the percent R must be greater than or equal to	(a) Formaldehyde concentration must be at 15 percent O_2, dry basis. Results of this test consist of the average of the three 1-hour or longer runs.

Requirements for Performance Tests (40 CFR 63.6610, 63.6611, 63.6612, 63.6620, and 63.6640 and Table 4 of RICE NESHAP)				
For each	**Complying with the requirement to…**	**Must…**	**Using…**	**According to the following requirements...**
			70 and less than or equal to 130	
		v. Measure CO at the exhaust of the stationary RICE.	(1) Method 10 of 40 CFR part 60, appendix A, ASTM Method D6522-00 (2005)[ac], Method 320 of 40 CFR part 63, appendix A, or ASTM D6348-03[a]	(a) CO concentration must be at 15 percent O_2, dry basis. Results of this test consist of the average of the three 1-hour or longer runs.

[a]Incorporated by reference, see 40 CFR 63.14. Copies can be obtained from University Microfilms International, 300 North Zeeb Road, Ann Arbor, MI 48106.

[b]Method 320 of 40 CFR part 63, appendix A, or ASTM D6348-03 can also be used.

[c]ASTM-D6522-00 (2005) may be used to test both CI and SI stationary RICE.

This page intentionally left blank

APPENDIX E: INITIAL COMPLIANCE WITH RICE NESHAP

Initial Compliance with Emission Limitations, Operating Limitations, and Other Requirements (40 CFR 63, Subpart ZZZZ, Table 5)		
For each…	**Complying with the requirement to…**	**You have demonstrated initial compliance if…**
1. New or reconstructed non-emergency 2SLB stationary RICE >500 hp located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 hp located at a major source of HAP, non-emergency stationary CI RICE >500 hp located at a major source of HAP, and existing non-emergency stationary CI RICE >500 hp located at an area source of HAP	a. Reduce CO emissions and using oxidation catalyst, and using a CPMS	i. The average reduction of emissions of CO determined from the initial performance test achieves the required CO percent reduction; and ii. You have installed a CPMS to continuously monitor catalyst inlet temperature according to the requirements in §63.6625(b); and iii. You have recorded the catalyst pressure drop and catalyst inlet temperature during the initial performance test.
2. Non-emergency stationary CI RICE >500 hp located at a major source of HAP, and existing non-emergency stationary CI RICE >500 hp located at an area source of HAP	a. Limit the concentration of CO, using oxidation catalyst, and using a CPMS	i. The average CO concentration determined from the initial performance test is less than or equal to the CO emission limitation; and ii. You have installed a CPMS to continuously monitor catalyst inlet temperature according to the requirements in §63.6625(b); and iii. You have recorded the catalyst pressure drop and catalyst inlet temperature during the initial performance test.
3. New or reconstructed non-emergency 2SLB stationary RICE >500 hp located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 hp located at a major source of HAP, non-emergency stationary CI RICE >500 hp located at a major source of HAP, and existing non-emergency stationary CI RICE >500 hp located at an area source of HAP	a. Reduce CO emissions and not using oxidation catalyst	i. The average reduction of emissions of CO determined from the initial performance test achieves the required CO percent reduction; and ii. You have installed a CPMS to continuously monitor operating parameters approved by the Administrator (if any) according to the requirements in §63.6625(b); and iii. You have recorded the approved operating parameters (if any) during the initial performance test.

Initial Compliance with Emission Limitations, Operating Limitations, and Other Requirements (40 CFR 63, Subpart ZZZZ, Table 5)		
For each…	**Complying with the requirement to…**	**You have demonstrated initial compliance if…**
4. Non-emergency stationary CI RICE >500 hp located at a major source of HAP, and existing non-emergency stationary CI RICE >500 hp located at an area source of HAP	a. Limit the concentration of CO, and not using oxidation catalyst	i. The average CO concentration determined from the initial performance test is less than or equal to the CO emission limitation; and ii. You have installed a CPMS to continuously monitor operating parameters approved by the Administrator (if any) according to the requirements in §63.6625(b); and iii. You have recorded the approved operating parameters (if any) during the initial performance test.
5. New or reconstructed non-emergency 2SLB stationary RICE >500 hp located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 hp located at a major source of HAP, non-emergency stationary CI RICE >500 hp located at a major source of HAP, and existing non-emergency stationary CI RICE >500 hp located at an area source of HAP	a. Reduce CO emissions, and using a CEMS	i. You have installed a CEMS to continuously monitor CO and either O_2or CO_2at both the inlet and outlet of the oxidation catalyst according to the requirements in §63.6625(a); and ii. You have conducted a performance evaluation of your CEMS using PS 3 and 4A of 40 CFR part 60, appendix B; and iii. The average reduction of CO calculated using §63.6620 equals or exceeds the required percent reduction. The initial test comprises the first 4-hour period after successful validation of the CEMS. Compliance is based on the average percent reduction achieved during the 4-hour period.

Initial Compliance with Emission Limitations, Operating Limitations, and Other Requirements (40 CFR 63, Subpart ZZZZ, Table 5)		
For each…	**Complying with the requirement to…**	**You have demonstrated initial compliance if…**
6. Non-emergency stationary CI RICE >500 hp located at a major source of HAP, and existing non-emergency stationary CI RICE >500 hp located at an area source of HAP	a. Limit the concentration of CO, and using a CEMS	i. You have installed a CEMS to continuously monitor CO and either O_2 or CO_2 at the outlet of the oxidation catalyst according to the requirements in §63.6625(a); and ii. You have conducted a performance evaluation of your CEMS using PS 3 and 4A of 40 CFR part 60, appendix B; and iii. The average concentration of CO calculated using §63.6620 is less than or equal to the CO emission limitation. The initial test comprises the first 4-hour period after successful validation of the CEMS. Compliance is based on the average concentration measured during the 4-hour period.
7. Non-emergency 4SRB stationary RICE >500 hp located at a major source of HAP	a. Reduce formaldehyde emissions and using NSCR	i. The average reduction of emissions of formaldehyde determined from the initial performance test is equal to or greater than the required formaldehyde percent reduction, or the average reduction of emissions of THC determined from the initial performance test is equal to or greater than 30 percent; and ii. You have installed a CPMS to continuously monitor catalyst inlet temperature according to the requirements in §63.6625(b); and iii. You have recorded the catalyst pressure drop and catalyst inlet temperature during the initial performance test.

Initial Compliance with Emission Limitations, Operating Limitations, and Other Requirements (40 CFR 63, Subpart ZZZZ, Table 5)		
For each…	**Complying with the requirement to…**	**You have demonstrated initial compliance if…**
8. Non-emergency 4SRB stationary RICE >500 hp located at a major source of HAP	a. Reduce formaldehyde emissions and not using NSCR	i. The average reduction of emissions of formaldehyde determined from the initial performance test is equal to or greater than the required formaldehyde percent reduction or the average reduction of emissions of THC determined from the initial performance test is equal to or greater than 30 percent; and ii. You have installed a CPMS to continuously monitor operating parameters approved by the Administrator (if any) according to the requirements in §63.6625(b); and iii. You have recorded the approved operating parameters (if any) during the initial performance test.
9. New or reconstructed non-emergency stationary RICE >500 hp located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE 250≤hp≤500 located at a major source of HAP, and existing non-emergency 4SRB stationary RICE >500 hp located at a major source of HAP	a. Limit the concentration of formaldehyde in the stationary RICE exhaust and using oxidation catalyst or NSCR	i. The average formaldehyde concentration, corrected to 15 percent O_2, dry basis, from the three test runs is less than or equal to the formaldehyde emission limitation; and ii. You have installed a CPMS to continuously monitor catalyst inlet temperature according to the requirements in §63.6625(b); and iii. You have recorded the catalyst pressure drop and catalyst inlet temperature during the initial performance test.

Initial Compliance with Emission Limitations, Operating Limitations, and Other Requirements (40 CFR 63, Subpart ZZZZ, Table 5)		
For each…	**Complying with the requirement to…**	**You have demonstrated initial compliance if…**
10. New or reconstructed non-emergency stationary RICE >500 hp located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE 250≤hp≤500 located at a major source of HAP, and existing non-emergency 4SRB stationary RICE >500 hp located at a major source of HAP	a. Limit the concentration of formaldehyde in the stationary RICE exhaust and not using oxidation catalyst or NSCR	i. The average formaldehyde concentration, corrected to 15 percent O_2, dry basis, from the three test runs is less than or equal to the formaldehyde emission limitation; and ii. You have installed a CPMS to continuously monitor operating parameters approved by the Administrator (if any) according to the requirements in §63.6625(b); and iii. You have recorded the approved operating parameters (if any) during the initial performance test.
11. Existing non-emergency stationary RICE 100≤hp≤500 located at a major source of HAP, and existing non-emergency stationary CI RICE 300<hp≤500 located at an area source of HAP	a. Reduce CO emissions	i. The average reduction of emissions of CO or formaldehyde, as applicable determined from the initial performance test is equal to or greater than the required CO or formaldehyde, as applicable, percent reduction.
12. Existing non-emergency stationary RICE 100≤hp≤500 located at a major source of HAP, and existing non-emergency stationary CI RICE 300<hp≤500 located at an area source of HAP	a. Limit the concentration of formaldehyde or CO in the stationary RICE exhaust	i. The average formaldehyde or CO concentration, as applicable, corrected to 15 percent O_2, dry basis, from the three test runs is less than or equal to the formaldehyde or CO emission limitation, as applicable.
13. Existing non-emergency 4SLB stationary RICE >500 hp located at an area source of HAP that are not remote stationary RICE and that are operated more than 24 hours per calendar year	a. Install an oxidation catalyst	i. You have conducted an initial compliance demonstration as specified in §63.6630(e) to show that the average reduction of emissions of CO is 93 percent or more, or the average CO concentration is less than or equal to 47 ppmvd at 15 percent O_2; ii. You have installed a CPMS to continuously monitor catalyst inlet temperature according to the requirements in §63.6625(b), or you have installed equipment to automatically shut down the engine if the catalyst inlet temperature exceeds 1350 °F.

Initial Compliance with Emission Limitations, Operating Limitations, and Other Requirements (40 CFR 63, Subpart ZZZZ, Table 5)		
For each…	**Complying with the requirement to…**	**You have demonstrated initial compliance if…**
14. Existing non-emergency 4SRB stationary RICE >500 hp located at an area source of HAP that are not remote stationary RICE and that are operated more than 24 hours per calendar year	a. Install NSCR	i. You have conducted an initial compliance demonstration as specified in §63.6630(e) to show that the average reduction of emissions of CO is 75 percent or more, the average CO concentration is less than or equal to 270 ppmvd at 15 percent O_2, or the average reduction of emissions of THC is 30 percent or more; ii. You have installed a CPMS to continuously monitor catalyst inlet temperature according to the requirements in §63.6625(b), or you have installed equipment to automatically shut down the engine if the catalyst inlet temperature exceeds 1250 °F.

APPENDIX F: CONTINUOUS COMPLIANCE WITH RICE NESHAP

Continuous Compliance with Emission Limitations, and Other Requirements (40 CFR 63, Subpart ZZZZ, Table 6)		
For each…	**Complying with the requirement to…**	**You must demonstrate continuous compliance by…**
1. New or reconstructed non-emergency 2SLB stationary RICE >500 hp located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 hp located at a major source of HAP, and new or reconstructed non-emergency CI stationary RICE >500 hp located at a major source of HAP	a. Reduce CO emissions and using an oxidation catalyst, and using a CPMS	i. Conducting semiannual performance tests for CO to demonstrate that the required CO percent reduction is achieved[1]; and ii. Collecting the catalyst inlet temperature data according to §63.6625(b); and iii. Reducing these data to 4-hour rolling averages; and iv. Maintaining the 4-hour rolling averages within the operating limitations for the catalyst inlet temperature; and v. Measuring the pressure drop across the catalyst once per month and demonstrating that the pressure drop across the catalyst is within the operating limitation established during the performance test.
2. New or reconstructed non-emergency 2SLB stationary RICE >500 hp located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 hp located at a major source of HAP, and new or reconstructed non-emergency CI stationary RICE >500 hp located at a major source of HAP	a. Reduce CO emissions and not using an oxidation catalyst, and using a CPMS	i. Conducting semiannual performance tests for CO to demonstrate that the required CO percent reduction is achieved[1]; and ii. Collecting the approved operating parameter (if any) data according to §63.6625(b); and iii. Reducing these data to 4-hour rolling averages; and iv. Maintaining the 4-hour rolling averages within the operating limitations for the operating parameters established during the performance test.

Continuous Compliance with Emission Limitations, and Other Requirements (40 CFR 63, Subpart ZZZZ, Table 6)		
For each…	**Complying with the requirement to…**	**You must demonstrate continuous compliance by…**
3. New or reconstructed non-emergency 2SLB stationary RICE >500 hp located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 hp located at a major source of HAP, new or reconstructed non-emergency stationary CI RICE >500 hp located at a major source of HAP, and existing non-emergency stationary CI RICE >500 hp	a. Reduce CO emissions or limit the concentration of CO in the stationary RICE exhaust, and using a CEMS	i. Collecting the monitoring data according to §63.6625(a), reducing the measurements to 1-hour averages, calculating the percent reduction or concentration of CO emissions according to §63.6620; and ii. Demonstrating that the catalyst achieves the required percent reduction of CO emissions over the 4-hour averaging period, or that the emissions remain at or below the CO concentration limit; and iii. Conducting an annual RATA of your CEMS using PS 3 and 4A of 40 CFR part 60, appendix B, as well as daily and periodic data quality checks in accordance with 40 CFR part 60, appendix F, procedure 1.
4. Non-emergency 4SRB stationary RICE >500 hp located at a major source of HAP	a. Reduce formaldehyde emissions and using NSCR	i. Collecting the catalyst inlet temperature data according to §63.6625(b); and ii. Reducing these data to 4-hour rolling averages; and iii. Maintaining the 4-hour rolling averages within the operating limitations for the catalyst inlet temperature; and iv. Measuring the pressure drop across the catalyst once per month and demonstrating that the pressure drop across the catalyst is within the operating limitation established during the performance test.
5. Non-emergency 4SRB stationary RICE >500 hp located at a major source of HAP	a. Reduce formaldehyde emissions and not using NSCR	i. Collecting the approved operating parameter (if any) data according to §63.6625(b); and ii. Reducing these data to 4-hour rolling averages; and iii. Maintaining the 4-hour rolling averages within the operating limitations for the operating parameters established during the performance test.

Continuous Compliance with Emission Limitations, and Other Requirements (40 CFR 63, Subpart ZZZZ, Table 6)		
For each…	**Complying with the requirement to…**	**You must demonstrate continuous compliance by…**
6. Non-emergency 4SRB stationary RICE with a brake hp ≥5,000 located at a major source of HAP	a. Reduce formaldehyde emissions	Conducting semiannual performance tests for formaldehyde to demonstrate that the required formaldehyde percent reduction is achieved, or to demonstrate that the average reduction of emissions of THC determined from the performance test is equal to or greater than 30 percent.[a]
7. New or reconstructed non-emergency stationary RICE >500 hp located at a major source of HAP and new or reconstructed non-emergency 4SLB stationary RICE 250≤hp≤500 located at a major source of HAP	a. Limit the concentration of formaldehyde in the stationary RICE exhaust and using oxidation catalyst or NSCR	i. Conducting semiannual performance tests for formaldehyde to demonstrate that your emissions remain at or below the formaldehyde concentration limit[1]; and ii. Collecting the catalyst inlet temperature data according to §63.6625(b); and iii. Reducing these data to 4-hour rolling averages; and iv. Maintaining the 4-hour rolling averages within the operating limitations for the catalyst inlet temperature; and v. Measuring the pressure drop across the catalyst once per month and demonstrating that the pressure drop across the catalyst is within the operating limitation established during the performance test.
8. New or reconstructed non-emergency stationary RICE >500 hp located at a major source of HAP and new or reconstructed non-emergency 4SLB stationary RICE 250≤hp≤500 located at a major source of HAP	a. Limit the concentration of formaldehyde in the stationary RICE exhaust and not using oxidation catalyst or NSCR	i. Conducting semiannual performance tests for formaldehyde to demonstrate that your emissions remain at or below the formaldehyde concentration limit[1]; and ii. Collecting the approved operating parameter (if any) data according to §63.6625(b); and iii. Reducing these data to 4-hour rolling averages; and iv. Maintaining the 4-hour rolling averages within the operating limitations for the operating parameters established during the performance test.

Continuous Compliance with Emission Limitations, and Other Requirements (40 CFR 63, Subpart ZZZZ, Table 6)		
For each…	**Complying with the requirement to…**	**You must demonstrate continuous compliance by…**
9. Existing emergency and black start stationary RICE ≤500 hp located at a major source of HAP, existing non-emergency stationary RICE <100 hp located at a major source of HAP, existing emergency and black start stationary RICE located at an area source of HAP, existing non-emergency stationary CI RICE ≤300 hp located at an area source of HAP, existing non-emergency 2SLB stationary RICE located at an area source of HAP, existing non-emergency stationary SI RICE located at an area source of HAP which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, existing non-emergency 4SLB and 4SRB stationary RICE ≤500 hp located at an area source of HAP, existing non-emergency 4SLB and 4SRB stationary RICE >500 hp located at an area source of HAP that operate 24 hours or less per calendar year, and existing non-emergency 4SLB and 4SRB stationary RICE >500 hp located at an area source of HAP that are remote stationary RICE	a. Work or Management practices	i. Operating and maintaining the stationary RICE according to the manufacturer's emission-related operation and maintenance instructions; or ii. Develop and follow your own maintenance plan which must provide to the extent practicable for the maintenance and operation of the engine in a manner consistent with good air pollution control practice for minimizing emissions.

Continuous Compliance with Emission Limitations, and Other Requirements (40 CFR 63, Subpart ZZZZ, Table 6)		
For each…	**Complying with the requirement to…**	**You must demonstrate continuous compliance by…**
10. Existing stationary CI RICE >500 hp that are not limited use stationary RICE	a. Reduce CO emissions, or limit the concentration of CO in the stationary RICE exhaust, and using oxidation catalyst	i. Conducting performance tests every 8,760 hours or 3 years, whichever comes first, for CO or formaldehyde, as appropriate, to demonstrate that the required CO or formaldehyde, as appropriate, percent reduction is achieved or that your emissions remain at or below the CO or formaldehyde concentration limit; and ii. Collecting the catalyst inlet temperature data according to §63.6625(b); and iii. Reducing these data to 4-hour rolling averages; and iv. Maintaining the 4-hour rolling averages within the operating limitations for the catalyst inlet temperature; and v. Measuring the pressure drop across the catalyst once per month and demonstrating that the pressure drop across the catalyst is within the operating limitation established during the performance test.
11. Existing stationary CI RICE >500 hp that are not limited use stationary RICE	a. Reduce CO emissions, or limit the concentration of CO in the stationary RICE exhaust, and not using oxidation catalyst	i. Conducting performance tests every 8,760 hours or 3 years, whichever comes first, for CO or formaldehyde, as appropriate, to demonstrate that the required CO or formaldehyde, as appropriate, percent reduction is achieved or that your emissions remain at or below the CO or formaldehyde concentration limit; and ii. Collecting the approved operating parameter (if any) data according to §63.6625(b); and iii. Reducing these data to 4-hour rolling averages; and iv. Maintaining the 4-hour rolling averages within the operating limitations for the operating parameters established during the performance test.

Continuous Compliance with Emission Limitations, and Other Requirements (40 CFR 63, Subpart ZZZZ, Table 6)		
For each…	**Complying with the requirement to…**	**You must demonstrate continuous compliance by…**
12. Existing limited use CI stationary RICE >500 hp	a. Reduce CO emissions or limit the concentration of CO in the stationary RICE exhaust, and using an oxidation catalyst	i. Conducting performance tests every 8,760 hours or 5 years, whichever comes first, for CO or formaldehyde, as appropriate, to demonstrate that the required CO or formaldehyde, as appropriate, percent reduction is achieved or that your emissions remain at or below the CO or formaldehyde concentration limit; and ii. Collecting the catalyst inlet temperature data according to §63.6625(b); and iii. Reducing these data to 4-hour rolling averages; and iv. Maintaining the 4-hour rolling averages within the operating limitations for the catalyst inlet temperature; and v. Measuring the pressure drop across the catalyst once per month and demonstrating that the pressure drop across the catalyst is within the operating limitation established during the performance test.
13. Existing limited use CI stationary RICE >500 hp	a. Reduce CO emissions or limit the concentration of CO in the stationary RICE exhaust, and not using an oxidation catalyst	i. Conducting performance tests every 8,760 hours or 5 years, whichever comes first, for CO or formaldehyde, as appropriate, to demonstrate that the required CO or formaldehyde, as appropriate, percent reduction is achieved or that your emissions remain at or below the CO or formaldehyde concentration limit; and ii. Collecting the approved operating parameter (if any) data according to §63.6625(b); and iii. Reducing these data to 4-hour rolling averages; and iv. Maintaining the 4-hour rolling averages within the operating limitations for the operating parameters established during the performance test.

Continuous Compliance with Emission Limitations, and Other Requirements (40 CFR 63, Subpart ZZZZ, Table 6)		
For each…	**Complying with the requirement to…**	**You must demonstrate continuous compliance by…**
14. Existing non-emergency 4SLB stationary RICE >500 hp located at an area source of HAP that are not remote stationary RICE and that are operated more than 24 hours per calendar year	a. Install an oxidation catalyst	i. Conducting annual compliance demonstrations as specified in §63.6640(c) to show that the average reduction of emissions of CO is 93 percent or more, or the average CO concentration is less than or equal to 47 ppmvd at 15 percent O_2; and either ii. Collecting the catalyst inlet temperature data according to §63.6625(b), reducing these data to 4-hour rolling averages; and maintaining the 4-hour rolling averages within the limitation of greater than 450 °F and less than or equal to 1350 °F for the catalyst inlet temperature; or iii. Immediately shutting down the engine if the catalyst inlet temperature exceeds 1350 °F.
15. Existing non-emergency 4SRB stationary RICE >500 hp located at an area source of HAP that are not remote stationary RICE and that are operated more than 24 hours per calendar year	a. Install NSCR	i. Conducting annual compliance demonstrations as specified in §63.6640(c) to show that the average reduction of emissions of CO is 75 percent or more, the average CO concentration is less than or equal to 270 ppmvd at 15 percent O_2, or the average reduction of emissions of THC is 30 percent or more; and either ii. Collecting the catalyst inlet temperature data according to §63.6625(b), reducing these data to 4-hour rolling averages; and maintaining the 4-hour rolling averages within the limitation of greater than or equal to 750 °F and less than or equal to 1250 °F for the catalyst inlet temperature; or iii. Immediately shutting down the engine if the catalyst inlet temperature exceeds 1250 °F.
[1]After you have demonstrated compliance for two consecutive tests, you may reduce the frequency of subsequent performance tests to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or you deviate from any of your operating limitations, you must resume semiannual performance tests.		

This page intentionally left blank

APPENDIX G: CI NSPS EMISSION LIMITS

Emission Standards for Pre-2007 stationary CI ICE Construction, modification, or reconstruction commenced after 11 July 2005 [40 CFR 60.4204, 60.4205, 94.8(a)(1) and Tables 1 and 2 of 40 CFR 60, Subpart IIII]					
Maximum engine power	**ALL Pre-2007 model year engines with a displacement <10 liters/cylinder and 2007–2010 model year engines >3,000 hp (>2,237 kW) and with a displacement of <10 liters/cylinder; *Units: g/kW-hr (g/hp-hr)***				
	NMHC + NO_X	**HC**	**NO_X**	**CO**	**PM**
hp<11 (kW<8)	10.5 (7.8)			8.0 (6.0)	1.0 (0.75)
11≤hp<25 (8≤kW<19)	9.5 (7.1)			6.6 (4.9)	0.80 (0.60)
25≤hp<50 (19≤kW<37)	9.5 (7.1)			5.5 (4.1)	0.80 (0.60)
50≤hp<175 (37≤kW<130)			9.2 (6.9)		
hp≥175 (kW≥130)		1.3 (1.0)	9.2 (6.9)	11.4 (8.5)	0.54 (0.4)
Maximum test speed	**Pre-2007 model year CI ICEs with displacement ≥10 L/cyl and <30 L/cyl Units: g/kW-hr (g/hp-hr)**				
<130 rpm			17.0 (12.7)		
≥130 and <2000 rpm			$45.0N^{-0.20}$ ($33.56N^{-0.20}$)		
≥2000 rpm			9.8 (7.3)		
N is the maximum test engine speed in revolutions per minute (rpm)					

Emission Standards for CI Fire Pumps Less than 30 L/cylinder; *Units: g/kW-hr (g/hp-hr)* [From 40 CFR 60.4205 and Table 4 of 40 CFR 60, Subpart IIII]				
Maximum Engine power	**Model year(s)**	**NMHC + NO_X**	**CO**	**PM**
hp<11 (kW<8)	Before 2010	10.5 (7.8)	8.0 (6.0)	1.0 (0.75)
	2011 or later	7.5 (5.6)		0.40 (0.30)
11≤hp<25 (8≤kW<19)	Before 2011	9.5 (7.1)	6.6 (4.9)	0.80 (0.60)
	2011 or later	7.5 (5.6)		0.40 (0.30)
25≤hp<50 (19≤kW<37)	Before 2011	9.5 (7.1)	5.5 (4.1)	0.80 (0.60)
	2011 or later	7.5 (5.6)		0.30 (0.22)
50≤hp<100 (37≤kW<75)	Before 2011	10.5 (7.8)	5.0 (3.7)	0.80 (0.60)
	2011 or later[1]	4.7 (3.5)		0.40 (0.30)
100≤hp<175 (75≤kW<130)	Before 2010	10.5 (7.8)	5.0 (3.7)	0.80 (0.60)
	2010 or later[2]	4.0 (3.0)		0.30 (0.22)
175≤hp<600 (130≤kW<450)	Before 2009	10.5 (7.8)	3.5 (2.6)	0.54 (0.40)
	2009 and later[3]	4.0 (3.0)		0.20 (0.15)
600≤hp≤750 (450≤kW<560)	Before 2009	10.5 (7.8)	3.5 (2.6)	0.54 (0.40)
	2009 and later	4.0 (3.0)		0.20 (0.15)
hp>750 (kw>560)	Before 2008	10.5 (7.8)	3.5 (2.6)	0.54 (0.40)
	2008 and later	6.4 (4.8)		0.20 (0.15)

[1] For model years 2011–2013, manufacturers, owners and operators of fire pump stationary CI ICE in this engine power category with a rated speed greater than 2,650 revolutions per minute (rpm) may comply with the emission limitations for 2010 model year engines.

[2] For model years 2010–2012, manufacturers, owners and operators of fire pump stationary CI ICEs in this engine power category with a rated speed greater than 2,650 rpm may comply with the emission limitations for 2009 model year engines.

[3] In model years 2009–2011, manufacturers of fire pump stationary CI ICEs in this engine power category with a rated speed of greater than 2,650 rpm may comply with the emission limitations for 2008 model year engines.

APPENDIX H: CI NSPS PERFORMANCE TESTING REQUIREMENTS

Compression Ignition New Source Performance Standards Requirements for Performance Testing for Stationary CI ICE with a Displacement of 30 Liters Per Cylinder and Above (From 40 CFR 60, Subpart IIII, Table 7)				
CI ICE Engine Type	**Complying with the requirement to…**	**Must…**	**Using…**	**According to the following requirements…**
Stationary CI Internal combustion engine with a displacement of ≥30 liters per cylinder	a. Reduce NO_X emissions by 90 percent or more;	i. Select the sampling port location and number/location of traverse points at the inlet and outlet of the control device;	Intentionally Blank	(a) For NO_X, O_2, and moisture measurement, ducts ≤6 inches in diameter may be sampled at a single point located at the duct centroid and ducts >6 and ≤12 inches in diameter may be sampled at 3 traverse points located at 16.7, 50.0, and 83.3% of the measurement line ('3-point long line'). If the duct is >12 inches in diameter and the sampling port location meets the two and half-diameter criterion of Section 11.1.1 of Method 1 of 40 CFR part 60, appendix A-1, the duct may be sampled at '3-point long line'; otherwise, conduct the stratification testing and select sampling points according to Section 8.1.2 of Method 7E of 40 CFR part 60, appendix A-4.
		ii. Measure O_2 at the inlet and outlet of the control device;	(1) Method 3, 3A, or 3B of 40 CFR part 60, appendix A-2	(b) Measurements to determine O_2 concentration must be made at the same time as the measurements for NO_X concentration.

Compression Ignition New Source Performance Standards Requirements for Performance Testing for Stationary CI ICE with a Displacement of 30 Liters Per Cylinder and Above (From 40 CFR 60, Subpart IIII, Table 7)				
CI ICE Engine Type	**Complying with the requirement to…**	**Must…**	**Using…**	**According to the following requirements…**
		iii. If necessary, measure moisture content at the inlet and outlet of the control device; and	(2) Method 4 of 40 CFR part 60, appendix A-3, Method 320 of 40 CFR part 63, appendix A, or ASTM D 6348-03 (incorporated by reference, see §60.17)	(c) Measurements to determine moisture content must be made at the same time as the measurements for NO_X concentration.
		iv. Measure NO_X at the inlet and outlet of the control device.	(3) Method 7E of 40 CFR part 60, appendix A-4, Method 320 of 40 CFR part 63, appendix A, or ASTM D 6348-03 (incorporated by reference, see §60.17)	(d) NO_X concentration must be at 15 percent O_2, dry basis. Results of this test consist of the average of the three 1-hour or longer runs.
	b. Limit the concentration of NO_X in the stationary CI internal combustion engine exhaust.	i. Select the sampling port location and number/location of traverse points at the exhaust of the stationary internal combustion engine;	Intentionally Blank	(a) For NO_X, O_2, and moisture measurement, ducts ≤6 inches in diameter may be sampled at a single point located at the duct centroid and ducts >6 and ≤12 inches in diameter may be sampled at 3 traverse points located at 16.7, 50.0, and 83.3% of the measurement line ('3-point long line'). If the duct is >12 inches in diameter and the

Compression Ignition New Source Performance Standards Requirements for Performance Testing for Stationary CI ICE with a Displacement of 30 Liters Per Cylinder and Above (From 40 CFR 60, Subpart IIII, Table 7)				
CI ICE Engine Type	**Complying with the requirement to…**	**Must…**	**Using…**	**According to the following requirements…**
				sampling port location meets the two and half-diameter criterion of Section 11.1.1 of Method 1 of 40 CFR part 60, appendix A-1, the duct may be sampled at '3-point long line'; otherwise, conduct the stratification testing and select sampling points according to Section 8.1.2 of Method 7E of 40 CFR part 60, appendix A-4.
		ii. Determine the O_2 concentration of the stationary internal combustion engine exhaust at the sampling port location;	(1) Method 3, 3A, or 3B of 40 CFR part 60, appendix A-2	(b) Measurements to determine O_2 concentration must be made at the same time as the measurement for NO_X concentration.
		iii. If necessary, measure moisture content of the stationary internal combustion engine exhaust at the sampling port location; and	(2) Method 4 of 40 CFR part 60, appendix A-3, Method 320 of 40 CFR part 63, appendix A, or ASTM D 6348-03 (incorporated by reference, see §60.17)	(c) Measurements to determine moisture content must be made at the same time as the measurement for NO_X concentration.
		iv. Measure NO_X at the exhaust of the stationary internal combustion engine; if using a control device, the sampling site must	(3) Method 7E of 40 CFR part 60, appendix A-4, Method 320 of 40 CFR part 63,	(d) NO_X concentration must be at 15 percent O_2, dry basis. Results of this test consist of the average of the three 1-hour or longer runs.

Compression Ignition New Source Performance Standards Requirements for Performance Testing for Stationary CI ICE with a Displacement of 30 Liters Per Cylinder and Above (From 40 CFR 60, Subpart IIII, Table 7)				
CI ICE Engine Type	**Complying with the requirement to…**	**Must…**	**Using…**	**According to the following requirements…**
		be located at the outlet of the control device.	appendix A, or ASTM D 6348-03 (incorporated by reference, see §60.17)	
	c. Reduce PM emissions by 60 percent or more	i. Select the sampling port location and the number of traverse points;	(1) Method 1 or 1A of 40 CFR part 60, appendix A-1	(a) Sampling sites must be located at the inlet and outlet of the control device.
		ii. Measure O_2 at the inlet and outlet of the control device;	(2) Method 3, 3A, or 3B of 40 CFR part 60, appendix A-2	(b) Measurements to determine O_2 concentration must be made at the same time as the measurements for PM concentration.
		iii. If necessary, measure moisture content at the inlet and outlet of the control device; and	(3) Method 4 of 40 CFR part 60, appendix A-3	(c) Measurements to determine and moisture content must be made at the same time as the measurements for PM concentration.
		iv. Measure PM at the inlet and outlet of the control device.	(4) Method 5 of 40 CFR part 60, appendix A-3	(d) PM concentration must be at 15 percent O_2, dry basis. Results of this test consist of the average of the three 1-hour or longer runs.
	d. Limit the concentration of PM in the stationary CI internal combustion engine exhaust	i. Select the sampling port location and the number of traverse points;	(1) Method 1 or 1A of 40 CFR part 60, appendix A-1	(a) If using a control device, the sampling site must be located at the outlet of the control device.
		ii. Determine the O_2 concentration of the stationary internal combustion engine exhaust at	(2) Method 3, 3A, or 3B of 40 CFR part 60, appendix A-2	(b) Measurements to determine O_2 concentration must be made at the same time as the measurements for PM concentration.

Compression Ignition New Source Performance Standards Requirements for Performance Testing for Stationary CI ICE with a Displacement of 30 Liters Per Cylinder and Above (From 40 CFR 60, Subpart IIII, Table 7)				
CI ICE Engine Type	**Complying with the requirement to…**	**Must…**	**Using…**	**According to the following requirements…**
		the sampling port location;		
		iii. If necessary, measure moisture content of the stationary internal combustion engine exhaust at the sampling port location; and	(3) Method 4 of 40 CFR part 60, appendix A-3	(c) Measurements to determine moisture content must be made at the same time as the measurements for PM concentration.
		iv. Measure PM at the exhaust of the stationary internal combustion engine.	(4) Method 5 of 40 CFR part 60, appendix A-3	(d) PM concentration must be at 15 percent O_2, dry basis. Results of this test consist of the average of the three 1-hour or longer runs.

This page intentionally left blank

APPENDIX I: SI NSPS PERFORMANCE TESTING REQUIREMENTS

Spark Ignition New Source Performance Standards Requirements for Performance Testing (From 40 CFR 60, Subpart JJJJ, Table 2)				
SI ICE Engine Type	**Complying with the requirement to…**	**Must…**	**Using…**	**According to the following requirements…**
Stationary SI internal combustion engine demonstrating compliance according to §60.4244	a. Limit the concentration of NO_X in the stationary SI internal combustion engine exhaust	i. Select the sampling port location and the number/location of traverse points at the exhaust of the stationary internal combustion engine;	(1) Method 1 or 1A of 40 CFR part 60, appendix A-1, if measuring flow rate	(a) Alternatively, for NO_X, O_2, and moisture measurement, ducts ≤6 inches in diameter may be sampled at a single point located at the duct centroid and ducts >6 and ≤12 inches in diameter may be sampled at 3 traverse points located at 16.7, 50.0, and 83.3 percent of the measurement line (`3-point long line'). If the duct is >12 inches in diameter *and* the sampling port location meets the two and half-diameter criterion of Section 11.1.1 of Method 1 of 40 CFR part 60, Appendix A, the duct may be sampled at `3-point long line'; otherwise, conduct the stratification testing and select sampling points according to Section 8.1.2 of Method 7E of 40 CFR part 60, Appendix A.
		ii. Determine the O_2 concentration of the stationary internal combustion engine exhaust at the sampling port location;	(2) Method 3, 3A, or 3B[b] of 40 CFR part 60, appendix A-2 or ASTM Method D6522-00 (Reapproved 2005)[ad]	(b) Measurements to determine O_2 concentration must be made at the same time as the measurements for NO_X concentration.
		iii. If necessary, determine the exhaust flowrate of the stationary internal	(3) Method 2 or 2C of 40 CFR part 60, appendix A-1 or Method 19 of 40	

Spark Ignition New Source Performance Standards Requirements for Performance Testing (From 40 CFR 60, Subpart JJJJ, Table 2)				
SI ICE Engine Type	**Complying with the requirement to…**	**Must…**	**Using…**	**According to the following requirements…**
		combustion engine exhaust;	CFR part 60, appendix A-7	
		iv. If necessary, measure moisture content of the stationary internal combustion engine exhaust at the sampling port location; and	(4) Method 4 of 40 CFR part 60, appendix A-3, Method 320 of 40 CFR part 63, appendix A[e], or ASTM Method D6348-03[de]	(c) Measurements to determine moisture must be made at the same time as the measurement for NO_X concentration.
		v. Measure NO_X at the exhaust of the stationary internal combustion engine; if using a control device, the sampling site must be located at the outlet of the control device	(5) Method 7E of 40 CFR part 60, appendix A-4, ASTM Method D6522-00 (Reapproved 2005)[ad], Method 320 of 40 CFR part 63, appendix A[e], or ASTM Method D6348-03[de]	(d) Results of this test consist of the average of the three 1-hour or longer runs.
	b. Limit the concentration of CO in the stationary SI internal combustion engine exhaust	i. Select the sampling port location and the number/location of traverse points at the exhaust of the stationary internal combustion engine;	(1) Method 1 or 1A of 40 CFR part 60, appendix A-1, if measuring flow rate	(a) Alternatively, for CO, O_2, and moisture measurement, ducts ≤6 inches in diameter may be sampled at a single point located at the duct centroid and ducts >6 and ≤12 inches in diameter may be sampled at 3 traverse points located at 16.7, 50.0, and 83.3 percent of the measurement line (`3-point long line'). If the duct is >12 inches in diameter *and* the sampling port location meets the two and half-diameter criterion of Section 11.1.1 of Method 1 of 40 CFR part 60,

Spark Ignition New Source Performance Standards Requirements for Performance Testing (From 40 CFR 60, Subpart JJJJ, Table 2)				
SI ICE Engine Type	**Complying with the requirement to…**	**Must…**	**Using…**	**According to the following requirements…**
				Appendix A, the duct may be sampled at `3-point long line'; otherwise, conduct the stratification testing and select sampling points according to Section 8.1.2 of Method 7E of 40 CFR part 60, Appendix A.
		ii. Determine the O_2 concentration of the stationary internal combustion engine exhaust at the sampling port location;	(2) Method 3, 3A, or 3B[b] of 40 CFR part 60, appendix A-2 or ASTM Method D6522-00 (Reapproved 2005)[ad]	(b) Measurements to determine O_2 concentration must be made at the same time as the measurements for CO concentration.
		iii. If necessary, determine the exhaust flowrate of the stationary internal combustion engine exhaust;	(3) Method 2 or 2C of 40 CFR 60, appendix A-1 or Method 19 of 40 CFR part 60, appendix A-7	
		iv. If necessary, measure moisture content of the stationary internal combustion engine exhaust at the sampling port location; and	(4) Method 4 of 40 CFR part 60, appendix A-3, Method 320 of 40 CFR part 63, appendix A[e], or ASTM Method D6348-03[de]	(c) Measurements to determine moisture must be made at the same time as the measurement for CO concentration.
		v. Measure CO at the exhaust of the stationary internal combustion engine; if using a control device, the sampling site must be located at the outlet of the control device	(5) Method 10 of 40 CFR part 60, appendix A4, ASTM Method D6522-00 (Reapproved 2005)[ade], Method 320 of 40 CFR part 63, appendix A[e], or ASTM Method D6348-03[de]	(d) Results of this test consist of the average of the three 1-hour or longer runs.

Spark Ignition New Source Performance Standards Requirements for Performance Testing (From 40 CFR 60, Subpart JJJJ, Table 2)				
SI ICE Engine Type	**Complying with the requirement to…**	**Must…**	**Using…**	**According to the following requirements…**
	c. Limit the concentration of VOC in the stationary SI internal combustion engine exhaust	i. Select the sampling port location and the number/location of traverse points at the exhaust of the stationary internal combustion engine;	(1) Method 1 or 1A of 40 CFR part 60, appendix A-1, if measuring flow rate	(a) Alternatively, for VOC, O_2, and moisture measurement, ducts ≤6 inches in diameter may be sampled at a single point located at the duct centroid and ducts >6 and ≤12 inches in diameter may be sampled at 3 traverse points located at 16.7, 50.0, and 83.3 percent of the measurement line (`3-point long line'). If the duct is >12 inches in diameter *and* the sampling port location meets the two and half-diameter criterion of Section 11.1.1 of Method 1 of 40 CFR part 60, Appendix A, the duct may be sampled at `3-point long line'; otherwise, conduct the stratification testing and select sampling points according to Section 8.1.2 of Method 7E of 40 CFR part 60, Appendix A.
		ii. Determine the O_2 concentration of the stationary internal combustion engine exhaust at the sampling port location;	(2) Method 3, 3A, or 3B[b] of 40 CFR part 60, appendix A-2 or ASTM Method D6522-00 (Reapproved 2005)[ad]	(b) Measurements to determine O_2 concentration must be made at the same time as the measurements for VOC concentration.
		iii. If necessary, determine the exhaust flowrate of the stationary internal combustion engine exhaust;	(3) Method 2 or 2C of 40 CFR 60, appendix A-1 or Method 19 of 40 CFR part 60, appendix A-7	

Spark Ignition New Source Performance Standards Requirements for Performance Testing (From 40 CFR 60, Subpart JJJJ, Table 2)				
SI ICE Engine Type	**Complying with the requirement to…**	**Must…**	**Using…**	**According to the following requirements…**
		iv. If necessary, measure moisture content of the stationary internal combustion engine exhaust at the sampling port location; and	(4) Method 4 of 40 CFR part 60, appendix A-3, Method 320 of 40 CFR part 63, appendix A[e], or ASTM Method D6348-03[de]	(c) Measurements to determine moisture must be made at the same time as the measurement for VOC concentration.
		v. Measure VOC at the exhaust of the stationary internal combustion engine; if using a control device, the sampling site must be located at the outlet of the control device	(5) Methods 25A and 18 of 40 CFR part 60, appendices A-6 and A-7, Method 25A with the use of a hydrocarbon cutter as described in 40 CFR 1065.265, Method 18 of 40 CFR part 60, appendix A-6[ce], Method 320 of 40 CFR part 63, appendix A[e], or ASTM Method D6348-03[de]	(d) Results of this test consist of the average of the three 1-hour or longer runs.

[a]The Administrator may be petitioned for approval to use alternative methods for portable analyzer.

[b] American Society of Mechanical Engineers (ASME) PTC 19.10-1981, Flue and Exhaust Gas Analyses, may be used for measuring the O_2 content of the exhaust gas as an alternative to EPA Method 3B. AMSE PTC 19.10-1981 incorporated by reference, see 40 CFR 60.17.

[c]EPA Method 18 of 40 CFR part 60, appendix A-6, may be used, provided that an adequate pre-survey test is conducted prior to the emissions test, such as the one described in OTM 11 on EPA's Web site.

[d]Incorporated by reference; see 40 CFR 60.17.

[e]Must meet the requirements in §60.4245(d).

This page intentionally left blank

ACRONYMS/BREVITY CODES

AFB	United States Air Force Base
APIMS	Air Program Information Management System
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
bhp	Brake Horsepower
CAA	Clean Air Act
CAAA	Clean Air Act Amendments (of 1990)
CARB	California Air Resource Board
CDX	Central Data Exchange
CEDRI	Compliance and Emissions Data Reporting Interface
CEMS	Continuous Emission Monitoring System
CFR	Code of Federal Regulations
CI	Compression Ignition
CO	Carbon Monoxide
CPMS	Continuous Parametric Monitoring System
D	Displacement
EF	Emission Factor
EPA	United States Environmental Protection Agency
ESP	Electrostatic Precipitator
ECA	Emission Controlled Area
FR	Federal Register
HAP	Hazardous Air Pollutant(s)
hp	Horsepower
Hz	Hertz
ICE	Internal Combustion Engine
LFG	Landfill Gas
LPG	Liquefied Petroleum Gas
MVNRLM	Motor Vehicle, Non-Road, Locomotive, and Marine
MMBtu	Million British Thermal Units
NAICS	North American Industry Classification System
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_X	Nitrogen Oxides
NSCR	Non-Selective Catalytic Reduction
NSPS	New Source Performance Standards
NTE	Not-to-Exceed
OC	Oxidation catalyst
PTE	Potential-to-Emit
PM	Particulate Matter
QA/QC	Quality Assurance/Quality Control
RATA	Relative Accuracy Test Audits
RB	Rich Burn
RICE	Reciprocating Internal Combustion Engine
Rpm	Revolutions per Minute

SCR	Selective Catalytic Reduction
SI	Spark Ignition
SLB	Stroke Lean Burn
SRB	Stroke Rich Burn
US	United States
USAF	United States Air Force
VOC	Volatile Organic Compounds

ABBREVIATIONS

µg	Microgram(s)
µm	Micrometer(s)
A-hr	Ampere-hours
bhp	Brake Horsepower
Btu	British Thermal Unit
ºC	Degrees Celsius
CH_2O	Formaldehyde
CO	Carbon Monoxide
CO_2	Carbon Dioxide
ºF	Degrees Fahrenheit
g/hp-hr	Grams per Horsepower-Hour
g/kW-hr	Grams per Kilowatt-Hour
gal	Gallon(s)
H-CHO	Formaldehyde
hp	Horse Power
hr	Hour(s)
kg	Kilogram
kW	Kilowatt(s)
kWe	Killowatt(s) Electrical
kWm	Killowatt(s) Mechanical
lb	Pound(s)
Mg	Megagram(s) [i.e., metric ton]
mg	Milligram(s)
MMBtu	Million British Thermal Units
NO_2	Nitrogen Dioxide
NO_X	Nitrogen Oxides
O_2	Oxygen
ppbvd	Parts per Billion by Volume Dry Basis
ppm	Parts per Million
ppmvd	Parts per million by volume dry basis
NHMC	Non-Methane Hydrocarbon
scf	Standard Cubic Foot
tpy	Tons per Year
yr	Year(s)

This page intentionally left blank

DEFINITIONS

Alaska Railbelt Grid means the service areas of the six regulated public utilities that extend from Fairbanks to Anchorage and the Kenai Peninsula. These utilities are Golden Valley Electric Association; Chugach Electric Association; Matanuska Electric Association; Homer Electric Association; Anchorage Municipal Light & Power; and the City of Seward Electric System.

Area source means any stationary source of HAP that is not a major source as defined in part 63.

Associated equipment as used in this subpart and as referred to in section 112(n)(4) of the CAA, means equipment associated with an oil or natural gas exploration or production well, and includes all equipment from the well bore to the point of custody transfer, except glycol dehydration units, storage vessels with potential for flash emissions, combustion turbines, and stationary RICE.

Backup power for renewable energy means an engine that provides backup power to a facility that generates electricity from renewable energy resources, as that term is defined in Alaska Statute 42.45.045(l)(5) (incorporated by reference, see § 63.14).

Black start engine means an engine whose only purpose is to start up a combustion turbine.

CAA means the Clean Air Act (42 U.S.C. 7401 *et seq.*, as amended by Public Law 101-549, 104 Stat. 2399).

Commercial emergency stationary RICE means an emergency stationary RICE used in commercial establishments such as office buildings, hotels, stores, telecommunications facilities, restaurants, financial institutions such as banks, doctor's offices, and sports and performing arts facilities.

Compression ignition means relating to a type of stationary internal combustion engine that is not a spark ignition engine.

Custody transfer means the transfer of hydrocarbon liquids or natural gas: After processing and/or treatment in the producing operations, or from storage vessels or automatic transfer facilities or other such equipment, including product loading racks, to pipelines or any other forms of transportation. For the purposes of this subpart, the point at which such liquids or natural gas enters a natural gas processing plant is a point of custody transfer.

Deviation means any instance in which an affected source subject to this subpart, or an owner or operator of such a source:

(1) Fails to meet any requirement or obligation established by this subpart, including but not limited to any emission limitation or operating limitation;

(2) Fails to meet any term or condition that is adopted to implement an applicable requirement in this subpart and that is included in the operating permit for any affected source required to obtain such a permit; or

(3) Fails to meet any emission limitation or operating limitation in this subpart during malfunction, regardless or whether or not such failure is permitted by this subpart.

(4) Fails to satisfy the general duty to minimize emissions established by § 63.6(e)(1)(i).

Diesel engine means any stationary RICE in which a high boiling point liquid fuel injected into the combustion chamber ignites when the air charge has been compressed to a temperature sufficiently high for auto-ignition. This process is also known as compression ignition.

Diesel fuel means any liquid obtained from the distillation of petroleum with a boiling point of approximately 150 to 360 degrees Celsius. One commonly used form is fuel oil number 2. Diesel fuel also includes any non-distillate fuel with comparable physical and chemical properties (*e.g.* biodiesel) that is suitable for use in compression ignition engines.

Digester gas means any gaseous by-product of wastewater treatment typically formed through the anaerobic decomposition of organic waste materials and composed principally of methane and CO_2 .

Dual-fuel engine means any stationary RICE in which a liquid fuel (typically diesel fuel) is used for compression ignition and gaseous fuel (typically natural gas) is used as the primary fuel.

Emergency stationary RICE means any stationary reciprocating internal combustion engine that meets all of the criteria in paragraphs (1) through (3) of this definition. All emergency stationary RICE must comply with the requirements specified in § 63.6640(f) in order to be considered emergency stationary RICE. If the engine does not comply with the requirements specified in § 63.6640(f), then it is not considered to be an emergency stationary RICE under this subpart.

(1) The stationary RICE is operated to provide electrical power or mechanical work during an emergency situation. Examples include stationary RICE used to produce power for critical networks or equipment (including power supplied to portions of a facility) when electric power from the local utility (or the normal power source, if the facility runs on its own power production) is interrupted, or stationary RICE used to pump water in the case of fire or flood, etc.

(2) The stationary RICE is operated under limited circumstances for situations not included in paragraph (1) of this definition, as specified in § 63.6640(f).

(3) The stationary RICE operates as part of a financial arrangement with another entity in situations not included in paragraph (1) of this definition only as allowed in § 63.6640(f)(2)(ii) or (iii) and § 63.6640(f)(4)(i) or (ii).

Engine startup means the time from initial start until applied load and engine and associated equipment reaches steady state or normal operation. For stationary engine with catalytic

controls, engine startup means the time from initial start until applied load and engine and associated equipment, including the catalyst, reaches steady state or normal operation.

Four-stroke engine means any type of engine which completes the power cycle in two crankshaft revolutions, with intake and compression strokes in the first revolution and power and exhaust strokes in the second revolution.

Gaseous fuel means a material used for combustion which is in the gaseous state at standard atmospheric temperature and pressure conditions.

Gasoline means any fuel sold in any State for use in motor vehicles and motor vehicle engines, or nonroad or stationary engines, and commonly or commercially known or sold as gasoline.

Glycol dehydration unit means a device in which a liquid glycol (including, but not limited to, ethylene glycol, diethylene glycol, or triethylene glycol) absorbent directly contacts a natural gas stream and absorbs water in a contact tower or absorption column (absorber). The glycol contacts and absorbs water vapor and other gas stream constituents from the natural gas and becomes "rich" glycol. This glycol is then regenerated in the glycol dehydration unit reboiler. The "lean" glycol is then recycled.

Hazardous air pollutants (HAP) means any air pollutants listed in or pursuant to section 112(b) of the CAA.

Institutional emergency stationary RICE means an emergency stationary RICE used in institutional establishments such as medical centers, nursing homes, research centers, institutions of higher education, correctional facilities, elementary and secondary schools, libraries, religious establishments, police stations, and fire stations.

ISO standard day conditions means 288 degrees Kelvin (15 degrees Celsius), 60 percent relative humidity and 101.3 kilopascals pressure.

Landfill gas means a gaseous by-product of the land application of municipal refuse typically formed through the anaerobic decomposition of waste materials and composed principally of methane and CO_2.

Lean burn engine means any two-stroke or four-stroke spark ignited engine that does not meet the definition of a rich burn engine.

Limited use stationary RICE means any stationary RICE that operates less than 100 hours per year.

Liquefied petroleum gas means any liquefied hydrocarbon gas obtained as a by-product in petroleum refining of natural gas production.

Liquid fuel means any fuel in liquid form at standard temperature and pressure, including but not limited to diesel, residual/crude oil, kerosene/naphtha (jet fuel), and gasoline.

Major Source, as used in this subpart, shall have the same meaning as in 40 CFR §63.2, except that:

(1) Emissions from any oil or gas exploration or production well (with its associated equipment (as defined in this section)) and emissions from any pipeline compressor station or pump station shall not be aggregated with emissions from other similar units, to determine whether such emission points or stations are major sources, even when emission points are in a contiguous area or under common control;

(2) For oil and gas production facilities, emissions from processes, operations, or equipment that are not part of the same oil and gas production facility, as defined in § 63.1271 of subpart HHH of this part, shall not be aggregated;

(3) For production field facilities, only HAP emissions from glycol dehydration units, storage vessel with the potential for flash emissions, combustion turbines and reciprocating internal combustion engines shall be aggregated for a major source determination; and

(4) Emissions from processes, operations, and equipment that are not part of the same natural gas transmission and storage facility, as defined in § 63.1271 of subpart HHH of this part, shall not be aggregated.

Malfunction means any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner which causes, or has the potential to cause, the emission limitations in an applicable standard to be exceeded. Failures that are caused in part by poor maintenance or careless operation are not malfunctions.

Natural gas means a naturally occurring mixture of hydrocarbon and non-hydrocarbon gases found in geologic formations beneath the Earth's surface, of which the principal constituent is methane. Natural gas may be field or pipeline quality.

Non-selective catalytic reduction (NSCR) means an add-on catalytic nitrogen oxides (NO_X) control device for rich burn engines that, in a two-step reaction, promotes the conversion of excess oxygen, NO_X , CO, and Volatile Organic Compounds (VOC) into CO_2 , nitrogen, and water.

Oil and gas production facility as used in this subpart means any grouping of equipment where hydrocarbon liquids are processed, upgraded (*i.e.*, remove impurities or other constituents to meet contract specifications), or stored prior to the point of custody transfer; or where natural gas is processed, upgraded, or stored prior to entering the natural gas transmission and storage source category. For purposes of a major source determination, facility (including a building, structure,

or installation) means oil and natural gas production and processing equipment that is located within the boundaries of an individual surface site as defined in this section. Equipment that is part of a facility will typically be located within close proximity to other equipment located at the same facility. Pieces of production equipment or groupings of equipment located on different oil and gas leases, mineral fee tracts, lease tracts, subsurface or surface unit areas, surface fee tracts, surface lease tracts, or separate surface sites, whether or not connected by a road, waterway, power line or pipeline, shall not be considered part of the same facility. Examples of facilities in the oil and natural gas production source category include, but are not limited to, well sites, satellite tank batteries, central tank batteries, a compressor station that transports natural gas to a natural gas processing plant, and natural gas processing plants.

Oxidation catalyst means an add-on catalytic control device that controls CO and VOC by oxidation.

Peaking unit or engine means any standby engine intended for use during periods of high demand that are not emergencies.

Percent load means the fractional power of an engine compared to its maximum manufacturer's design capacity at engine site conditions. Percent load may range between 0 percent to above 100 percent.

Potential to emit means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the stationary source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable. For oil and natural gas production facilities subject to subpart HH of this part, the potential to emit provisions in § 63.760(a) may be used. For natural gas transmission and storage facilities subject to subpart HHH of this part, the maximum annual facility gas throughput for storage facilities may be determined according to § 63.1270(a)(1) and the maximum annual throughput for transmission facilities may be determined according to § 63.1270(a)(2).

Production field facility means those oil and gas production facilities located prior to the point of custody transfer.

Production well means any hole drilled in the earth from which crude oil, condensate, or field natural gas is extracted.

Propane means a colorless gas derived from petroleum and natural gas, with the molecular structure $C_3 H_8$.

Remote stationary RICE means stationary RICE meeting any of the following criteria:

(1) Stationary RICE located in an offshore area that is beyond the line of ordinary low water along that portion of the coast of the United States that is in direct contact with the open seas and beyond the line marking the seaward limit of inland waters.

(2) Stationary RICE located on a pipeline segment that meets both of the criteria in paragraphs (2)(i) and (ii) of this definition.

(i) A pipeline segment with 10 or fewer buildings intended for human occupancy and no buildings with four or more stories within 220 yards (200 meters) on either side of the centerline of any continuous 1-mile (1.6 kilometers) length of pipeline. Each separate dwelling unit in a multiple dwelling unit building is counted as a separate building intended for human occupancy.

(ii) The pipeline segment does not lie within 100 yards (91 meters) of either a building or a small, well-defined outside area (such as a playground, recreation area, outdoor theater, or other place of public assembly) that is occupied by 20 or more persons on at least 5 days a week for 10 weeks in any 12-month period. The days and weeks need not be consecutive. The building or area is considered occupied for a full day if it is occupied for any portion of the day.

(iii) For purposes of this paragraph (2), the term pipeline segment means all parts of those physical facilities through which gas moves in transportation, including but not limited to pipe, valves, and other appurtenance attached to pipe, compressor units, metering stations, regulator stations, delivery stations, holders, and fabricated assemblies. Stationary RICE located within 50 yards (46 meters) of the pipeline segment providing power for equipment on a pipeline segment are part of the pipeline segment. Transportation of gas means the gathering, transmission, or distribution of gas by pipeline, or the storage of gas. A building is intended for human occupancy if its primary use is for a purpose involving the presence of humans.

(3) Stationary RICE that are not located on gas pipelines and that have 5 or fewer buildings intended for human occupancy and no buildings with four or more stories within a 0.25 mile radius around the engine. A building is intended for human occupancy if its primary use is for a purpose involving the presence of humans.

Residential emergency stationary RICE means an emergency stationary RICE used in residential establishments such as homes or apartment buildings.

Responsible official means responsible official as defined in 40 CFR 70.2.

Rich burn engine means any four-stroke spark ignited engine where the manufacturer's recommended operating air/fuel ratio divided by the stoichiometric air/fuel ratio at full load conditions is less than or equal to 1.1. Engines originally manufactured as rich burn engines, but modified prior to December 19, 2002 with passive emission control technology for NO_X (such as pre-combustion chambers) will be considered lean burn engines. Also, existing engines where there are no manufacturer's recommendations regarding air/fuel ratio will be considered a rich burn engine if the excess oxygen content of the exhaust at full load conditions is less than or equal to 2 percent.

Site-rated hp means the maximum manufacturer's design capacity at engine site conditions.

Spark ignition means relating to either: A gasoline-fueled engine; or any other type of engine with a spark plug (or other sparking device) and with operating characteristics significantly similar to the theoretical Otto combustion cycle. Spark ignition engines usually use a throttle to regulate intake air flow to control power during normal operation. Dual-fuel engines in which a liquid fuel (typically diesel fuel) is used for CI and gaseous fuel (typically natural gas) is used as the primary fuel at an annual average ratio of less than 2 parts diesel fuel to 100 parts total fuel on an energy equivalent basis are spark ignition engines.

Stationary reciprocating internal combustion engine (RICE) means any reciprocating internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile. Stationary RICE differ from mobile RICE in that a stationary RICE is not a non-road engine as defined at 40 CFR 1068.30, and is not used to propel a motor vehicle or a vehicle used solely for competition.

Stationary RICE test cell/stand means an engine test cell/stand, as defined in subpart PPPPP of this part, that tests stationary RICE.

Stoichiometric means the theoretical air-to-fuel ratio required for complete combustion.

Storage vessel with the potential for flash emissions means any storage vessel that contains a hydrocarbon liquid with a stock tank gas-to-oil ratio equal to or greater than 0.31 cubic meters per liter and an American Petroleum Institute gravity equal to or greater than 40 degrees and an actual annual average hydrocarbon liquid throughput equal to or greater than 79,500 liters per day. Flash emissions occur when dissolved hydrocarbons in the fluid evolve from solution when the fluid pressure is reduced.

Surface site means any combination of one or more graded pad sites, gravel pad sites, foundations, platforms, or the immediate physical location upon which equipment is physically affixed.

Two-stroke engine means a type of engine which completes the power cycle in single crankshaft revolution by combining the intake and compression operations into one stroke and the power and exhaust operations into a second stroke. This system requires auxiliary scavenging and inherently runs lean of stoichiometric.