

## Overview of Reciprocating Internal Combustion Engine (RICE) NESHAP Requirements for Stationary Agricultural Engines

**This document provides guidance on the RICE NESHAP requirements for stationary agricultural engines.** The content provided in this document is intended solely as assistance in determining requirements for compliance under the RICE NESHAP. Any variation between the rule and the information provided in this document is unintentional, and, in the case of such variations, the requirements of the rule govern.

### General Overview

#### **What is the RICE NESHAP rule?**

The National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (“RICE NESHAP”) limits emissions of toxic air pollutants from stationary reciprocating internal combustion engines, including agricultural engines. The pollutants emitted from stationary engines are known or suspected of causing cancer and other serious health effects. This rule applies to stationary reciprocating internal combustion engines throughout the U.S.

#### **What agricultural engines are affected by this rule?**

The RICE NESHAP applies to stationary reciprocating internal combustion engines nationwide, including (but not limited to) those at farming operations. Stationary engines located at farming operations are generally used to generate electricity and power equipment. All sizes of stationary engines are covered by the rule.

The RICE NESHAP does not apply to engines used in motor vehicles and mobile nonroad equipment. Mobile nonroad engines are those that are:

- Self-propelled (such as tractors, combines, loaders, bulldozers)
- Propelled while performing their function (such as lawnmowers)
- Portable or transportable (has wheels, skids, carrying handles, dolly, trailer, or platform) and do not remain in one location for more than 12 months, or full annual operating period of a seasonal source

#### **What do I need to consider when determining compliance requirements?**

The applicable RICE NESHAP requirements typically differ depending on whether the engine is a compression ignition (CI) or a spark ignition (SI) engine. Compression ignition engines are generally those that use diesel fuel. Spark ignition engines generally use gasoline or gaseous fuels such as natural gas, propane, or digester gas.

The RICE NESHAP requirements for an engine also depend on factors including the engine horsepower (HP) and type, construction date (existing or new – see below) and application (non-emergency or emergency). The requirements also depend on the amount of hazardous air pollutants (HAP) that are emitted from the facility. Information provided to the EPA indicates that the majority of farming operations are not major sources of HAP. Facilities that are not major sources of HAP are known as area sources of HAP. This document focuses on the requirements for engines at area sources of HAP.

Refer to the rule at 40 CFR part 63 subpart ZZZZ for the requirements for engines at major sources of HAP.

**How do I determine if my engine is considered “existing” or “new”?**

Engines located at an area source of HAP are considered “existing” if the original owner/operator of the engine entered into a contract for the on-site installation of the engine before June 12, 2006. Engines for which the original owner/operator of the engine entered into a contractual obligation for the on-site installation of the engine on or after June 12, 2006 are “new” engines. Note that relocating an existing engine to a new location (same facility or elsewhere) does not change the engine’s status as an “existing” engine.

**What do I have to do to comply with the rule?**

The specific compliance requirements for emergency engines are found on p. 3-5 of this document. The specific compliance requirements for non-emergency engines are found on p. 6-9 of this document.

**By what date must my engine(s) comply with these requirements?**

Existing CI engines must comply by May 3, 2013. Existing SI engines must comply by October 19, 2013. New engines must comply upon startup.

**What if I was not aware of this rule? What happens?**

Contact your EPA Regional Office as soon as possible. A list of RICE NESHAP contacts for each state can be found here:

<http://www.epa.gov/ttn/atw/icengines/docs/EPARegionalRICEcontacts.pdf>

**Where can I go for more information?**

Visit the EPA Office of Air and Radiation’s Agriculture website:

<http://www.epa.gov/airquality/agriculture/>

## Requirements for Emergency Engines

### What are emergency engines?

Emergency engines are engines that are operated to provide electrical power or mechanical work during an emergency situation. Examples include engines used to produce power for critical networks or equipment when electric power from the local utility is interrupted, or engines used to pump water in the case of fire or flood. A typical agricultural application for an emergency engine is a backup generator.

### What are the operational limitations for emergency engines?

In order to be considered an emergency engine, the engine must meet the RICE NESHAP operational requirements for emergency engines, which are as follows:

- There is no time limit on the use of the engine in emergency situations
- The engine may be used for up to 100 hours per calendar year for any combination of the following purposes:
  - Maintenance checks and readiness testing
  - Emergency demand response when an Energy Emergency Alert Level 2 has been declared by the Reliability Coordinator
  - Periods where the voltage or frequency deviates by 5 percent or more below standard
- The engine may be used for up to 50 hours per calendar year for any combination of the following purposes, but the operation counts as part of the 100 hours per calendar year for maintenance, testing, and emergency demand response:
  - Non-emergency situations, provided there is no financial arrangement with another entity
  - Peak shaving in local system operator program until May 3, 2014 if existing engine
  - Local reliability as part of a financial arrangement with another entity if all of the following conditions are met:
    - engine is an existing engine
    - engine is dispatched by local transmission/distribution system operator
    - dispatch is intended to mitigate local transmission and/or distribution limitations so as to avert potential voltage collapse or line overloads
    - dispatch follows reliability, emergency operation, or similar protocols that follow specific NERC, regional, state, public utility commission, or local standards or guidelines
    - power is provided only to the facility or to support the local distribution system
    - engine owner/operator identifies and records dispatch and standard that is being followed

### What do I have to do to comply with this rule?

#### New Emergency Engines

New emergency engines must meet the requirements of the New Source Performance Standards, 40 CFR part 60 subpart IIII for CI engines and 40 CFR part 60 subpart JJJJ for SI engines. These engines have no further requirements under the RICE NESHAP.

New CI engines are generally required to be certified by the engine manufacturer to be compliant with the NSPS. New SI engines that are 25 HP or less, or are gasoline or rich burn LPG engines larger than 25 HP are also required to be certified by the engine manufacturer. Owners and operators of certified engines must install, configure, operate and maintain the engine per the manufacturer's instructions.

### Existing Emergency Engines

Owners and operators must:

- Change oil and filter every 500 hours of operation or annually, whichever comes first
- Inspect air cleaner for CI engines or spark plugs for SI engines every 1,000 hours of operation or annually, whichever comes first, and replace as necessary
- Inspect hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary
- Operate and maintain the engine per the manufacturer's instructions or your own maintenance plan
- Minimize the engine's time spent at idle during startup and minimize the engine's startup time to a period needed for appropriate and safe loading of the engine
- Equip the engine with a non-resettable hour meter if one is not already installed
- Keep records of engine maintenance
- Keep records of the hours of operation recorded through the non-resettable hour meter, including how many hours are spent for emergency operation and what classified the operation as emergency

An oil analysis program may be used to extend the oil change requirement. The oil analysis must be performed at the same frequency specified for changing oil. The program must analyze the Total Base Number (CI RICE only), Total Acid Number (SI RICE only), viscosity and percent water content. If all of the condemning limits are not exceeded, the owner or operator is not required to change the oil. If any of the limits are exceeded, the owner or operator must change the oil within two business days of receiving the results of the analysis, or before operating the engine, whichever is later. Records of the analysis must be kept. The condemning limits are as follows:

- Total Base Number is <30% of the TBN of the oil when new
- Total Acid Number increases by more than 3.0 mg of KOH per gram from TAN of the oil when new
- Viscosity has changed by more than 20% from the viscosity of the oil when new
- Percent water content (by volume) is >0.5

### *Emergency Engines in Emergency Demand Response or Local Reliability Programs:*

In addition to meeting the requirements above, starting January 1, 2015, owners and operators of emergency engines meeting the below three (3) criteria must use ultra low sulfur diesel fuel (if the engine uses diesel fuel; existing diesel fuel obtained prior to January 1, 2015, may be used until depleted) and submit an annual report of the dates and times that the engine operated for emergency demand response or for local reliability.

1. Larger than 100 HP with a displacement less than 30 liters per cylinder, and either
2. Operated or contractually obligated to be available greater than 15 hours per year (up to the maximum of 100 hours per year) for emergency demand response or voltage/frequency deviation, or

3. Operated for local reliability (up to the maximum of 50 hours per year).

The annual report must contain the following information:

- Facility name and address
- Engine rating, model year, latitude/longitude
- Date, start time, and end time for operation for emergency demand response, voltage/frequency deviations and local reliability
- Number of hours engine is contractually obligated for emergency demand response or voltage/frequency deviation
- Entity that dispatched engine for local reliability and situation that necessitated dispatch
- For CI engines, deviations from ultra low sulfur diesel fuel requirement

The first annual report must cover the calendar year 2015 and must be submitted no later than March 31, 2016. Subsequent annual reports for each calendar year must be submitted no later than March 31 of the following calendar year. The annual report must be submitted through the Compliance and Emissions Data Reporting Interface that is accessed through EPA's Central Data Exchange (<http://www.epa.gov/cdx>).

## Requirements for Non-Emergency Engines

### What are non-emergency engines?

Non-emergency engines are engines that are operated to provide electrical power or mechanical work primarily during non-emergency situations. Typical agricultural applications for non-emergency engines include irrigation pumps and digester gas engines used for power generation. Any engine that does not meet the RICE NESHAP definition of an emergency engine is considered to be a non-emergency engine. A more detailed description of an emergency engine can be found in the previous section of this document.

### What are the emission standards and other compliance requirements for new non-emergency engines?

New non-emergency engines must meet the requirements of the New Source Performance Standards (NSPS), 40 CFR part 60 subpart IIII for CI engines and 40 CFR part 60 subpart JJJJ for SI engines. These engines have no further requirements under the RICE NESHAP.

New CI engines are generally required to be certified by the engine manufacturer to be compliant with the NSPS. New SI engines that are 25 HP or less, or are gasoline or rich burn LPG engines larger than 25 HP are also required to be certified by the engine manufacturer. Owners and operators of certified engines must install, configure, operate and maintain the engine per the manufacturer's instructions.

### What are the emission standards for existing non-emergency engines?

The emission standards for existing non-emergency engines are provided in the table below. Certain larger non-emergency engines must meet a numeric emission limit for carbon monoxide (CO). Other engines are required to meet management practice emission standards, such as change engine oil and filter, or equipment standards requiring the installation of a catalyst on the engine.

Emission Standards for Existing Non-Emergency Engines

HP	Engine Subcategory				
	CI	SI 2-Stroke Lean Burn	SI 4-Stroke in remote areas	SI 4-Stroke not in remote areas	Landfill or Digester Gas
≤300	Change oil/filter & inspect air cleaner every 1,000 hours or annually; inspect hoses/belts every 500 hours or annually, whichever comes first	Change oil/filter, inspect spark plugs, & inspect hoses/belts every 4,320 hours or annually, whichever comes first	Change oil/ filter, inspect spark plugs, & inspect hoses/belts every 1,440 hours of operation or annually, whichever comes first		Change oil/ filter, inspect spark plugs, & inspect hoses/belts every 1,440 hours of operation or annually, whichever comes first
300-500	49 ppm CO or 70% CO reduction				

HP	Engine Subcategory				
	CI	SI 2-Stroke Lean Burn	SI 4-Stroke in remote areas	SI 4-Stroke not in remote areas	Landfill or Digester Gas
>500	23 ppm CO or 70% CO reduction		Change oil/ filter, inspect spark plugs, & inspect hoses/belts every 2,160 hours of operation or annually, whichever comes first	If engine used >24 hrs/yr*: 4SLB: Install oxidation catalyst 4SRB: Install non-selective catalytic reduction	

\* If engine used ≤24 hr/yr: change oil/filter & inspect air cleaner every 500 hours or annually; inspect hoses/belts every 500 hours or annually, whichever comes first.

Owners and operators of existing non-emergency CI RICE larger than 300 HP that are certified to the Tier 3 (Tier 2 for engines above 560 kilowatt) emission standards in Table 1 of 40 CFR 89.112 may comply with the RICE NESHAP by meeting the requirements for Tier 3 engines (Tier 2 for engines above 560 kilowatt) in 40 CFR part 60 subpart IIII instead of the emission limitations and other requirements that would otherwise apply under the RICE NESHAP.

Oil analysis program

An oil analysis program may be used to extend the oil change requirement. The oil analysis must be performed at the same frequency specified for changing oil. The program must analyze the Total Base Number (CI RICE only), Total Acid Number (SI RICE only), viscosity and percent water content. If all of the condemning limits are not exceeded, the owner or operator is not required to change the oil. If any of the limits are exceeded, the owner or operator must change the oil within two business days of receiving the results of the analysis, or before operating the engine, whichever is later. Records of the analysis must be kept. The condemning limits are as follows:

- Total Base Number is <30% of the TBN of the oil when new
- Total Acid Number increases by more than 3.0 mg of KOH per gram from TAN of the oil when new
- Viscosity has changed by more than 20% from the viscosity of the oil when new
- Percent water content (by volume) is >0.5

**What are the other compliance requirements for existing non-emergency engines?**

In addition to meeting the emission standards, owners and operators must comply with the requirements listed below. Also, all engines that are subject to the rule must minimize the engine's time spent at idle during startup and minimize the engine's startup time to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the emission standards applicable to all times other than startup apply to the engine.

Existing non-emergency CI engines of 300 horsepower (HP) or less and existing non-emergency SI engines of 500 HP or less

- Operate and maintain the engine per the manufacturer's instructions or your own maintenance plan
- Keep records of engine maintenance

Existing non-emergency CI engines larger than 300 HP

- Initial performance test to demonstrate compliance with emission limit
- If larger than 500 HP:
  - subsequent performance testing every 8,760 hours of operation or 3 years, whichever comes first (every 5 years if engine operates less than 100 hours per calendar year)
  - keep catalyst pressure drop within 2 inches of water from pressure drop measured during initial performance test; measure and record catalyst pressure drop monthly
  - keep catalyst inlet temperature between 450-1,350°F; continuously monitor and record catalyst inlet temperature
- Use ultra low sulfur diesel fuel
- Equip engine with closed crankcase ventilation system or open crankcase filtration system
- Submit required notifications
- Submit semiannual compliance reports (annual if engine operates less than 100 hours per calendar year)

Existing non-emergency SI 4-stroke engines larger than 500 HP that are in remote areas (must be in a remote area on the initial compliance date (October 19, 2013) to be considered a remote engine) An engine is in a remote area if within a 0.25 mile radius around the engine there are 5 or fewer buildings intended for human occupancy and no buildings with four or more stories. A building is intended for human occupancy if its primary use is for a purpose involving the presence of humans.

- Operate and maintain the engine per the manufacturer's instructions or your own maintenance plan
- Keep records of engine maintenance

Existing non-emergency SI 4-stroke engines larger than 500 HP that are not in remote areas

- Install a catalyst and conduct initial and annual catalyst activity checks. The initial and annual catalyst activity checks must show that 4-stroke lean burn engine CO emissions are reduced by at least 93 percent or more or limited to 47 parts per million (ppm), and 4-stroke rich burn engine CO emissions are reduced by at least 75 percent or more or limited to 270 ppm or total hydrocarbons is reduced by 30 percent or more in order to meet the catalyst equipment standard.
- Equip engine with high temperature engine shutdown or continuously monitor catalyst inlet temperature and maintain between 450-1,350°F for 4-stroke lean burn engines and 750-1,250°F for 4-stroke rich burn engines
- Submit required notifications
- Submit semiannual compliance reports (annual if engine operates less than 100 hours per calendar year)



**What requirements apply to CI engines scheduled to be replaced in the next few years due to state or local rules?**

Prior to January 1, 2015, or 12 years after the installation date of the engine (whichever is later), but not later than June 1, 2018, owners and operators of existing non-emergency CI RICE larger than 300 HP that are certified to the Tier 1 or Tier 2 emission standards in Table 1 of 40 CFR 89.112 and subject to an enforceable state or local standard that requires the engine to be replaced no later than June 1, 2018 may choose to comply with the requirements for non-emergency CI RICE of 300 HP or less. After January 1, 2015, or 12 years after the installation date of the engine (whichever is later), but not later than June 1, 2018, the engine must comply with the requirements for non-emergency CI RICE larger than 300 HP.