



Connecticut Department of Energy and Environmental Protection



National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines (RICE Rule)



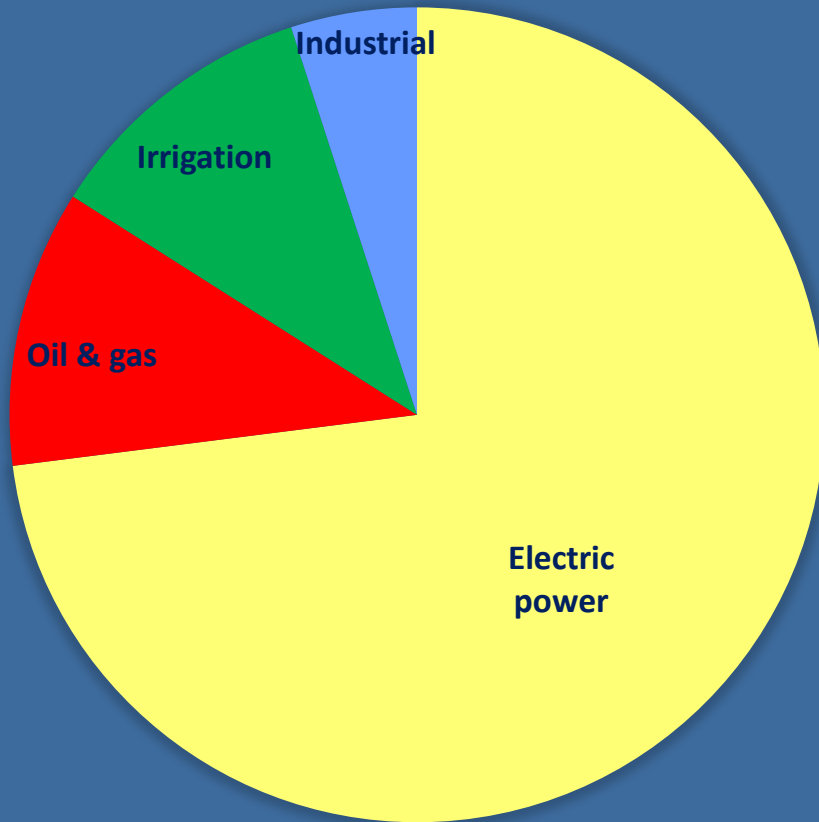
40 CFR 63 Subpart ZZZZ



Connecticut Department of Energy and Environmental Protection

Background on Stationary Engines

APPLICATIONS



- ~1.5 million stationary engines in U.S.
 - 78% compression ignition
 - 22% spark ignition
 - ~900,000 used for emergency power
- Sizes range from 1 kW to >10 MW
- Main hazardous air pollutants (HAP) emitted: formaldehyde, acetaldehyde, acrolein, methanol, and PAH
- Main criteria pollutants emitted: NO_x, CO, VOC, PM



Stationary vs. Mobile

- Stationary- not used in a motor vehicle and not a nonroad engine
 - Nonroad engines are:
 - Self-propelled (tractors, bulldozers)
 - Propelled while performing their function (lawnmowers)
 - Portable or transportable (has wheels, skids, carrying handles, dolly, trailer, or platform)
 - Portable nonroad engine becomes stationary if it stays in one location for more than 12 months, or full annual operating period if seasonal source



VS.



Why are engine emissions a concern?

- Pollutants emitted from stationary engines are known or suspected of causing cancer and other serious health effects:
 - Aggravation of respiratory and cardiovascular disease
 - Changes in lung function and increased respiratory symptoms
 - Premature deaths in people with heart or lung disease
 - Benzene and 1,3-butadiene are known human carcinogens
 - Non-cancer health effects from air toxics may include neurological, cardiovascular, liver, kidney effects, also effects on immune and reproductive systems
- NO_x and VOC can react in the presence of sunlight to form ozone



EPA's Stationary Engine Regulations

- National Emission Standards for Hazardous Air Pollutants (NESHAP) for Stationary Reciprocating Internal Combustion Engines (RICE)
 - 40 CFR 63 subpart ZZZZ
- New Source Performance Standards (NSPS) for Stationary Compression Ignition (CI) Internal Combustion Engines (ICE)
 - 40 CFR 60 subpart IIII
- NSPS for Stationary Spark Ignition (SI) ICE
 - 40 CFR 60 subpart JJJJ



Applicability

RICE Rule

Applies to stationary CI and SI engines, both existing and new

CI NSPS

Applies to stationary CI engines:

- Ordered after 7/11/2005 and manufactured after 4/1/2006
- Modified or reconstructed after 7/11/2005

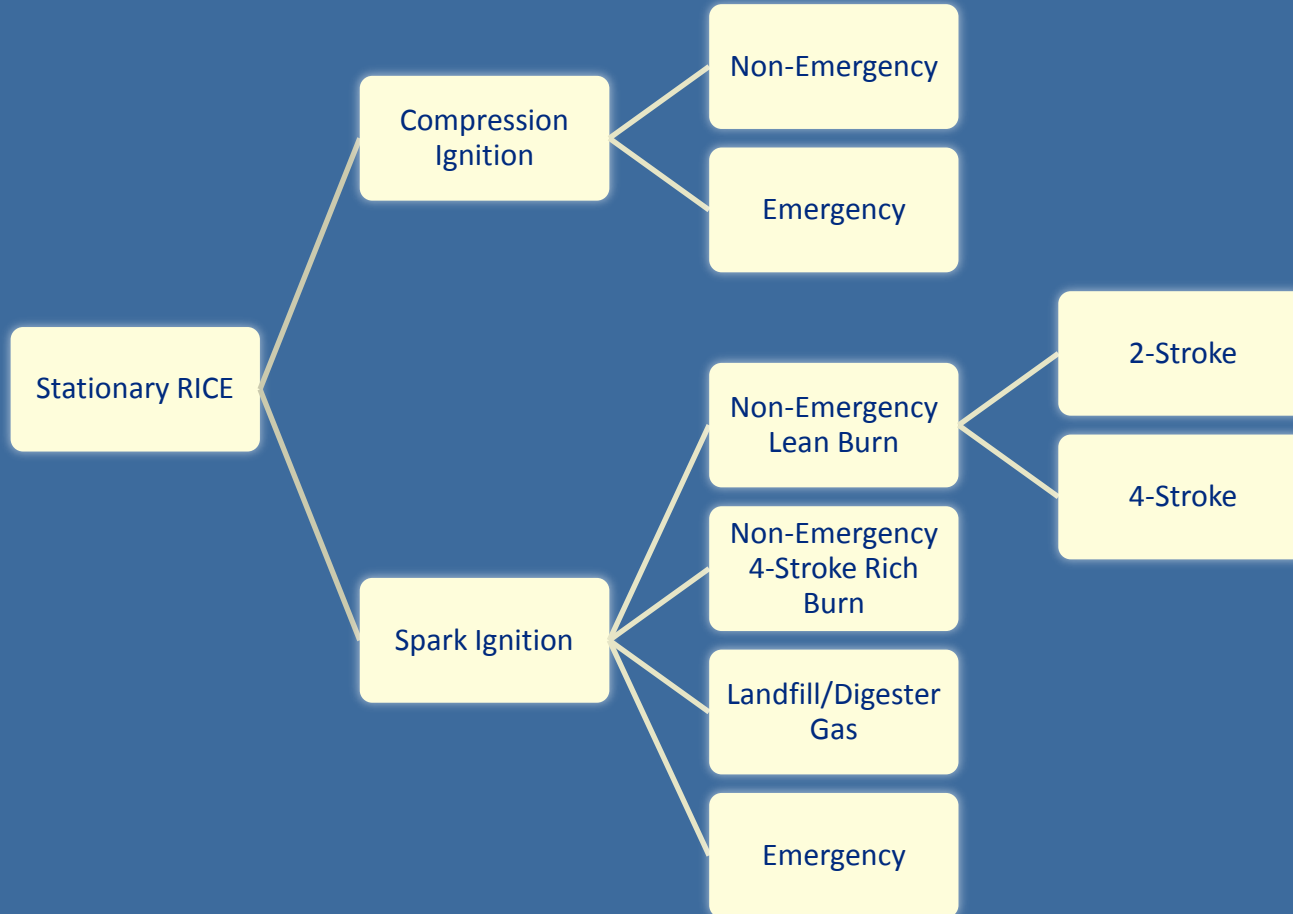
SI NSPS

Applies to stationary SI engines:

- Ordered after 6/12/2006 and manufactured on/after
 - 7/1/2007 if ≥ 500 HP (except lean burn $500 \leq \text{HP} < 1,350$)
 - 1/1/2008 if lean burn $500 \leq \text{HP} < 1,350$
 - 7/1/2008 if < 500 HP
 - 1/1/2009 if emergency > 25 HP
- Modified or reconstructed after 6/12/2006



General Sub-Categorization Approach



RICE Rule Background

- Regulates HAP emissions from stationary RICE at both major and area sources of HAP
- All sizes of engines are covered
- **ONLY ENGINES NOT SUBJECT:** existing emergency engines located at residential, institutional, or commercial area sources used or obligated to be available ≤ 15 hr/yr for emergency demand response, and not used for local reliability



2013 Amendments: Background

- EPA finalized amendments to the RICE NESHAP in 2010 that established standards for certain existing engines
- After promulgation of the 2010 amendments, EPA received several petitions for reconsideration, petitions for judicial review, and other communications regarding several issues with the final rules
- On 1/30/2013, EPA finalized amendments to the NESHAP to address the petitions
 - Amendments effective 4/1/2013
 - Minor amendments/clarifications also made to NSPS



Before you start...

In order to access the appropriate training module, you will need to know:

- Whether the unit is located at a major or area source of HAP
- Whether the unit is compression ignition or spark ignition
 - If spark ignition, whether the unit is 2-stroke, 4-stroke lean burn, 4-stroke rich burn, or landfill/digester gas-fired
- Whether the unit is emergency or non-emergency
- Date of engine construction or reconstruction
- Engine brake horsepower (HP)
- How many hr/yr the unit operates



Helpful definitions

(page 1 of 4)

Area source- any stationary source of HAP that is not a major source

Major source- has the potential to emit 10 or more tons/year of any single HAP or 25 or more tons/year of any combination of HAP

Potential to emit- 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 (40 CFR 63.2).

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

Spark ignition- 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.

Limited use- any stationary RICE that operates <100 hours/year



Construction- the on-site fabrication, erection, or installation of an affected source.

Construction does not include the removal of all equipment comprising an affected source from an existing location and reinstallation of such equipment at a new location. The owner/operator of an existing affected source that is relocated may elect not to reinstall minor ancillary equipment including, but not limited to, piping, ductwork, and valves. However, removal and reinstallation of an affected source will be construed as reconstruction if it satisfies the criteria for reconstruction as defined in this section. The costs of replacing minor ancillary equipment must be considered in determining whether the existing affected source is reconstructed.

Reconstruction- the replacement of components of an affected or a previously nonaffected source to such an extent that:

- (1) The fixed capital cost of the new components exceeds 50% of the fixed capital cost that would be required to construct a comparable new source; and
- (2) It is technologically and economically feasible for the reconstructed source to meet the relevant standard(s) established by the Administrator (or a State) pursuant to section 112 of the Act. Upon reconstruction, an affected source, or a stationary source that becomes an affected source, is subject to relevant standards for new source, including compliance dates, irrespective of any change in emissions of HAP from that source.



Emergency- In order to be considered emergency under 40 CFR 63 subpart ZZZZ, an engine must adhere to the following:

- There is no limit on the number of hours the engine can be operated during emergencies.
 - Do not operate the engine for more than 30 minutes before the emergency condition is expected to occur; terminate engine operation immediately upon notification that the emergency condition is no longer imminent.
- Operation for up to 100 hours/year is allowed for maintenance and testing.
- Operation for up to 50 hours/year is allowed for non-emergencies (counts as part of the 100 hour/year maintenance and testing limit).
 - These hours cannot be used for peak shaving or as art of a financial arrangement with another entity.

Note: If operation in response to a deviation of voltage from the electricity supplier to the premises does not qualify as emergency operation under the rule, the unit may operate for up to 50 hours/year as part of the non-emergency operation allowance as long as the engine is not used for peak shaving or as part of a financial arrangement with another entity. Contact EPA if you have any questions. The following are examples of when a voltage deviation might be considered an emergency:

- Voltage deviation at a hospital which disrupts normal operations
- Deviation in power to a 911 call center
- Power disruption at a shopping mall which affects lighting and prevents shoppers from exiting the building safely
- If located at an area source: Operation for up to 50 hours/year is allowed to head off potential voltage collapse or line overloads that could result in local or regional power disruption.
- If located at a major source: Operation for up to 50 hours/year during non-emergencies is allowed, as long as operation is not part of a financial arrangement with another entity.

If an emergency engine operates for more than allowable hours for non-emergency purposes, it will need to meet non-emergency engine requirements.



Helpful definitions

(page 4 of 4)

Commercial emergency stationary RICE- 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- 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.

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

For further guidance regarding the definition of residential, commercial, or institutional emergency stationary RICE, please visit:

www.epa.gov/ttn/atw/icengines/docs/guidance_emergency_engine_def.pdf

