

National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

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Paid for, in part, by the Kansas Department of Health and Environment

Webinar logistics

- Can't hear? If it's not the computer volume, then access by phone. Click on the phone button and dial the number/pin number.
- Ask questions and offer comments by typing them into the long text box in the "questions section" of the control panel.
Press enter.
- Presentation will be archived.
- A short evaluation will be sent by email.

Overview

- Who's SBEAP?
- Area source background
- 4Z HAPs
- History/Summary 4Z modifications
- Compliance date
- Requirements/Work practices
- Operating limitations
- Compliance demonstration
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Where's Kansas SBEAP?

Kansas State University

- College of Engineering
 - Engineering Extension
 - Pollution Prevention Institute (PPI)
 - Small Business Environmental Assistance Program (SBEAP)

Small Business Environmental Assistance Program

- Environmental compliance assistance
- Multimedia [air (mostly), waste, water, energy, GHG inventory and reporting, and EMS]
- Free to small- and medium-sized businesses (KDHE funded)
- Confidential
- Staff located throughout the state
- Contact information
 - Web site: www.sbeap.org
 - Hotline: 800-578-8898
 - E-mail: sbeap@ksu.edu



Upcoming Learning Opportunities

- Idling Reduction Workshop
- Thursday, June 24, 2010, 9:00 am-12:00 pm,
6000 Lamar, Mission, KS 66202

Sign up at www.sbeap.org

Other State technical assistance programs

- Small Business Environmental Home Page
 - Small Business Ombudsman/Small Business Environmental Assistance Program (SBO/SBEAP)
[List of Contacts](#)

Area Source Rules Background

- NESHAP – National Emission Standards for Hazardous Air Pollutants
 - **major** source – facility emits or has PTE at least 10 tons/yr single HAP or 25 tons/yr combinations of HAPs
 - **area** source – not a **major** source
 - www.epa.gov/ttn/atw/area/arearules.html
- CAA requires EPA to ID 30 most toxic HAPs in urban areas
- CAA requires EPA to ID **area** source categories representing 90% of emitters of these “Urban Dirty Thirty”

4Z HAPs

- HAPs emitted from diesel-fired stationary RICE:
 - 1, 3-butadiene, acetaldehyde, acrolein, benzene, ethylbenzene, formaldehyde, n-hexane, naphthalene, PAH, polycyclic organic matter, styrene, toluene, and xylene
 - Metallic HAPs include cadmium, chromium, lead, manganese, mercury, nickel, and selenium
- The urban HAP that must be regulated at stationary RICE are: 7 polycyclic aromatic hydrocarbons (PAH), formaldehyde, acetaldehyde, arsenic, benzene, beryllium compounds, and cadmium
- EPA uses formaldehyde to serve as a surrogate for HAP emissions.
- The final rule limits emissions of HAP through emission standards for CO for existing stationary CI RICE

History of 4Z

- June 15, 2004 – NESHAP for Stationary RICE
- January 18, 2008 – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines and NESHAP for RICE
- March 3, 2010 – NESHAP for RICE
- August 10, 2010 (?) – RICE – Existing Spark Ignition
- 40 CFR Subpart ZZZZ (40 CFR 63.6580-63.6675)

Summary of 4Z Modifications

- June, 2004 NESHAP for RICE (subpart ZZZZ) applied to
 - new and reconstructed stationary RICE
 - existing stationary RICE > 500 HP at major sources
- March 3, 2010
 - Addresses emissions from existing stationary CI engines ≤ 500 HP at major sources and all existing stationary CI engines at area sources
 - Addresses emissions from existing stationary non-emergency CI engines > 500 HP at major sources

Summary of 4Z Modifications

- Adds to subpart ZZZZ requirements for
 - existing CI stationary RICE ≤ 500 HP at major sources
 - emergency and
 - non-emergency engines
 - existing stationary CI engines at area sources
 - existing stationary non-emergency CI engines >500 HP at major sources

Definitions

- **Black start engine** means an engine whose only purpose is to start up a combustion turbine.
- **Compression ignition** means relating to a type of stationary internal combustion engine that is not a spark ignition engine.
- **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.
- **Lean burn engine** means any two-stroke or four-stroke spark ignited engine that does not meet the definition of a rich burn engine.
- **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.
- **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.

Compliance date

- May 3, 2013
 - Existing non-emergency CI stationary RICE > 500 HP at major source
 - Existing stationary CI RICE \leq 500 HP
 - Existing stationary CI RICE at area source

Requirements for Existing Stationary RICE at Major Sources

- Emission standards

TABLE 1—NUMERICAL EMISSION STANDARDS FOR EXISTING STATIONARY CI RICE LOCATED AT MAJOR SOURCES

Subcategory	Except during periods of startup
Non-Emergency CI $100 \leq \text{HP} \leq 300$	230 ppmvd CO at 15% O ₂ .
Non-Emergency CI $300 < \text{HP} \leq 500$	49 ppmvd CO at 15% O ₂ or 70% CO reduction.
Non-Emergency CI > 500 HP	23 ppmvd CO at 15% O ₂ or 70% CO reduction.

- Fuel requirements – ultra-low sulfur diesel

Work Practice Standards for Existing Stationary RICE at Major Sources

- Existing stationary emergency CI RICE ≤ 500 HP at major sources
 - Change oil and filter every 500 hours or annually
 - Inspect air cleaner every 1,000 hours or annually
 - Inspect all hoses and belts every 500 hours or annually
- Existing stationary non-emergency CI RICE <100 HP at major sources
 - Change oil and filter every 1,000 hours or annually
 - Inspect air cleaner every 1,000 hours or annually
 - Inspect all hoses and belts every 500 hours or annually

Capture and collection requirements for metallic HAP

- O/O of existing stationary non-emergency CI engines > 300 HP at major sources must either
 - Install a closed crankcase ventilation system, or
 - Install an open crankcase filtration emission control system
 - Filters exhaust stream to remove oil mist, particulates, and metals

Requirements for Existing Stationary RICE at Area Sources

- Emission standards

TABLE 2—NUMERICAL EMISSION STANDARDS FOR EXISTING STATIONARY RICE LOCATED AT AREA SOURCES

Subcategory	Except during periods of startup
Non-Emergency CI 300<HP≤500	49 ppmvd CO at 15% O ₂ or 70% CO reduction.
Non-Emergency CI>500 HP	23 ppmvd CO at 15% O ₂ or 70% CO reduction.

- Existing stationary emergency engines at area sources located at residential, commercial, or institutional facilities are not subject to the requirements of this rule
- Fuel requirements – ultra-low sulfur diesel

Work Practice Standards for Existing Stationary RICE at Area Sources

- Existing stationary emergency CI RICE at area sources
 - Change oil and filter every 500 hours or annually
 - Inspect air cleaner every 1,000 hours or annually
 - Inspect all hoses and belts every 500 hours or annually
- Existing stationary non-emergency CI RICE ≤ 300 HP at area sources
 - Change oil and filter every 1,000 hours or annually
 - Inspect air cleaner every 1,000 hours or annually
 - Inspect all hoses and belts every 500 hours or annually

Capture and collection requirements for metallic HAP

- O/O of existing stationary non-emergency CI engines > 300 HP at area sources must either
 - Install a closed crankcase ventilation system, or
 - Install an open crankcase filtration emission control system
 - Filters exhaust stream to remove oil mist, particulates, and metals

Startup Requirements (applicable engines)

- Existing CI RICE ≤ 500 HP at major sources
- Existing non-emergency CI RICE > 500 HP at major sources
- Existing CI RICE at area sources
- New or reconstructed non-emergency 2SLB > 500 HP at major sources
- New or reconstructed non-emergency 4SLB ≥ 250 HP at a major sources
- Existing non-emergency 4SRB > 500 HP at major sources
- New or reconstructed non-emergency 4SRB > 500 HP at major sources
- New or reconstructed non-emergency CI > 500 HP at major sources

Operating limitations

- Stationary non-emergency CI RICE > 500 HP equipped with oxidation catalyst
 - Must maintain catalyst so pressure drop across catalyst does not change by more than 2 inches of water from the pressure drop measured during the initial performance test
 - Must maintain temperature of the stationary RICE exhaust so the catalyst inlet temperature is between 450 and 1,350 degrees Fahrenheit
- Stationary non-emergency CI engines > 300 HP meeting requirement of open or closed crankcases must follow manufacturer's specified maintenance requirements for operation and maintenance, and replacement

Compliance demonstration

- Existing Stationary CI RICE, Major source
 - Non-emergency CI RICE < 100 HP and emergency CI RICE
 - Operate and maintain RICE and aftertreatment control device IAW manufacturer's emission-related written instructions or develop their own maintenance plan
 - No performance testing; not subject to numerical emission standards
 - Non-emergency CI RICE ≥ 100 HP, ≤ 500 HP
 - Initial performance test
 - Non-emergency CI RICE > 500 HP
 - Initial performance test
 - Test every 8,760 hours of operation or 3 year
 - Continuously monitor and record catalyst inlet temperature and measure pressure drop across catalyst monthly
 - If an oxidative catalyst is not used on the engine, continuously monitor and record operating parameters approved by Administrator

Compliance demonstration

- O/O of existing stationary RICE at area sources subject to management practices have no performance testing requirements
- Existing Stationary CI RICE, Area source
 - **Non-emergency CI RICE > 300 HP**
 - Initial performance test
 - **Non-emergency CI RICE > 500 HP**
 - Initial performance test
 - Test every 8,760 hours of operation or 3 years (5 years for limited use stationary RICE)
 - Continuously monitor and record catalyst inlet temperature and measure pressure drop across catalyst monthly
 - If an oxidative catalyst is not used on the engine, continuously monitor and record operating parameters approved by Administrator

Recordkeeping requirements

- O/O of existing stationary emergency RICE that do not meet the requirements for non-emergency engines are required to keep records of their hours of operation
- O/O of existing stationary emergency RICE must install a non-resettable hour meter on their engines to record the hours of operation
- Emergency stationary RICE may be operated for maintenance checks and readiness testing
 - 100 hours/year
 - No time limit on use in emergency situations
 - Record the length of operation and the reason
 - Maintain records
 - Can use for non-emergency purposes for 50 hours/year
 - Counts towards the 100 hours
 - Cannot be used to generate income (e.g., supply power to an electric grid)
 - May operate 15 hours/year as part of a demand response program
 - Counts towards the 50 hours
 - Must maintain records showing how they were notified of the emergency condition, by whom, and the time the engine was operated as part of the demand response

Recordkeeping requirements (cont)

- O/O of existing stationary CI RICE located at area sources that are subject to management practices are required to keep records that show that management practices that are required are being met
 - Oil and filter change dates and corresponding hour on the hour meter
 - Inspection and replacement dates for air cleaners, hoses, and belts
 - Record of other emission-related repairs and maintenance
- O/O of existing non-emergency stationary CI RICE > 300 HP
 - Records of manufacturer's recommended maintenance procedures for crankcase systems
 - Records of maintenance performed on the system

Reporting requirements

- O/O of existing stationary CI RICE ≤ 500 HP at major source and existing stationary CI RICE at area source must submit all applicable notifications for each stationary RICE
 - Initial notification
 - Notification of performance test
 - Notification of compliance
- Reporting requirements do not apply
 - Stationary RICE < 100 HP
 - Existing emergency stationary RICE
 - Existing stationary RICE not subject to numerical emission standards

Outline of 4Z, 40 CFR Part 63, Subpart ZZZZ

- 63.6580 What is the purpose
- 63.6585 Am I subject?
- 63.6590 What parts does this cover?
- 63.6595 When do I have to comply?
- 63.6600 Emission and operating limitations for stationary RICE > 500 HP at major source
- 63.6601 Emission and operating limitations for 4SLB stationary RICE $250 \leq \text{HP} < 500$ at major source

Outline of 4Z, 40 CFR Part 63, Subpart ZZZZ (cont)

- 63.6602 Emission and operating limitations for existing stationary CI RICE ≤ 500 brake HP at major source
- 63.6603 Emission and operating limitations for existing stationary CI RICE at area source
- 63.6604 Fuel requirements for existing stationary CI RICE
- 63.6605 General requirements
- 63.6610 Initial performance tests for stationary RICE > 500 brake HP at major source
- 63.6611 Initial performance tests for 4SLB SI stationary RICE ≥ 250 and ≤ 500 HP at major source
- 63.6612 Initial performance tests for existing stationary RICE ≤ 500 brake HP at a major source or an existing stationary RICE located at an area source

Outline of 4Z, 40 CFR Part 63, Subpart ZZZZ (cont)

- 63.6615 Subsequent performance tests
- 63.6620 Performance tests and other procedures
- 63.6625 Monitoring, installation, collection, operation, and maintenance requirements
- 63.6630 Demonstration of initial compliance
- 63.6635 Monitoring and data collection
- 63.6640 Demonstration of continuous compliance

Outline of 4Z, 40 CFR Part 63, Subpart ZZZZ (cont)

- 63.6645 Notifications
- 63.6650 Reports
- 63.6655 Records
- 63.6660 Record retention
- 63.6665 General provisions
- 63.6670 Implementation and enforcement
- 63.6675 Definitions

Outline of 4Z, 40 CFR Part 63, Subpart ZZZZ (cont)

- [Table 1a](#) - Emission Limitations for Existing, New, and Reconstructed SI, 4SRB Stationary RICE >500 HP at Major Source
- [Table 1b](#) - Operating Limitations for Existing, New, and Reconstructed SI, 4SRB Stationary RICE >500 HP at Major Source
- [Table 2a](#) - Emission Limitations for New and Reconstructed 2SLB and CI Stationary RICE >500 HP and New and Reconstructed 4SLB Stationary RICE \geq 250 HP at Major Source
- [Table 2b](#) - Operating Limitations for New and Reconstructed 2SLB and CI Stationary RICE >500 HP Located at a Major Source of HAP Emissions, Existing Non-Emergency CI Stationary RICE >500 HP, and New and Reconstructed 4SLB Stationary RICE \geq 250 HP at Major Source

Outline of 4Z, 40 CFR Part 63, Subpart ZZZZ (cont)

- [Table 2c](#) - Requirements for Existing CI Stationary RICE at Major Sources
- [Table 2d](#) - Requirements for Existing CI Stationary RICE at Area Sources
- [Table 3](#) - Subsequent Performance Tests
- [Table 4](#) - Requirements for Performance Tests
- [Table 5](#) - Initial Compliance With Emission Limitations and Operating Limitations
- [Table 6](#) - Continuous Compliance With Emission Limitations and Operating Limitations
- [Table 7](#) - Requirements for Reports
- [Table 8](#) - Applicability of General Provisions

Resources

- www.epa.gov/ttn/atw/area/arearules.html - EPA's Air Toxics Website for Area Source Standards
- EPA [4Z flowchart](#) (bottom of page, under "Implementation Information")
- Mississippi Department of Environmental Quality's [flow chart for determining requirements of 4Z rule](#)
- EPA [On-demand training video](#), June 2010
- Texas Commission on Environmental Quality [4Z PowerPoint Presentation](#) (Sam Madison)

Questions or comments?

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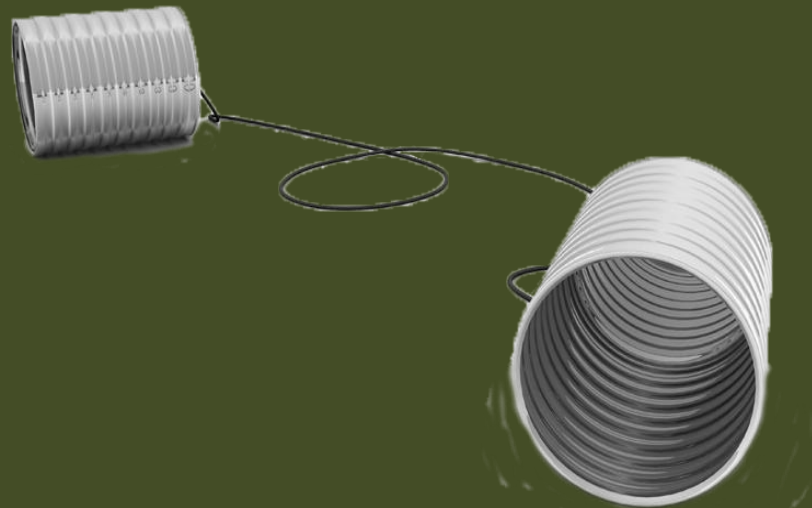
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U.S. EPA Region 7

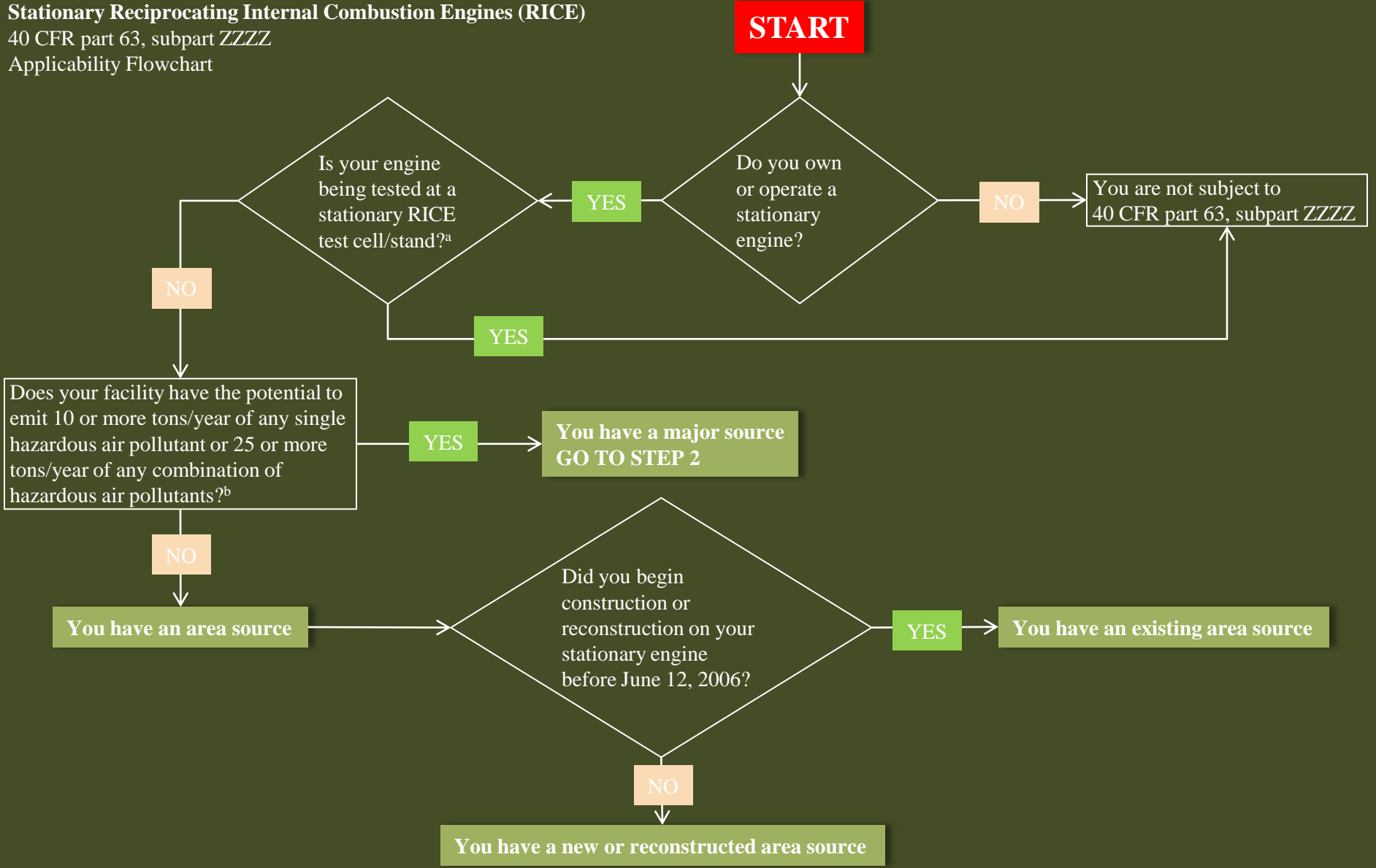
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Stationary Reciprocating Internal Combustion Engines (RICE)
 40 CFR part 63, subpart ZZZZ
 Applicability Flowchart

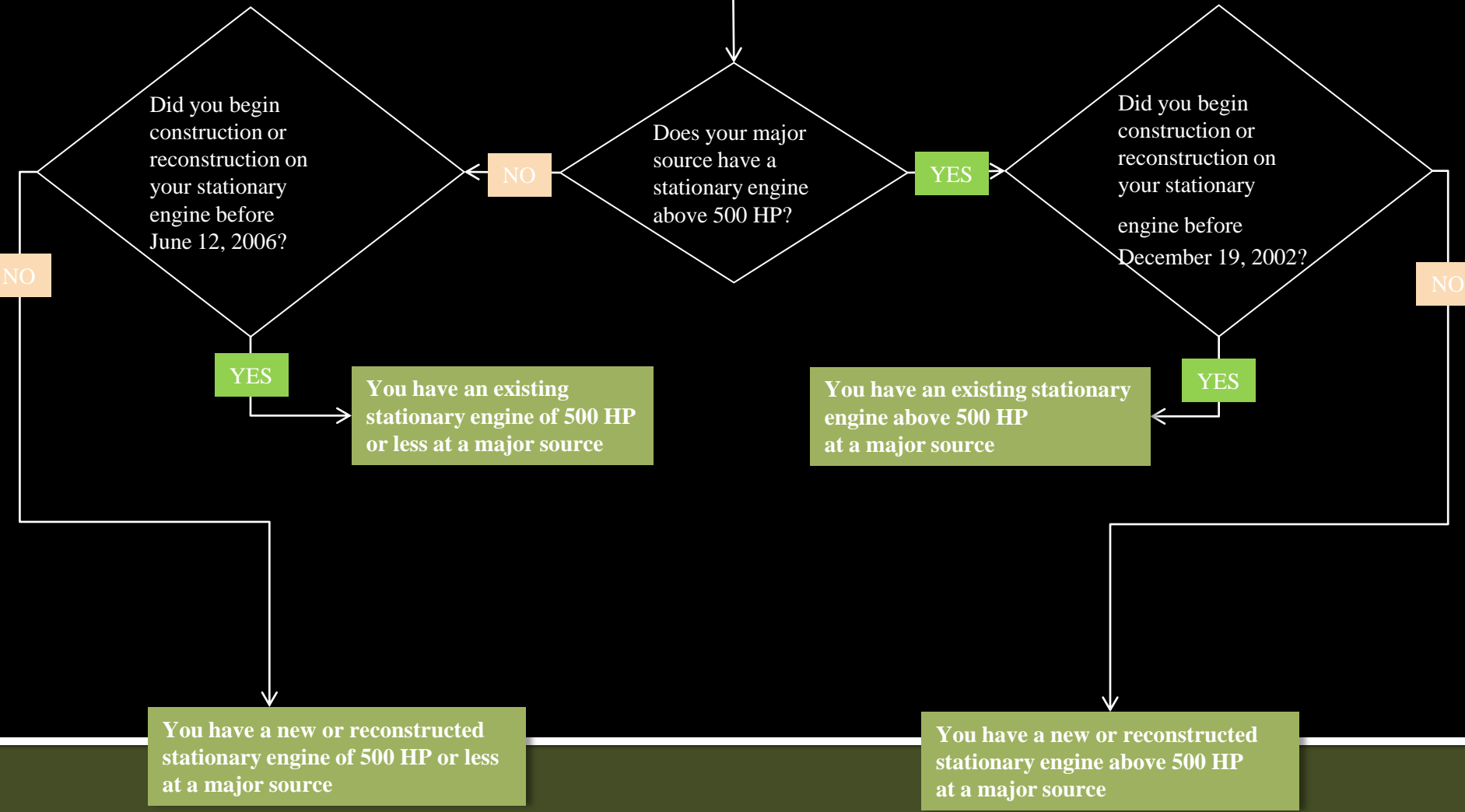


^aAn engine test cell/stand is any apparatus used for testing uninstalled stationary or uninstalled mobile (motive) engines.

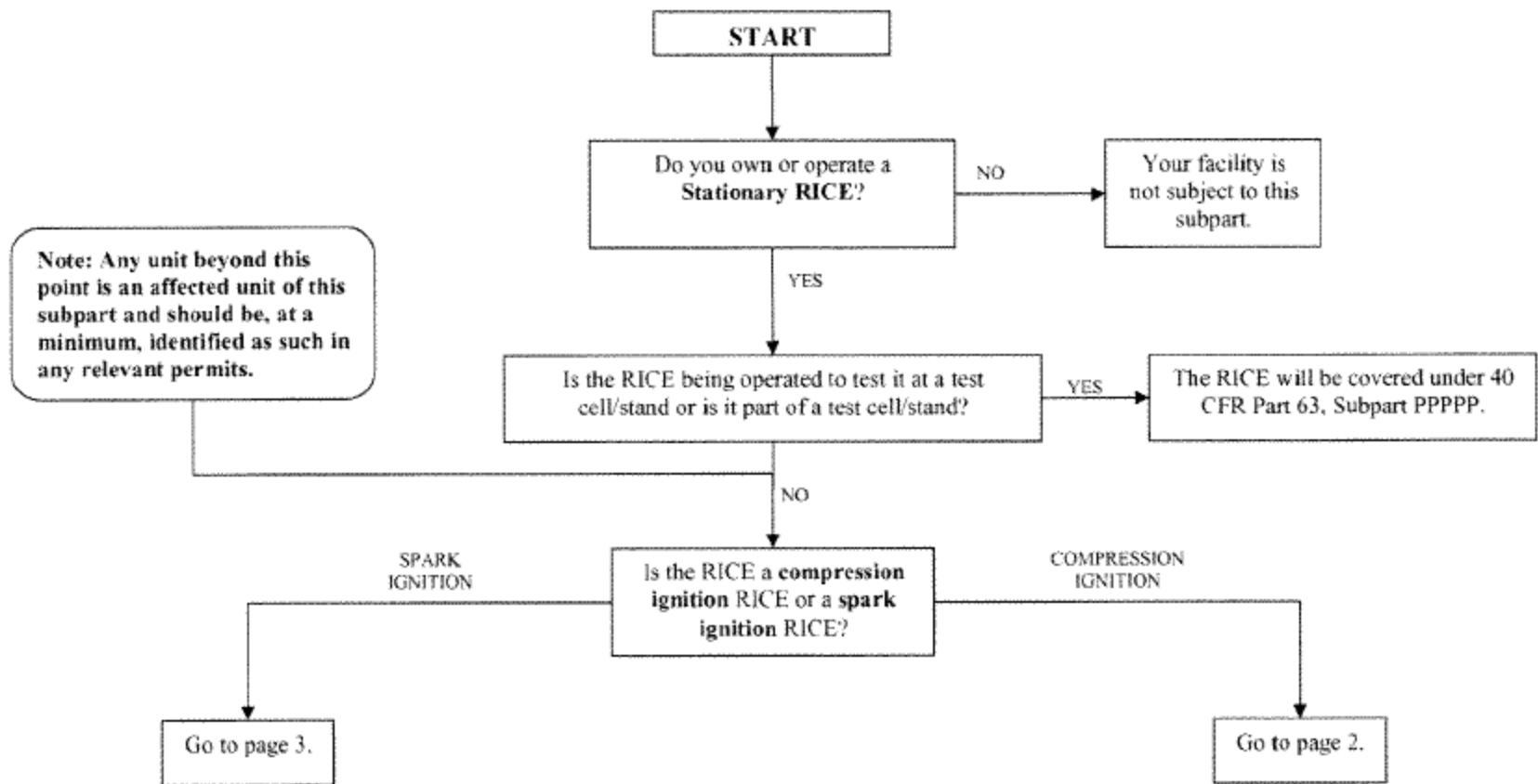
^bFor assistance in determining the potential to emit, please refer to <http://www.epa.gov/ttn/chief/ap42/index.html> or contact your EPA regional office or state permitting staff. To determine the potential to emit, you may use emission factors from <http://www.epa.gov/ttn/chief/ap42/ch03/index.html>, test data, or other published information.

Stationary Reciprocating Internal Combustion Engines (RICE)
40 CFR part 63, subpart ZZZZ
Applicability Flowchart

STEP 2



**Applicability Flowchart for NESHAP for Reciprocating Internal Combustion Engines (RICE)
40 CFR 63, Part ZZZZ**



This flowchart was developed by Mississippi Department of Environmental Quality, Air Division, 5/2010.

