Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

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National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines (RICE Rule) Training Module 40 CFR 63 Subpart ZZZZ Script- Major Source Existing Non-Emergency Spark Ignition 4-Stroke Rich Burn Engine >500 Horsepower

NARRATOR:
[Slide 2:]
Welcome to the Connecticut Department of Energy & Environmental Protection's Online Training for the National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines, also known as the RICE Rule!

This tool is designed to help owners and operators of reciprocating internal combustion engines, also known as RICE, determine their requirements under 40 CFR Section 63, subpart ZZZZ. By answering the successive questions, your specific requirements have been estimated. Please note that they may not be complete, and refer any questions to your local authority.

[Slide 3:]
We have established that your engine is an existing non-emergency four-stroke rich burn engine greater than 500 horsepower, located at a major source that operates more than 24 hours per year. Now, let's discuss your requirements.

To comply with this rule you must either limit the formaldehyde concentration in the engine exhaust to less than or equal to 350 parts per billion at 15% oxygen, or reduce the formaldehyde emissions by 76% or more. Alternatively you may demonstrate that you are achieving at least a 30% average reduction of total hydrocarbon, or THC, emissions.

To achieve this standard your unit will probably require a non-selective or three-way catalyst. An estimate of the capital and annual operating costs of retrofitting your engine with a three-way catalyst is indicated by the formulas here.

You must comply with emission limits and operating limits at all times and you must operate and maintain all equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions. The general duty to minimize emissions does not require you to make any further efforts to reduce emissions if levels required by this standard have been achieved.

[Slide 4:]
If your engine uses a three-way catalyst, you must maintain the catalyst so that the pressure drop does not change by more than two inches of water, while operating at 100% load, from the pressure drop across the catalyst that was measured during the initial performance test. Maintain the temperature of the engine exhaust so that the catalyst inlet temperature is greater than or equal to 750 degrees Fahrenheit and less than or equal to 1,250 degrees Fahrenheit, or you may petition EPA for a different temperature range . If your engine is not using a three-way catalyst then comply with any operating limitations approved by EPA.

[Slide 5:]
An initial performance test is required within 180 days of the compliance date. You may not be required to conduct an initial test on units for which a test has been previously conducted, but the test must meet the following:

- The test must have been conducted following the required methods
- The test must have been performed within the last two years and been reviewed and accepted by EPA.
- There have been no process or equipment changes made since the test was performed, or you must be able to demonstrate that the results of the performance test, with or without adjustments, reliably demonstrate compliance.
- The test must have been conducted at 100% load, plus or minus 10%.

[Slide 6:]
If your engine is greater than 5,000 horsepower and complying with formaldehyde percent reduction, subsequent performance tests are required semi-annually. If you have demonstrated compliance for two consecutive tests, you may reduce the frequency to annually. However, if the results of any subsequent annual test indicate that the engine is not in compliance with the emission limit, or you deviate from any of your operating limits, then you must resume semi-annual tests.

If your engine is currently non-operational, you may conduct the test when the engine is started up again.

[Slide 7:]
You must reduce the emissions of formaldehyde or total hydrocarbon in the engine exhaust using the procedures and approved methods indicated here. All sampling must be performed at the inlet and outlet of the control device and measurements to determine oxygen concentration and moisture content must be made at the same time and location as the measurements for formaldehyde or total hydrocarbon concentration.

[Slide 8:]
You must limit the concentration of formaldehyde in the engine exhaust using the procedures and approved methods indicated here. All sampling must be performed at the outlet of the control device and measurements to determine oxygen concentration and moisture content must be made at the same time and location as the measurements for formaldehyde concentration.

[Slide 9:]
You are required to conduct three separate test runs for each performance test required in this section. Each run must last at least one hour. Use the formula shown here to determine compliance with the percent reduction requirement.

[Slide 10:]
You must normalize the total hydrocarbon or formaldehyde concentrations at the inlet and outlet of the control device to a dry basis and to 15% oxygen or an equivalent percent carbon dioxide. If pollutant concentrations are to be corrected to 15% oxygen and carbon dioxide concentration is measured in lieu of oxygen concentration measurement, a carbon dioxide correction factor is needed. Calculate the carbon dioxide correction factor as indicated by the formulas here.

[Slide 11:]
If you comply with either a limitation on the concentration of formaldehyde in the engine exhaust or the requirement to reduce the emissions of formaldehyde or total hydrocarbon in the engine exhaust and you are not using a three – way catalyst, you must petition EPA to establish operating limitations determined during the initial test or obtain approval of no operating limitations prior to conducting the test.

Any petition for approval of operating limitations must include the parameters you propose to use as operating limitations and their relationship to the hazardous air pollutant, or HAP, emissions, identifying how you will establish the upper and/or lower values for these parameters, and the methods and instruments you will use to measure and monitor these parameters. Finally the petition shall include the relative accuracy of the instruments and the precision and frequency and methods for recalibrating the instruments you will use for monitoring these parameters.

[Slide 12:]
Any petition for approval of no operating limitations must include the information listed here.

[Slide 13:]
Testing must be conducted at any load condition within plus or minus ten percent of 100 percent load.

Engine percent load during a performance test must be determined by documenting the calculations, assumptions, and measurement devices used to measure or estimate the percent load in a specific application. A report of the average percent load determination must be included in the Notification of Compliance Status. The following information shall be included in the Notification of Compliance Status: the engine model number, manufacturer, year of purchase, site brake horsepower, and ambient conditions encountered during the test. An explanation of all assumptions that were made to estimate or calculate percent load during the performance test and the model number and estimated accuracy of any measurement devices used to determine percent load shall also be included in the Notification of Compliance Status.

[Slide 14:]
If you are complying with the requirement to reduce formaldehyde emissions using a three-way catalyst then you have demonstrated initial compliance if the average reduction of emissions determined from the initial performance test is greater than or equal to the required formaldehyde percent reduction, you have installed a continuous parameter monitoring system, or CPMS, to monitor catalyst inlet temperature according to the requirements in this module and you have recorded the catalyst pressure drop and catalyst inlet temperature during the initial performance test. If you are not using a three-way catalyst then you may seek approval to record alternative operating parameters in place of the pressure drop and catalyst temperature.

If you are complying with the requirement to limit the concentration of formaldehyde in the engine exhaust using a three-way catalyst, then you have demonstrated initial compliance if the average formaldehyde concentration, corrected to 15% oxygen, dry basis, is less than or equal to the emission limit, you have installed a CPMS to monitor catalyst inlet temperature according to the requirements in this module, and you have recorded the catalyst pressure drop and catalyst inlet temperature during the initial performance test. If you are not using a three-way catalyst then you may seek approval to record alternative operating parameters in place of the pressure drop and catalyst temperature.

[Slide 15:]
If you are using a three-way catalyst then during the initial performance test you must maintain the catalyst so that the pressure drop across the catalyst does not change by more than two inches of water, while operating at 100% load, from the pressure drop across the catalyst that was measured during the initial performance test. Maintain the temperature of the engine exhaust so that the catalyst inlet temperature is greater than or equal to 750 degrees Fahrenheit and less than or equal to 1,250 degrees Fahrenheit, or you may petition EPA for a different temperature range. If your engine is not using a three-way catalyst then comply with any operating limitations approved by EPA.

Submit a Notification of Compliance Status, containing the results of the initial compliance demonstration, before the close of business on the 60th day following the completion of the initial compliance demonstration.

[Slide 16:]
If you are required to install a CPMS, you must prepare a monitoring plan that addresses specific monitoring system design, data collection, quality assurance and quality control elements. You may request approval of alternative monitoring system quality assurance and quality control procedures in your site-specific monitoring plan. Each CPMS must be installed, operated, and maintained according to the procedures in your monitoring plan. The CPMS must collect data at least once every 15 minutes.

Conduct the CPMS equipment performance evaluation, system accuracy audits, or other audit procedures specified in your monitoring plan at least annually.

[Slide 17:]
You must minimize engine idling time and limit startup time to a period needed for appropriate and safe loading of the engine. Engine startup may not exceed 30 minutes, after which time the non-startup emission limits apply.

[Slide 18:]
You must continuously monitor emissions at all times that the engine is operating, except for monitor malfunctions, associated repairs, required performance evaluations and required quality assurance or control activities. You may 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. Monitoring failures caused in part by poor maintenance or careless operation are not malfunctions.

[Slide 19:]
To demonstrate continuous compliance with the requirement to reduce formaldehyde emissions using a three-way catalyst, you must collect the catalyst inlet temperature data according to the requirements in this module, reduce these data to 4-hour rolling averages, and maintain the 4-hour rolling averages within the operating limits for the catalyst inlet temperature. You must also measure the pressure drop across the catalyst once per month and demonstrate that the pressure drop across the catalyst is within the operating limit established during the performance test. If you are not using a three-way catalyst then you may record an approved alternative operating parameter.

If your engine is rated at greater than or equal to 5,000 horsepower, you must conduct semi-annual performance tests to demonstrate that the required formaldehyde percent reduction is achieved. Alternatively, you may demonstrate that the average reduction of emissions of total hydrocarbons is greater than or equal to 30%.

[Slide 20:]
Let’s talk about your recordkeeping and reporting requirements. You are required to keep records of each notification and report submitted and all supporting documentation, the occurrence and duration of each malfunction, any performance tests and evaluations, required maintenance performed on air pollution control and monitoring equipment, and any actions taken during malfunctions to minimize emissions and corrective actions.

If you have a CPMS you must keep records of each period during which a CMS is malfunctioning, inoperative or out-of-control, all required measurements needed to demonstrate compliance with a relevant standard, all CMS performance test results and evaluations, and the conditions during the performance tests and evaluations. All CMS calibration checks, adjustments and maintenance performed on the CMS, previous versions of the performance

evaluation plan, and requests for alternatives to the relative accuracy test audit plan, or RATA plan, shall also be included.

Keep all records for five years from the date of creation.

[Slide 21:]
A Notification of Applicability was due December 13th, 2004. You are required to submit a notification 60 days prior to performing any compliance test, and 60 days after your compliance demonstration.

[Slide 22:]
Each year you are required to submit a Semi-Annual Compliance Report by January 31st, covering the period of July 1st to December 31st of the previous year, and by July 31st for the period covering January 1st through June 30th of the current year. The first compliance report must cover the period beginning on October 19th, 2013 and ending on December 31st, 2013.

The report must contain a statement by a responsible official certifying the accuracy of the report. It must also indicate any malfunctions that occurred during the reporting period, including the number, duration, and a brief description for each type of malfunction which occurred and which caused or may have caused any limits to be exceeded. Also include actions taken during malfunction to minimize emissions and correct malfunctions. If no deviations occurred, or there were no periods during which the CMS was out-of-control, include a statement indicating so.

For each deviation that occurs where you are ***not*** using a CMS, the report must include the total operating time at which the deviation occurred, the number, duration, and cause of the deviations, and the corrective action taken.

[Slide 23:]
For each deviation that occurs where you ***are*** using a CMS, the Semi-Annual Report must include the date and time each malfunction or deviation started and stopped, and whether each deviation occurred during a period of malfunction or during another period. You must also include the date, time, and duration that each CMS was inoperative or out-of-control and a summary of the total duration of the deviation and the total duration as a percent of the total source operating time during that reporting period.

The report must include a breakdown of the total duration of the deviations during the reporting period into those that are due to control equipment problems, process problems, or other known and unknown causes. Finally, the report shall include an identification of each parameter and pollutant that was monitored at the engine, a brief description of the engine and CMS, the date of the latest CMS certification or audit and a description of any changes in CMS, processes, or controls since the last reporting period.

[Slide 24:]
The Semi-Annual Compliance Report must include each instance in which you did not meet an emission limit, operating limit or any requirement of the general provisions. If you change your catalyst then you must reestablish the values of the operating parameters measured during the initial performance test and demonstrate that you are meeting the required emission limit applicable to your engine.

If your source has a Title V Operating Permit, report all deviations in the Title V Semi-Annual Monitoring Report.

[Slide 25:]

Notifications must be sent to EPA Region 1 at the address provided.

[Slide 26:]
Your compliance date is June 15th, 2007.

[Slide 27:]
If you would like more information about the RICE rule, please visit the EPA RICE Compliance web page at the address provided. This site provides resources such as Q and A documents, fact sheets, sample notification forms, and recordings of webinars, all of which are designed to help you comply with this rule.

[Slide 28:]
Let's summarize the requirements for your major source, existing non-emergency four-stroke rich burn engine greater than 500 horsepower that operates more than 24 hours per year. You must limit the concentration of formaldehyde in the exhaust to less than or equal to 350 parts per billion at 15% oxygen or reduce formaldehyde emissions by 76% or more, or reduce total hydrocarbon emissions by 30% or more. You may likely need to use a three-way catalyst to help achieve this standard. You are required to maintain the catalyst so that the pressure drop does not change by more than two inches of water at 100% load plus or minus 10% from the pressure drop across the catalyst measured during the initial performance test. You are also required to maintain the exhaust temperature so that the catalyst inlet temperature is greater than or equal to 750 degrees Fahrenheit and less than or equal to 1,250 degrees Fahrenheit or some other pre-approved temperature range.

You must perform an initial test and all subsequent testing.

[Slide 29:]
You must install, operate and maintain a CPMS and continuously monitor engine operation, keep records of notifications, reports, malfunctions, corrective actions, tests, and maintenance for a period of five years.

Submit Notifications of: Applicability, Intent to Conduct Performance Testing and Compliance Status. Also submit a Semi-Annual Compliance Report. Your compliance date was June 15th, 2007.