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 New Non-Emergency Spark Ignition 4-Stroke Lean Burn Engine 250-500 Horsepower, constructed after January 1st, 2008

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 you own or operate a new, non-emergency spark ignition four stroke lean-burn engine, 250 to 500 horsepower, located at a major source, that was manufactured after January 1st, 2008. 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 14 parts per million at 15% oxygen, or reduce the carbon monoxide emissions by 93% or more.

To achieve this standard, your unit will probably require the installation of an oxidation catalyst. An estimate of the capital and annual operating costs of retrofitting your engine with an oxidation catalyst is indicated here.

You must comply with the 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 an oxidation 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 between 450° Fahrenheit and 1,350° Fahrenheit, or you may petition EPA for a different temperature range. If your engine is not using an oxidation catalyst, then comply with any operating limitations approved by EPA.

[Slide 5:]

An initial emission performance test is required within 240 days after engine startup. You must conduct subsequent tests semi-annually if you are not using a carbon monoxide continuous emission monitoring system, or CEMS. If compliance is demonstrated for two consecutive tests, you may reduce the frequency to annually. If the results of any annual test indicate noncompliance with emission or operating limits, you must resume semi-annual testing.

[Slide 6:]
If your engine is currently non-operational, you may conduct the test when the engine is started up again.

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

[Slide 8:]
All measurements must be based on the average of three 1-hour test runs. Use the equation listed here to determine compliance with the percent reduction requirement.

[Slide 9:]
You must normalize the carbon monoxide 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 described here.

[Slide 10:]
If you comply with either a limitation on the concentration of formaldehyde in the engine exhaust or the requirement to reduce the emissions of carbon monoxide in the engine exhaust and you are not using an oxidation catalyst or non-selective catalytic reduction, 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 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 and precision of the methods and instruments, and the frequency and methods for recalibrating the instruments you will use.

[Slide 11:]
Any petition for approval of ***no*** operating limitations must include the information listed here.

[Slide 12:]
Engine testing must be performed at a specific load as determined by documenting the calculations, assumptions, and measurement devices used to measure or estimate the percent load in a specific application. 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 13:]
If you are complying with the requirement to reduce carbon monoxide emissions using an oxidation catalyst, then you have demonstrated initial compliance if the average reduction of carbon monoxide emissions determined from the initial performance test is greater than or equal to the required carbon monoxide 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 an oxidation catalyst then you may seek approval from EPA to record alternative operating parameters in place of the pressure drop and catalyst temperature.

If you are complying with the requirement to reduce carbon monoxide emissions, and using a CEMS, you have demonstrated initial compliance if you have installed a CEMS to monitor carbon monoxide and either oxygen or carbon dioxide at both the inlet and outlet of the oxidation catalyst according to the requirements in this module, you have conducted a performance evaluation of your CEMS, and the average reduction of carbon monoxide is greater than the required percent reduction. Compliance is based on the average percent reduction achieved during the first 4-hour period after successful validation of the CEMS.

[Slide 14:]
If you are complying with the requirement to limit the concentration of formaldehyde and using an oxidation catalyst, you have demonstrated initial compliance if the average formaldehyde concentration, corrected to 15% oxygen, from the three test runs is less than or equal to the formaldehyde emission limit, you have installed a CPMS to monitor catalyst inlet temperature and you have recorded the catalyst pressure drop and inlet temperature during the initial performance test.

If you are not using an oxidation catalyst to limit the concentration of formaldehyde, you must monitor operating parameters approved by EPA and record the approved operating parameters (if any) during the initial performance test.

[Slide 15:]
During the initial performance test you must establish the aforementioned operating limits and submit a Notification of Compliance Status, containing the results of the initial compliance demonstration, before the close of business on the 60^{th} day following the completion of the initial compliance demonstration.

[Slide 16:]
If you are complying with the requirement to reduce carbon monoxide emissions and you are using a CPMS, you must conduct semi-annual performance tests for carbon monoxide to demonstrate that the required carbon monoxide percent reduction is achieved, collect the catalyst inlet temperature or approved operating parameter and reduce these data to 4-hour rolling averages, and maintain the 4-hour rolling averages within the operating limits. If you are using an oxidation catalyst, 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 complying with the requirement to reduce carbon monoxide emissions using a CEMS then you must collect the monitoring data, reduce the measurements to 1-hour averages, and calculate the percent reduction or concentration of carbon monoxide emissions. You must also demonstrate that the catalyst achieves the required percent reduction of carbon monoxide emissions over the 4-hour averaging period,

or that the emissions remain at or below the carbon monoxide limit; and conduct an annual relative accuracy test audit, or RATA, of your CEMS and daily and periodic data quality checks.

[Slide 17:]
If you are complying with the requirement to limit the concentration of formaldehyde using an oxidation catalyst, then conduct semi-annual performance tests for formaldehyde to demonstrate that your emissions remain below the concentration limit and collect the catalyst inlet temperature or approved operating parameter data according to the requirements in this module. You must also reduce the data to 4-hour rolling averages and maintain the 4-hour rolling averages within the operating limits. If you are using an oxidation catalyst or non-selective catalytic reduction, you must measure the pressure drop across the catalyst once per month and demonstrate that the pressure drop across the catalyst is within the operating limitation established during the performance test.

[Slide 18:]
If you install a CEMS, you must install, operate, and maintain a CEMS to monitor carbon monoxide and either oxygen or carbon dioxide at both the inlet and outlet of the control device according to the applicable performance specifications. You must also conduct an initial performance evaluation and a RATA of each CEMS. CEMS data must be reduced as specified in 40 CFR 63 and recorded in parts per million at 15% oxygen or the equivalent carbon dioxide concentration.

[Slide 19:]
If you are required to install a CPMS, you must prepare a monitoring plan that addresses the monitoring system design, data collection, quality assurance, and quality control elements as specified here and in 40 CFR 63.8(d) or request an alternative plan. You must also install, operate, and maintain each CPMS in continuous operation according to the procedures in your monitoring plan and conduct CPMS equipment performance evaluation and system audits at least annually.

[Slide 20:]
You must minimize engine idling time and limit startup time to a period needed for appropriate and safe loading of the engine. The duration of engine startup may not exceed 30 minutes, after which time the non-startup emission limits apply.

[Slide 21:]
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 22:]
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 RATA plan shall also be included.

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

[Slide 23:]
You must submit Notifications of: Applicability, Startup, Intent to Conduct Performance Testing and Compliance Status within specific deadlines.

[Slide 24:]
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 report must contain a statement by a responsible official certifying the accuracy of the report and must 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 25:]
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 26:]
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, 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 27:]
Notifications must be sent to EPA Region 1 at the address provided.

[Slide 28:]
You must comply with the rule upon startup.

[Slide 29:]
Your engine is subject to the spark ignition New Source Performance Standards, or SI NSPS, listed in 40 CFR 60 subpart JJJJ, if any of the following three scenarios apply:

- Your engine was constructed after June 12th, 2006 and manufactured on or after January 1st, 2008, if the engine is exactly 500 horsepower
- Your engine was constructed after June 12th, 2006 and manufactured on or after July 1st, 2008 if the engine is less than 500 horsepower
- Your engine was modified or reconstructed after June 12th, 2006.

For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator.

[Slide 30:]
If you are subject to the SI NSPS, you must use only gas with a sulfur content of no more than 80 parts per million per gallon and meet all compliance requirements for the life of the engine.

[Slide 31:]
If you have a certified engine, you must install, configure, operate and maintain the engine according to the manufacturer's instructions. If you do not operate or maintain your engine according to the manufacturer's instructions, or your engine is not certified, you must keep your maintenance plan, operate consistent with good air pollution control practices, and conduct an initial performance test. You must retest if the engine is rebuilt or undergoes major repair or maintenance.

You must maintain records of the EPA Certificate of Conformity and records of engine maintenance. If the engine is non-certified and 500 horsepower, submit an Initial Notification. A Notification of Intent to Conduct Performance Testing is required 30 days prior to a performance test. Results of performance testing must be submitted within 60 days of completing the test.

[Slide 32:]
This plate, mounted on an engine, shows proof of engine certification.

[Slide 33:]
In case you are not familiar with an EPA Certificate of Conformity, here's what it looks like.

[Slide 34:]
Please study this table to determine your applicable emission standards, importing and installing requirements, compliance requirements, testing requirements, reporting requirements, and general requirements.

[Slide 35:]
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 36:]
Let's summarize the requirements for your major source new non-emergency spark ignition four-stroke lean burn engine greater than or equal to 250 horsepower. You must limit the concentration of

formaldehyde in the exhaust to less than or equal to 14 parts per million at 15% oxygen or reduce carbon monoxide emissions by 93% or more. This will likely require an oxidation catalyst.

If you are using an oxidation catalyst, maintain that the pressure drop does not change by more than two inches of water at 100% load from the pressure drop across the catalyst measured during the initial test, and maintain the engine exhaust temperature so that the catalyst inlet temperature is between 450° Fahrenheit and 1,350° Fahrenheit. If you are not using an oxidation catalyst, you may comply with any operating limitations approved by EPA. Conduct performance testing as required.

[Slide 37:]
You must keep all records of notifications, reports, malfunctions, corrective actions, tests, and maintenance for a period of five years. You must also submit Notifications of: Applicability, Startup, Intent to Conduct Performance Testing and Compliance Status. Finally, if you are subject to the SI NSPS, you must comply with all requirements in 40 CFR 60 Subpart JJJJ, submit a Semi-Annual Compliance Report, and comply upon start-up.