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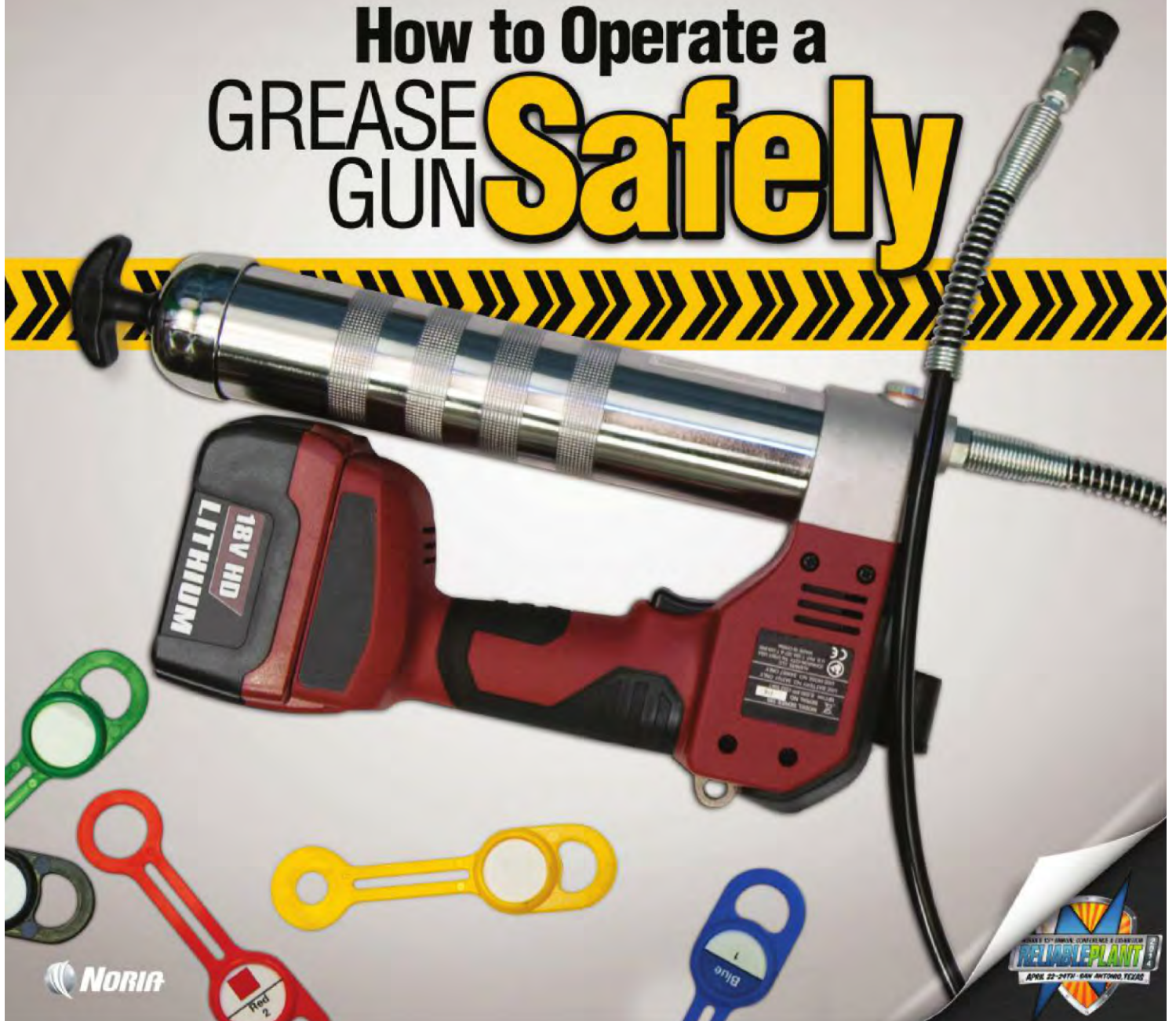
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# How New Emissions Standards May Impact Scheduled Oil Changes

For many people, U.S. Environmental Protection Agency (EPA) regulations are difficult to comprehend because of the terminology that is used. For example, internal combustion engines (ICE) and reciprocating internal combustion engines (RICE) are the terms most often used in rulemaking to describe stationary engines, while industry prefers terms like compressors, generators and pumps. This can create a disconnect between the regulator and the regulated.

With the most recent revisions to emissions standards possibly impacting more engines and industries than any prior rule released by the EPA, it becomes even more critical to understand these applicable rules, including the latest amendment focused on stationary reciprocating internal combustion engines.

In March 2010, the EPA announced a new amendment to the final rule on the "Subpart ZZZZ National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines," or RICE NESHAPs, with new requirements targeting compression-ignition (CI) or diesel engines, and revisions delayed for spark-ignited (SI) or natural gas and gaseous-fueled engines until August 2010. These engine types are referred to as CI RICE and SI RICE, respectively. The rule will require impacted sources to achieve emission limits reflecting the application of the Maximum Achievable Control Technology (MACT) consistent with sections 112(d) of the Clean Air Act.

Both engine types were given different deadlines for final compliance. CI RICE types were to be compliant by May 2013, while SI RICE by October 2013. The requirements went into effect on those dates, including those related to emission standards, testing, compliance, operating limits, work practices, recordkeeping and reporting.

The rule applies to the following stationary engines:

- Engines with more than 500 horsepower (hp) at the major source of hazardous air pollutants (HAP), including existing engines constructed before Dec. 19, 2002; new engines constructed on or after Dec. 19, 2002; and reconstructed engines in which reconstruction began on or after Dec. 19, 2002.
- Engines with less than 500 hp at the major source of HAP and engines of all horsepower at an area source of HAP,



**Figure 1. This graphic shows the results of a detailed applicability analysis for a stationary CI RICE or diesel engine placed into service in 2002 versus 2013. Green indicates the rules don't apply, yellow indicates something may apply, and red indicates a rule applies. (Courtesy of step2compliance)**





**Figure 2.** These results are from an applicability analysis for an SI RICE or natural gas engine placed into service in 2002 versus 2013. (Courtesy of step2compliance)



**Figure 3.** In this analysis, two SI RICE or natural gas engines were placed into service in 2002, with one engine above 500 horsepower and one engine below 500 hp. (Courtesy of step2compliance)

including existing engines constructed before June 12, 2006; new engines constructed on or after June 12, 2006; and reconstructed engines in which reconstruction began on or after June 12, 2006.

Note the qualifications of “major source” and “HAP.” The term “major source” has different definitions and thresholds based on whether it is referencing a hazardous air pollutant (HAP), criteria air pollutant (CAP) or greenhouse gas (GHG). The

definition of major source for this rule refers to the facility-wide emission of HAPs where the stationary engine is located. A facility is considered a major source if any single HAP exceeds 10 tons per year or if the total of all facility HAPs exceeds 25 tons per year. Everything else is considered an “area source.”

Emissions standards under the rule target HAPs but ultimately cannot be separated from other EPA regulatory drivers that also impact stationary reciprocating internal combustion engines. As an example, the rule has several trigger conditions that directly reference specific New Source Performance Standards (NSPS) for stationary engines and can actually meet an engine’s NESHAP ZZZZ requirements by complying with the applicable NSPS standard.

Figures 1 and 2 show the results of an applicability determination for both types of engines (CI and SI RICE). The examples were at “area source” facilities in Texas with 2013 and 2002 model-year engines rated at 1,000 horsepower. Notice that the 2013 model-year engine technically triggers NESHAP but has no NESHAP requirements; it satisfies the NESHAP requirements by complying with the applicable NSPS rule.

In both the CI and SI examples, stationary engines installed in 2002 trigger almost all of the possible NESHAP ZZZZ requirements, with the exception of operations and maintenance practices for the CI RICE as well as work practices, operations and maintenance for the SI RICE. If either of the CI or SI examples from 2002 were below 500 horsepower, then only the operations, maintenance and work practices would apply. Figure 3 shows an example of an SI RICE of the same 2002 model year, with one engine above 500 horsepower and the other below 500 horsepower to demonstrate the requirements mentioned previously.

“Work practices” is unique to this rule and can identify a specific time interval required for changing the engine oil. While this might be favorable to having emissions limits and testing requirements, the interval may be well below the historical oil change frequency that has been followed. The exact oil change interval specified depends on the engine type and other factors, but in this example, it is 1,440 hours. If this was a non-emergency engine with an annual runtime of approximately 7,000 hours, an oil change at 1,440 hours would hinder operations, since such engines routinely reach 4,000 hours or more before the oil is changed.

Following public comment on this portion of the proposed rule, the EPA added an option allowing the implementation of oil analysis to extend oil change frequencies. Hence, for those engines that require periodic oil changes, the schedule for changing engine oil can be extended if the oil is part of an oil analysis program. However, oil analysis must be performed at the same frequency as specified for oil changes.

An oil analysis program must include the following parameters in order to qualify: base number (CI RICE), acid number (SI RICE), viscosity and percent water content. If certain limits are met during the analysis, then the owner/operator is not required to change the oil. However, if any of the limits are exceeded, the oil must be changed within two business days.

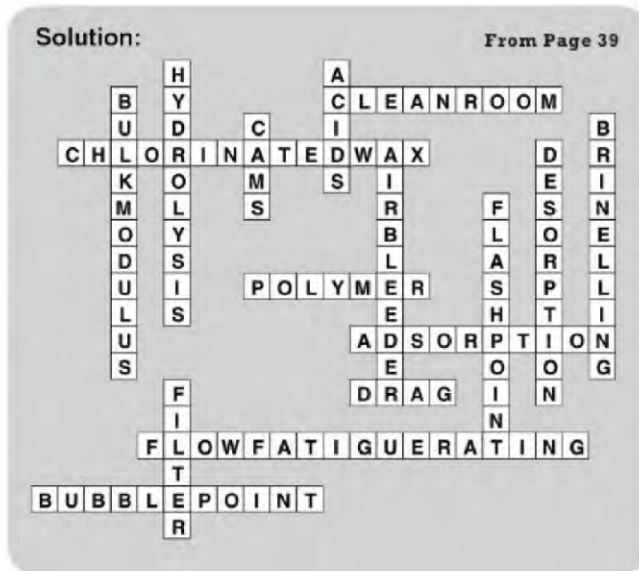


PARAMETER	CONDEMNING LIMITS
Base Number (CI RICE only)	<30 percent of the BN of the oil when new
Acid Number (SI RICE only)	Increases by more than 3.0 mg of potassium hydroxide per gram from the AN of the oil when new
Viscosity	Changed by more than 20 percent from the viscosity of the oil when new
% Water Content by Volume	>0.5

**Figure 4. The NESHAP ZZZZ oil analysis protocol outlines specific parameters and condemning limits for oil changes.**

The documentation requirements for this rule give the EPA and state environmental agencies the authority to request compliance records for a period of up to five years, so owners/operators must validate that the work practices have been implemented and be able to supply substantiating records in a timely fashion should a request be made. This may also be true for other recordkeeping and reporting requirements.

Some industrial oil analysis labs such as TestOil offer NESHAP-compliant reports to meet stationary engine oil analysis needs. These reports provide an analysis rating of "compliant" or "non-compliant." Non-compliant oils will be



recommended for resampling to confirm the original data reported. Alerts are based on test parameters for base number or acid number (depending on the engine), viscosity and percent water content. As per the regulations, operators will have two business days to change their oil or take the unit out of operation upon receipt of the non-compliant sample rating. ■



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