Are You Ready for RICE NESHAP?
Start preparing now for the May 3, 2013 deadline

By Jay Warner and Chad Kaderabek, Universal Acoustic & Emission Technologies

Although most government regulations are looked upon as impediments, the recent RICE NESHAP (Reciprocating Internal Combustion Engine, National Emission Standards Hazardous Air Pollutants) ruling by the U.S. Environmental Protection Agency (EPA) can be looked upon as a business opportunity to some. The ruling, issued in February 2010, covers existing non-emergency stationary diesel engines. The EPA states there are over 900,000 stationary engines in the US that are affected by this ruling, which goes into effect May 3, 2013.

Revenue opportunities caused by the ruling will include new engine sales, catalyst sales and labor for installation of catalysts. Engine distributors and packagers particularly have an opportunity to generate revenue from this ruling for the following reasons:

• They already have a database of previously sold packages
• They have existing relationships with end-users as they provide them service and/or replacement parts.
• Their customers will be looking for answers to the question: What do I need to do to my engine to be compliant by 2013?
• Customers with non-compliant engines may opt to purchase a new compliant engine instead of retrofitting.

Now is the time for a packager to be looking for a solution to this opportunity. Some items they need to consider are:

- Type of control technology
- Backpressure requirements
- Catalyst placement
- Supportive structure
- Catalyst sizing
- Catalyst configuration
- Service
- Compliance testing
- Continuous monitoring
- Labor time

Emission control technology that will be used is Diesel Oxidation Catalysts. One needs to be aware of the type of coating on the catalyst element’s substrate. Platinum coated substrates are more durable than Palladium. Platinum lasts longer and is more robust against poisons like sulfur. RICE NESHAP requires CO reduction by 70%. Most catalysts on the market today are calibrated on the order of 90% CO reduction and therefore would be more expensive. Look for a catalyst provider that can adapt to these lower CO reduction requirements.

Engine backpressure also needs to be considered when adding a catalyst to an existing engine. Adding a catalyst will add backpressure that may exceed the engine exhaust backpressure threshold. A catalyst can add an additional 3-4” of water to engine backpressure. Replacing the silencer with a combination silencer/catalyst unit is a solution to minimize the additional backpressure. They are designed for lower backpressure by reducing the number of expansions and contractions of the exhaust gases. As another option, the catalyst itself can be designed for lower backpressure.

Placement of the catalyst in the exhaust system is critical as the exhaust gas temperature needs to be managed so the catalyst works properly. Most catalysts need to operate above 250 degrees C. The further the gas path is from the source, the lower the temperature. In some applications, this may require additional insulation around the exhaust system in order to maintain the proper exhaust temperature. The system should be optimized for the lowest temperature seen throughout the year. For example, colder climates may need additional insulation because of winter temperatures. Also, proper attention needs to be paid to the components upstream from the catalyst system. If you are using a packed silencer in sequence with the catalyst system, fibers may come loose that may coat or plug the catalyst’s element and reduce its effectiveness. In these instances, the catalyst system should be located upstream from the packed silencer.

Before installation of the catalyst system, the physical support structure needs to be considered. For larger catalyst systems, the connecting pipe will not be able to support the catalyst’s weight. A steel ladder system may be required to support the catalyst from the package’s base. The supportive structures should be fabricated before on-site installation to minimize service time.

Proper attention needs to be given to catalyst sizing. The volume of the catalyst must be properly sized for the exhaust flow rate to meet the required emissions reduction target. If it is undersized, you won’t meet the emissions target. And if it is oversized, the catalyst may be overpriced and uncompetitive when selling to an end user.

Catalysts require periodic servicing, typically every 8700 hours of operation. The catalyst system needs to be placed where it can be easily accessed, whether near a service panel or open area. Engines less than 500 HP may utilize a more economical disposable/non-service catalyst housing. For larger HP engine applications, a removable catalyst element housing design is more cost effective. It should allow easy access to the catalyst element.
and quick removal without special tools or cumbersome capture mechanisms. The faster technicians can remove and replace the catalyst element, the more time they have for other billable jobs. Exhaust bypass is a common problem in some catalyst housing designs. This is where the exhaust gas circumvents the element and is not forced through the catalyst. This issue will impact the effectiveness of the catalyst system. Seek a housing and catalyst design that includes a positive seal against the side of the housing, forcing the exhaust gas to flow through the catalyst element.

Many engines that will be affected by the RICE NESHAP ruling will come in enclosed skid-mounted packages. Space inside the enclosures is at a premium. Finding a location to fit a catalyst can be difficult. However, by utilizing an integrated silencer/catalyst system, you may be able to place it in the same footprint as the current silencer. Also, you will need catalyst housings that have different mounting configurations, such as end-in/end-out, side-in/end-out, and high-side in/end-out.

Existing stationary engines that require the addition of a catalyst system require before and after emissions testing to validate compliance. To make this requirement easier for your organization, work with an emissions control supplier who can provide the testing. In this way, the emissions control supplier can receive information immediately if changes need to be made to meet compliance.

An additional opportunity for your organization is continuous monitoring requirements. The RICE NESHAP ruling requires engines that are larger than 500 hp and are a major source of hazardous air pollutants to maintain a service log of catalyst differential pressure and temperature. You can sell and install a continuous monitoring system to make this documentation requirement easier for your customer. Offer a continuous monitoring device that allows the storage of multiple readings. Also, a monitoring device with CANBUS capabilities will allow integration into a facility’s Building Automation System. Or, you may want to consider offering a monitoring service to your customers that will handle the data tracking requirements for a monthly or yearly fee.

Labor time to retrofit an existing stationary engine is quite variable. One needs to consider the catalyst systems size, weight, site accessibility, lifting equipment, if the package is enclosed or open and installation complexity. Because the deadlines for compliance are not until May 3, 2013, you have plenty of time to actively seek some test project sites to hone the skills and techniques required before the majority of the retrofit projects take place in late 2012 and early 2013.

**SUMMARY FROM THE FEDERAL REGISTER**

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

The Environmental Protection Agency (EPA) is setting national emission standards for hazardous air pollutants that impact existing stationary, compression-ignition, reciprocating, internal-combustion engines.

These engines are located at area sources of hazardous air pollutant emissions or have a site rating of less than or equal to 500 brake horsepower and are located at major sources of hazardous air pollutant emissions.

In addition, the EPA is setting national emission standards for hazardous air pollutants for existing, non-emergency, stationary, compression-ignition engines greater than 500 brake horsepower. These engines are located at major sources of hazardous air pollutant emissions.

Finally, the EPA is revising the provisions related to startup, shutdown, and malfunction for the engines that were regulated previously by these national emission standards for hazardous air pollutants.

This rule will go into effect on May 3, 2013.

**About Universal Acoustic**

Universal Acoustic & Emission Technologies provides engineered acoustic, emission and filtration solutions for power generation, oil, gas, and industrial markets. Universal has particular expertise in air movement applications, diesel engines, and gas turbine engine systems.

Editor’s note: for more information about RICE NESHAP, visit the EGSA Green Committee’s page online at www.egsa.org.