

Policy Discussion

Emission Regulations for Compression Ignition Internal Combustion Engines

Summary: By May 3, 2013 all large stationary engines, built before June 12, 2006, which are operated without the use of spark plugs will be required to install emission controls, continuous monitoring, and maintenance systems, with one exception. Engines used solely to provide emergency power generation can be used provided that appropriate maintenance and operating records are maintained

Background: The Environmental Protection Agency (EPA) as part of its ongoing review of Hazardous Air Pollutants (HAPS) implemented rules May 3, 2010 to reduce emissions from large (larger than 100 hp) compression ignition engines through a combination of operational changes and emission controls. Compression ignition internal combustion engines generally operate on diesel fuel, although dual fuel natural gas and diesel fuel engines are also covered.

Emissions from these engines contain trace amounts of various organic compounds from unburned fuel which have been linked to a variety of health conditions. The implementation of the newest rule is part of the settlement of a 2007 lawsuit against the agency by the Sierra Club.

This rule does not impact natural gas fired turbines. Spark ignition internal combustion engines will be covered in rules that will be released in August of 2010.

Current estimates are that oxidation catalyst units will cost between \$40K and \$100K per engine depending on construction materials, features, and installation requirements. Older diesel engines where exhaust temperatures do not exceed 450 degrees cannot be retrofitted with catalyst units.

Under separate federal laws, diesel engine manufacturers are allowed to continue building units with Tier II emission controls until approximately the end of 2010. After that date, they are only allowed to manufacture units that meet the more stringent (and more expensive) Tier IV limits.

Engines can escape regulation if 10% of their heat input comes from methane gas either from landfills or methane digesters. Dual fuel units could be operated in a manner that would ensure that the required level was met, assuming that the methane is economically available.

Discussion: Cities which have compression ignition internal combustion engines to power their electric generation equipment have a specific decision to make on the future of their electric utility. Under current rules it appears that the city may have one of six potential options:

1. Replace the current engine(s) with a Tier II engine by the end of the year.
2. Replace the current engine(s) with a Tier VI engine in 2011, 2012 or early 2013.
3. Install the necessary compliance equipment and controls by May 3, 2013
4. Explore specific exemptions for use of supplemental methane gas if applicable.
5. Designate the engine for only emergency power production only.
6. Shut down the Power Plant on May 3, 2013

There will be no status quo option after May 3, 2013.

It is obvious that none of these options should be selected without due consideration of the full implications of the decision.

Options 1, 2, 3 and perhaps 4 will allow the community to continue to provide power as deemed appropriate by city leadership including emergency power, peak shaving, demand response assistance, and reserve capacity. However each option will require significant investment which will be offset by some level of revenue.

Option 5 will provide the community with the equipment resources to provide power in times of emergency provided that necessary maintenance and personnel are available to keep the unit(s) in operating condition. The power plant will not provide income except in times of emergency, and then operating expenses are likely to exceed current electric rates.

Option 6 puts the community in the position of total reliance on external transmission and energy service to provide all power regardless of external circumstances. This is a condition experienced by many communities in Missouri. The salvage value of large diesel or diesel/natural gas engines will be determined by the marketplace and by the costs associated with removal and possible environmental mitigation.

EMERGENCY POWER – The regulations limit primary use of the engines to times when the normal supply of power to the community is not available. This is for use when a transmission line is not available because of natural or manmade causes. There is a 100 hour exemption to allow the plant to run for maintenance and reliability testing, but during some of that time the city is prohibited from selling that power.