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VIA EMAIL

July 7, 2004

Mr. Mark Prettyman
Environmental Scientist
Delaware DNREC-AQM
Dover, Delaware

RE: Comments of the Engine Manufacturers Association on Proposed Regulation 44: Emissions Standards for Stationary Generators

Dear Mr. Prettyman:

The Engine Manufacturers Association (EMA) is the trade association representing the leading manufacturers of internal combustion engines including those diesel-fueled and gaseous-fueled engines used in emergency standby and Distributed Generation (DG) applications that will be regulated by the proposed rule cited above. Accordingly, EMA has a direct and substantial interest in the pending Department of Natural Resources (DNREC) adoption and implementation of Regulation 44.

EMA has played an active role with states, the federal government, and organizations across the country in developing appropriate emissions control standards and regulations for DG and emergency standby generators. With respect to the current rulemaking, EMA participated in two of the recent workshops and provided oral comments to the DG Workgroup. In addition, EMA participated in the efforts of the Regulatory Assistance Project (RAP) to develop a state "model rule" to control emissions from DG; the RAP work product appears to serve as a template for the proposed Delaware standards.

EMA appreciates the opportunity to provide input to the Workgroup during the rule development process and believes that the proposed regulation will be improved by incorporating appropriate comments and recommendations from participants. In general, EMA supports the intent of the proposed regulation to establish emission standards for stationary engines and turbines and to streamline the approval process. We believe that such actions can have a positive effect on air quality as well as encourage the expansion of DG resources in the state. EMA also supports the need to provide separate and distinct regulation of emergency, standby generators.

However, as noted in our oral comments, EMA is concerned that several provisions of the proposed rule will discourage the expansion of clean DG resources and unnecessarily restrict the installation and use of stationary engines and generators to produce electricity for the state. The four primary concerns with the proposed regulation are as follows:

- The proposed emissions standards for stationary engines are overly stringent and are not cost effective.

- The proposed regulation will discourage the expansion of energy efficient and clean DG including combined heat and power (CHP) facilities in the state.

- The regulation needs to incorporate appropriate standards for alternative and renewable fuels such as landfill, digester, and other biogases as well as provisions to encourage the expansion of CHP.

- Manufacturers cannot provide the three year or 15,000 hours certification required in the proposed regulation, thereby negating the intent of the regulation to streamline and reduce permitting requirements.

The following provides EMA's comments and recommendations on these key issues as well as some additional comments on other aspects of the rule.

The proposed emission standards for new, non-emergency engines are unnecessarily stringent and will have a negative impact on the use of DG and CHP in the state. DNREC should adopt alternate emission standards that are technically feasible and cost effective that will allow Delaware's businesses and industry to continue to deploy clean DG resources, thereby taking advantage of the resultant enhanced reliability, economic savings, and air quality benefits of DG and CHP.

The emission standards for new, non-emergency engines proposed in Regulation 44 are based on the RAP model rule and impose increasingly stringent requirements between 2005 and 2008. The proposed NOx standards, starting with 0.6 lbs/MWh and decreasing to 0.30 lbs/MWh, are sufficiently stringent to require all generators to be equipped with expensive NOx aftertreatment control equipment, even clean-burning natural gas units.

Today, gaseous-fueled engines can achieve emissions levels of 2-6 lbs/MWh without aftertreatment while achieving energy efficiencies as high as 42%. Engines manufacturers are currently engaged in long-term research with the U.S. Department of Energy to improve engine efficiency and reduce emissions through the Advanced Reciprocating Engine Systems (ARES) program. The goal of this multi-year research and development program is to develop a high efficiency, low emitting engine that can generate electricity in a cost competitive manner. The 2010 stretch goals for the ARES program are to produce prototype engines with 50% efficiency and a NOx emission level of 0.3 lbs/MWh.

The proposed Delaware regulation sets a 0.3 lbs/MWh emissions standard fully two years before completion of the ARES research and well before the possible successful commercialization of such engines. Meeting such stringent standards greatly increases the costs of such systems and makes their economic feasibility questionable at best.

The net effect of the proposed standards will be to restrict natural gas engines, the predominant technology for new distributed generation and CHP units, from the marketplace in Delaware.

As an example of the effect of overly stringent emissions standards on the DG marketplace, one need only look to California. California developed a NOx emission standard of 0.5 lbs/MWh for small DG sources in 2001 with an effective date in 2003. Currently, only four generators sets have been certified to this standard, two microturbines and two fuel cells – all under 250 kW. Consequently, the options available to potential users of small DG systems have been severely curtailed, and any future expanded use of DG in California is in jeopardy. If DNREC adopts the standards as proposed, we expect that no cost effective DG equipment will be certified in Delaware, thus rendering the entire regulation and streamlining program moot.

Clearly, the end result of implementing any emissions standards for prime stationary engines should be to ensure that emissions from the source category are as low as practical, not to place a defacto ban on future installation or disrupt the market in such a way as to discourage further investment in product development and improvement. Unfortunately, the proposed Regulation 44 NOx standards will likely make the installation of DG equipment economically infeasible, thereby curtailing any market growth prospects for DG equipment. Without a viable market, industry has no business reason to invest in developing cleaner energy resources in Delaware.

As a better solution, EMA recommends that DNREC propose reasonable and cost effective NOx standards that are in line with the state of technology as it continues to evolve over the near future. There are a number of emerging technologies to reduce NOx emissions from stationary engines, including the use of exhaust gas recirculation and thee-way catalysts, that offer promise for even greater emissions reductions in the future. However, these potential control technologies currently come with a high penalty in fuel and energy efficiency that degrade one of the great advantages of internal combustion engines, namely high energy efficiency. Industry and government need more time to develop these technologies so that not only are NOx emissions significantly decreased but also that the engine's inherent energy efficiency, reliability, and reasonable cost structure are maintained.

Accordingly, EMA recommends that Delaware adopt the following NOx standards in the final regulation for new stationary, prime engines:

- 2005 – 2.2 lbs/MWh
- 2008 – 1.0 lbs/MWh
- 2012 – 0.3 lbs/Mwh

These progressively more stringent emissions standards will allow the best performing generators to be installed without the need for expensive SCR aftertreatment devices through 2007 and create or maintain a viable market for DG in the state. In addition, setting a reasonable standard of 2.2 lbs/MWh also will have a positive effect on the state's NOx inventories since that emission rate is essentially equivalent to, or lower than, average emissions levels produced by utility central and peaking generators and may also relieve the need to maintain spinning reserve

capacity. The 2012 emission standard recommended by EMA is in line with industry and US DOE research objectives to develop and introduce extremely low-emission, cost-effective generators sets in the 2010-2012 timeframe.

Compounding the technical difficulties and high costs associated with the proposed NOx standards, the proposed regulation includes CO, hydrocarbon, PM and carbon dioxide standards that place further constraints on options and control strategies for stationary engines. Because of the very stringent NOx standards, all engine-based DG equipment will require the addition of aftertreatment equipment. For lean burn gaseous-fueled and compression ignition engines, manufacturers will be forced to use Selective Catalytic Reduction (SCR) aftertreatment devices that use urea to reduce NOx emission levels.

DNREC is proposing a CO standard of 2.0 lbs/MWh in 2008. As engine manufacturers work to meet the NOx standard, it will be problematic to simultaneously achieve a 90% reduction in CO emissions. Doing so will require the development and addition of an additional aftertreatment device independent of the NOx reduction system. This will add to the complexity and costs of any emissions control system and will not result in substantial benefits to air quality. EMA recommends that the CO emissions limit remain stable at 10 lbs/MWh through 2012.

In conjunction with the stringent NOx and CO standards, DNREC is proposing CO_2 standards as well. Because internal combustion engines are highly energy efficient compared to other forms of electricity generation, the proposed CO_2 standard would not normally be problematic. However, when combined with the need for NOx, PM, and CO controls, all of which will require aftertreatment and result in lower overall energy and fuel efficiency, the addition of a CO_2 standard adds to the uncertainty and constraints on the DG system. The combination of strict emissions limits and energy efficiency constraints imposed by the CO_2 emission standard will effectively remove any cost-effective options for DG in the state.

EMA recommends that DNREC delete the CO_2 standard from the regulation. Given the need to meet the other strict emissions standards of the proposed regulation, there is no way for engine or generator manufacturers to effectively control or alter the inherent CO_2 emissions from a specific generator set. Considering that the priority to control emissions is properly placed on minimizing emissions of criteria pollutants, such as NOx, CO, and PM, and that CO_2 emissions from stationary engines are minimal, there is little to be gained by adding additional constraints that only make compliance with the primary emissions standards more difficult.

Similarly, the proposed non-methane hydrocarbon (NMHC) standards are extremely low and will be difficult to achieve. Hydrocarbons can be reduced through the use of aftertreatment devices such as oxidation catalysts, but their effective efficiencies are limited to 90-95%. Consequently, with engine-out emissions from gaseous-fueled lean burn engines in the range of 3-5 lbs/MWh, the proposed emissions limit may not be achievable for many gaseous-fueled engines.

EMA recommends that the NMHC standard be raised to 0.5 lbs and remain at that level through at least 2008.

Adoption and implementation of the regulation as proposed will discourage, and perhaps halt, the expansion of DG and CHP in the Delaware.

The proposed regulation is intended to assure deployment of environmentally sound stationary engines, regulate emissions consistent with needs and allow time for development of effective emissions reduction technologies. Because of the very stringent emissions control requirements proposed, Regulation 44 does not achieve those intended outcomes.

The primary reason that the proposed regulation fails in this regard is because the proposed NOx emissions standards go well beyond what is needed to assure that new DG sources are cleaner than the central station power plants that are currently producing the electricity that they will replace. As stated in the OTC Distributed Generation Initiative (March 2001), air regulators need to ensure that new forms of electricity generation are at least as clean as the power they are replacing. The proposed NOx emissions standards go well beyond what is needed to meet that objective.

Revised emissions standards for engines that utilize alternate gaseous fuels, such as landfill gas and biogases are needed so that the environmentally beneficial use of those fuels can continue.

The proposed emission standards for stationary engines are problematic from a technical and cost-effectiveness standpoint for fuels such as diesel and natural gas. However, those standards will be impossible to meet when alternative or biofuels are used as a fuel.

There are many environmental, natural resource conservation, and air quality benefits to be gained when waste gases or biogases are used for fuel. Such gases, which would normally either be vented to the atmosphere or flared, can be harnessed by using internal combustion engines to produce electricity or heat. This approach has the dual benefits of reducing emissions and recycling energy.

However, due to the inherent qualities and composition of these gas streams, it is often impossible to assure the quality of the gases as a combustion fuel or to apply catalyst-based aftertreatment systems. For the most part, emissions from engines utilizing these gas streams will have higher emissions compared to burning pipeline-grade fuels that have a consistent quality.

Because aftertreatment systems generally cannot be used, any stationary engine system using biofuels would not be able to meet the proposed standards. The regulation would have the effect of preventing the further utilization of the waste gas streams. This is unfortunate because there are many benefits from doing so.

In order to assure the continued use of alternate fuel and waste gas streams such as landfill, digester, and biofuel gases, the regulation should establish separate emissions standards for these processes. The alternative credits proposed in Section 8.1 are not adequate to assure that the use of flared or waste gases will be able to meet the emissions limits.

DNREC should survey emissions from existing facilities in the state and determine appropriate emissions standards based on the state of technology. Such emissions standards should also take into account the type of fuel used.

The proposal to require manufacturers to certify that a generator will meet the proposed emissions standards for 15,000 hours of operation or 3 years is beyond the current industry standard and technical capability of emissions control equipment.

Section 7.1.2 of the proposed regulation requires generator manufacturers to supply a certified statement that a particular make and model of the generator has the ability to comply with the applicable emissions standards for 15,000 hours of operation or three years, whichever is less.

Importantly, the proposed certification period goes well beyond the expected life of current engines and the emissions warranty requirements as applied to mobile source emissions by the U.S. EPA. Engines used in stationary sources are generally the same as those used in nonroad mobile applications which are manufactured to US EPA emissions standards. In the US EPA nonroad regulations, the useful life of nonroad engines, defined as the time period that the engines must meet emissions standards, is only 8,000 hours (40 CFR 1039.101). Moreover, engine manufacturers are only required to warrant emissions for all nonroad equipment for 3,000 hours of operation (roughly 150,000 miles) or five years, whichever comes first (40 CFR 1039.120). The emission certification period proposed by the DNREC for these same engines in stationary applications is over twice as long as the normal useful life of the engine and 5 times longer than the emissions warranty period for nonroad engines and equipment. It is not logical or technically possible to guarantee that stationary engines will meet the proposed emissions limits for 15,000 hours when that time period is well beyond the useful life of the engine itself.

A second reason why this proposed certification period is unreasonable is that the proposed emissions standards would require the use of aftertreatment devices to meet emissions limits, and engine and generator manufacturers must rely on the warranty conditions of the emissions control aftertreatment systems. Currently, these manufactures do not warrant their products for such a long time period, and many systems are not designed to last 15,000 hours. Therefore, it would be virtually impossible for generator manufacturers to certify that the emissions would meet the requirements of the proposed regulation when the manufactures of the requisite emission control equipment are not likely to provide such a warranty.

Finally, given that the proposed regulation would become effective in 2005, even if the standards were adopted today and manufacturers were to immediately start testing integrated systems, it would take until at least February 2006 to test DG systems for 15,000 hours of operation. Quite simply, there is insufficient time to complete the required testing in order to meet the proposed certification requirements. Consequently, there would essentially be no certified generators available for installation in the state until after mid 2006.

Each manufacturer has their own policies and statements on warranty issues. Standards and practices not only vary among manufacturers, but also among technologies. The normal practice of most manufacturers is to certify or warrant their products for one year.

Rather than require the generator manufacturer to provide certification for the time period or operational hours currently proposed, DNREC should require the operator to maintain the generator and any emissions control equipment so that the proposed emission limits are met. In this way, the operator will have a requirement to properly maintain or replace the equipment to ensure that emissions remain below the applicable standards. Manufacturers' warranty and certification programs will continue to be a competitive marketing issue, spurring manufacturers to offer improved products and better warranties.

If any certification period is to be included in the final regulation, it should be reduced to a time period corresponding to current industry practice of offering a one year warranty.

ADDITIONAL COMMENTS

EMA supports the adoption of emissions standards for emergency engines based on the US EPA Nonroad Mobile Source Regulations.

EMA supports DNREC's proposal to require emergency engines to meet US EPA nonroad engine standards. Applying the Tier 2 and Tier 3 nonroad engine standards will minimize emissions from this source category while at the same time ensuring that emergency engines will be able to perform their intended life-saving functions. .

EMA strongly supports the inclusion of adjusted emissions standards or emissions credit or offsets for DG facilities using Combined Heat and Power (CHP) technology in the final regulation.

DG facilities that incorporate CHP into their design and operations provide many benefits, including improved fuel and energy efficiency, compared to DG facilities that only produce electricity. CHP facilities can produce useable heat and power at an efficiency rate of over 80% and thus creates an excellent opportunity to save fuel and conserve natural resources. The final regulation should recognize the emissions benefits of CHP that result from the use of excess heat from engines to provide benefits such as heating and cooling. CHP replaces the need for additional energy use through combustion to produce an equivalent benefit.

The final regulation should incorporate provisions that allow emissions credits or offsets for DG facilities that utilize CHP. This should be in the form of higher allowable emissions limits for CHP facilities that reflect the emissions saved using the equivalent energy needed to produce the benefit. Incorporating such a benefit into the rule will encourage the further deployment of CHP facilities in the state. The proposed Section 8 approach appears to be adequate to address this issue.

More time is needed to bring existing engines into compliance in Section 1.3.1.

EMA believes that more than 6 months is needed in order to bring existing units into compliance with the emissions standards. A significant amount of engineering work may be needed and specific equipment procured, and this process is likely to take longer than six months at some

facilities. EMA recommends that facilities need at least nine months to come into compliance with the new emissions standards.

DNREC should allow emergency generators to operate under conditions that would prevent an imminent loss of power.

The definition of emergency includes the loss of power and appropriately allows emergency generators to operate when there is a power failure. However, it is also appropriate for emergency engines to operate under circumstances where their operation could prevent or mitigate a potential power outage. It does not make sense to prohibit emergency generators from operating in cases of an imminent power failure if their operation would prevent the outage and potentially save citizens the costs and inconvenience of a power outage.

DNREC should work with PJM to come up with a suitable definition of emergency and establish a set of conditions that allows emergency generators to operate in the case of an imminent power outage.

EMA believes that the recommended changes noted above are critical to making the proposed regulation feasible as well as to minimize the disruption of the DG market in Delaware. As noted, the more reasonable standards recommended by EMA will still be protective of the environment and fulfill the goals of the regulation. Even with these less stringent emissions standards, the resulting expanded deployment of DG will actually help reduce NOx and other emissions in the state.

EMA looks forward to continue to work with the DG Workgroup and DNREC to craft a final regulation that achieves the stated goals of the agency to assure that emissions from DG in the state do not degrade air quality and to encourage the installation and deployment of clean, energy efficient DG to meet the state's growing electricity needs.

We would be happy to provide additional information or answer any questions you may have.

Sincerely,

Joseph L. Suchecki

Joseph L. Suchecki
Director, Public Affairs