

February 23, 2007

Mr. Martin Kay
Science and Technology Advancement
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

RE: Proposed Amended Rule 1110.2 – Emissions From Gaseous and Liquid-fueled Engines

Dear Mr. Kay:

The Engine Manufacturers Association (EMA) is the international trade association representing the manufacturers of internal combustion engines including those used in stationary applications such as pumping, compression, and electricity generation. The proposed revisions to AQMD Rule 1110.2 would add additional regulatory requirements for existing stationary engines as well as establish stringent new standards for distributed generation within the South Coast AQMD air basin. The proposed rules would have a direct impact on the products produced and marketed by EMA member companies.

EMA has prepared the following comments on the proposed revisions to Rule 1110.2. The primary focus of the EMA comments is on the technical and economic feasibility of the proposed emission standards and on the compliance assurance issues associated with internal combustion engines. EMA also plans to submit comments on the background and analyses on the Preliminary Staff Report that serves as justification for the proposed rule changes.

The attached comments first provide some overall recommendations on the general approach and changes to Rule 1110.2 and then discuss more detailed and specific issues.

EMA appreciates the opportunity to submit comments on the proposed rule and would be pleased to answer any questions that you may have regarding our concerns.

Respectfully Submitted

Joseph L. Suchecki
Director, Public Affairs

**South Coast Air Quality Management District
Proposed Amended Rule 1110.2
Emissions From Gaseous-fueled and Liquid-fueled Engines**

**Written Comments of the
Engine Manufacturers Association
February 23, 2007**

The Engine Manufacturers Association (EMA) is the international trade association representing the major manufacturers of internal combustion engines. EMA's 31 member companies manufacture and market virtually all of the prime power and emergency standby engines that are used in stationary sources within the AQMD air basin (Basin). Consequently, the proposed changes to Rule 1110.2 (The Rule) directly affect EMA members' products.

EMA participated in the preliminary discussions regarding the Rule including the stakeholder demonstration project completed last year as well as the public workshops leading up to development of the Rule. EMA has the following written comments on the Rule and its provisions.

General Comments

EMA supports the need to improve in-use compliance of existing engines in the Basin.

One of the primary drivers for the proposed changes to Rule 1110.2 has been the results of recent compliance tests on in-use engines in the District. Those District tests showed a substantial rate of noncompliance with current NO_x and CO emission standards for in-use engines. Following the initial testing, a group of stakeholders, including EMA, funded a demonstration program to determine appropriate monitoring and control techniques to assure compliance.

The results of the demonstration program indicated that well maintained and operated engines were achieving a compliance rate of over 90%, much higher than compliance rates observed during District field tests. The program also found that current Air-Fuel Ratio Controllers (AFRs) and catalysts for rich-burn engines were sometimes not able to maintain or detect noncompliant excursions. While the demonstration program showed that engines can maintain compliance with current emissions standards, it pointed out that an enhanced compliance assurance program is needed to provide confidence that in-use stationary engines are meeting applicable emissions standards. EMA recommends that an advanced compliance program be developed to further understand and develop technologies needed to consistently meet current BACT requirements.

Once installed in the field, stationary engines must be able to meet their permitted or regulatory emission levels and maintain compliance. It is not acceptable for any emissions source to pass initial or annual source testing, and then drift out of compliance for any substantial length of time during normal operating conditions. Owners and operators, together with engine manufacturers, systems packagers, and aftertreatment suppliers, must assure that engines remain in compliance. EMA believes that the best way to assure compliance is with an appropriate and cost-effective compliance assurance program. Such a program should include periodic source monitoring, installation of systems to detect excursions, and proper maintenance and operation. EMA supports the need to enhance the current AQMD compliance requirements in order to give the District and the public confidence that in-use emissions from stationary engines will meet applicable emission limits.

The Emissions Standards proposed in Rule 1110.2 may not be achievable or sustainable in the field for existing engines or certain applications.

As indicated above, EMA supports programs that will help ensure compliance, and the AQMD is correct in expecting compliance with its standards. However, there is a current technological limit to engine emissions control technology that can be constantly sustained under real-world field conditions. EMA believes that the emissions standards proposed in Rule 1110.2 for existing engines may be beyond the limit of add-on engine control technology considering the need for consistent operation under varying fuel qualities, load profiles, and ambient conditions.

Consistent and 100% compliance with an emissions standard depends on a number of factors including successfully engineering an integrated emission control system, proper operation and maintenance, fuel characteristics, ambient environmental conditions, and engine duty cycle. The ability to comply also depends heavily on the target emissions standards. Given a set of current and feasible emission and engine control technologies, 100% compliance with a very stringent emission standard is much more difficult to achieve than compliance with a less stringent standard.

Information from the District's recent compliance initiative may be instructive in this regard. Initial field compliance was only near 50%, but the stakeholder demonstration program indicated that well-maintained and monitored engines were in compliance over 90% of the time. The difference in the compliance rates for the two programs, roughly 40%, could be indicative of what a compliance assurance program could achieve if implemented, while the roughly 10% noncompliance could be interpreted as an indication that current state-of-the-art controls (SOTA) fall short when faced with meeting AQMD's current, stringent emissions levels.

The current AQMD emissions standards for stationary engines are the most stringent in the world. Emissions standards in other states and countries are less stringent, and since the vast majority of the market does not have to achieve the very stringent AQMD standards, control systems are designed and engineered to provide control at emissions levels that are higher than what must be achieved within AQMD. Furthermore, since AQMD is moving towards much more stringent standards that are far beyond all other standards, and the total market for

stationary engines in the AQMD area is very small, the availability of proven control technologies becomes less likely with each additional tightening of the standards.

EMA believes that AQMD's proposed emissions levels in Rule 1110.2 for existing engines exceed the ability of current SOTA engine and control technology to consistently maintain compliance. The reasons for this are twofold. First, with such low emissions limits, there is very little tolerance margin in either the combustion process or the emissions control technology. Today's SOTA emissions control systems simply cannot meet the performance standards and extreme tolerances needed to guarantee compliance at those low levels of emissions. As an example, heavy-duty mobile source engines, at least over the next six years, will generally have to meet NOx emissions limits that are an order of magnitude higher than the AQMD BACT standards. The mobile source industry is not expected to reach the emissions levels proposed by AQMD for existing stationary engines until the 2011 to 2014 timeframe.

Secondly, the proposal seeks to implement new stringent standards on older, existing engines. In-use engines will generally have inherently higher emissions than new engines (since they have older in-cylinder combustion control technology) which, therefore, makes the emissions reduction targets even more difficult to achieve. In addition, any required emissions controls, such as catalysts, must be added-on rather than integrated into a final product. Consequently, owners and operators have to piece together system components, controllers, sensors, and aftertreatment technology in an attempt to assemble a system that can meet the standards. Such non-integrated systems will simply have a much more difficult time in meeting the proposed emissions standards.

As AQMD identified through their compliance program, in-use engines are already having difficulty complying with current emissions standards. By lowering the standards even further, and requiring those same engines to cut their emissions by 70% in the case of NOx, and by orders of magnitude in the case of VOC and CO, compliance will be even less likely, if possible at all. Substantially decreasing the emission standard further will only increase the likelihood of noncompliance given the state of available control technology for in-use engines. Given the evidence gained from the District's compliance investigation regarding the current state of technology, one can only conclude that meeting the proposed, much more stringent emission standards is not technically feasible for existing engines within the time proposed.

The solution to the existing engine noncompliance and control issues in the Basin is not to make the target emission standards lower and more difficult to achieve. The solutions rests with a combination of realistic emission standards coupled with appropriate and consistent enforcement action to assure compliance.

There will be no measurable improvement to the air quality in the Basin from the proposed rule since the emissions from stationary engines contribute so little to the overall inventory.

The preliminary staff report for the proposed changes to Rule 1110.2 estimates that the total emissions from all stationary engines in the Basin are 3.3 tons/day NOx, 1.5 tons/day VOC, and 11.2 tons/day CO. The staff report estimates that the emissions levels from all stationary

engines will be reduced to levels of 2.2, 1.0, and 4.0 tons per day, respectively, once the rule is fully implemented in 2012. Therefore, the rule will result in an estimated reduction of 1.1 tons/day NO_x, 0.5 tons/day VOC, and 7 tons/day CO.

The draft 2007 AQMD Air Quality Management Plan reports that total 2002 emissions from all sources in the Basin were as follows: 1,090 tons/day NO_x, 1,028 tons/day VOC, and 5,390 tons/day CO. Accordingly, neither the current emissions from stationary engines nor the estimated emissions reductions from the proposed changes to Rule 1110.2 are significant in terms of total emissions in the Basin. In fact, the emissions from stationary engines represent 0.3% NO_x, 0.1% VOC, and 0.2% CO of the total emissions inventory, and the proposed reductions from full implementation of the rule changes represent 0.1% NO_x, 0.04% VOC, and 0.1% CO of the total emissions, or about 1/1000th of the air emissions inventory in the Basin.

The total stationary engine emissions inventory is such a small portion of the total emissions that it is in the “noise” or “error” level of the AQMD emissions inventory. Consequently, no measurable or significant improvement in air quality will result from implementation of the proposed rule.

The intent of this comment is not to say that stationary engine emissions should not be as low as practically and economically achievable, but rather to point out that the economic and operational costs as well as the significant benefits of operating stationary engines must be weighed against truly insignificant emissions reductions that will not result in any overall improvement in air quality or public health in the Basin.

The minimal benefits of emissions reductions resulting from the final emission standards and compliance program changes must be balanced against the economic, operational, and reliability benefits to the public obtained through the use of stationary engines.

The use of stationary engines to produce needed power provides significant benefits to owners and operators, as well as the public. Engines provide enhanced reliability, localized power sources, the power and durability needed to perform specific tasks, and economic benefits. One of the primary uses of stationary engines in the Basin is to provide essential services for the public good by public agencies such as water and sanitation districts, transit authorities, and natural gas suppliers.

In public workshops and the preliminary staff report, AQMD staff has consistently maintained that use of stationary engines is discretionary and used simply for financial gain. A frequently raised solution to stakeholders’ concerns with the difficulty and impracticality of the proposed regulation or the economic costs of meeting the proposed emission standards is to suggest that owners and operators can simply connect to the electricity grid for power. There is no acknowledgment of the overall positive operational, reliability, and economic efficiency of operating stationary engines or the real issues and impact of solely relying on the electric grid.

Stationary engines are often the best source of power for certain applications. If other sources provided better advantages to owners and operators, they would already be using those alternatives. Consequently, it is important that AQMD allow stationary engines to continue to

provide critically important power for certain applications, and recognize that establishing technically or economically infeasible emission standards that essentially eliminate engines from the mix of alternatives would have significant consequences for owners and operators as well as the general public.

AQMD must balance the benefits derived from the very small emissions reductions that would result from implementation of the proposed rule against not only the direct costs to owners and operators of implementing provisions in the rule, but also costs in reliability reductions, decreased efficiency, and the loss of benefits to the public as a whole. This is particularly true for public agencies that use engines to provide essential services such as drinking water supplies and wastewater treatment where there will be a negative impact on the delivery of the public service as well as significantly increased costs that must be borne by the general public through increased taxes or service fees.

The final emissions standards and compliance program changes in Rule 1110.2 must evaluate and balance the very small emissions benefits of the program against the broader public good that comes from the continued use of clean burning, stationary engines.

The beneficial uses of waste gases as alternative energy sources should be maintained and encouraged.

One of the key uses of stationary engines is the transformation of waste gases that would otherwise be released into the atmosphere into a useful and viable fuel. Examples include the combustion of methane from landfills and the conversion of digester gases into electricity.

The new emission standards proposed in Rule 1110.2 for engines utilizing such fuels are the same as engines burning natural gas pipeline fuel that is controlled to provide a standard, clean fuel. The contaminants and variability in waste gas fuels make achieving those emission standards technically or economically infeasible.

By virtually all analyses, the use of waste gas fuels to produce useable energy is in the public interest and is being viewed as a key strategy to reduce the impacts of power production from fossil fuels on climate change. The AQMD proposal to reduce emissions from such operations, as well as the added costs for compliance assurance programs proposed in the Rule, would serve as significant deterrents to the continued use of waste fuels as an energy source. The cost of compliance with the proposed standards would likely be high enough to make the productive use of such fuels impractical from an economic standpoint. Imposition of the new requirements would provide minimal improvements, even if facilities were able to achieve the standards, but would force the abandonment of current and future projects and result in increased emissions from flaring and increased greenhouse gas emissions from replacement fossil fuel sources.

AQMD needs to recognize the considerable advantages that conversion of waste gases creates in terms of energy production and reduced greenhouse gas emissions and should establish emission standards for those operations that are both technically and economically

feasible and that would not act as a deterrent or barrier to utilization of waste gases for energy production.

The proposed emission standards for Distributed Generation are not attainable, do not represent BACT standards for engines and should not be adopted at this time.

AQMD has proposed adopting central station combined cycle power plant BACT as the emission standards for engines used in Distributed Generation. The emission standards are referred to as the 2007 CARB standards and stem from California legislation that requires all new power generation in the state to eventually meet central power station BACT.

No engine systems have been shown to be capable of meeting the proposed emission standards. Consequently, the District is proposing a set of emission standards that are not feasible or practical, and certainly have not been demonstrated in practice anywhere in the United States. In fact, other than a single microturbine in a combined heat and power (CHP) configuration, no DG system other than fuel cells have been certified by ARB to meet the proposed 2007 emission standards.

Engine-based systems are the primary source of Distributed Generation and CHP power, and are the most energy efficient and cost-effective systems available. If the proposed emission standards are adopted in Rule 1110.2, engines would no longer be a viable option, and owners and operators would have few, if any, realistic or practical alternatives to install DG or CHP systems in southern California. Although small scale fuel cells can meet the emission standards, they are prohibitively expensive to install in most applications. In addition, the single CHP microturbine has limited application.

EMA recommends that AQMD not adopt the DG emission standards as proposed. The legislation that serves as the basis for the requirement clearly indicates that the standards should be adopted when feasible, and although CARB suggested in the Distributed Generation Guidance Document that 2007 was expected to be the year when such systems would be available, industry does not see any reliable and proven technology that would allow engines to meet the standards anytime during 2007. Delaying adoption will be in compliance with the legislation as well as the CARB Guidance. The so-called 2007 CARB standards should not be adopted until there is a system demonstrated in the field that can reliably and consistently meet those standards.

Finally, if the District insists on establishing those standards in order to prevent Distributed Generation and Combined Heat and Power Systems in the District, Rule 1110.2 is not the appropriate regulation in which to adopt the CARB Distributed Generation standards. The state legislation applies to all DG energy sources and not just to engines. If the District is going to impose BACT as proposed, then it must be done for all sources of electricity generation including turbines, fuel cells, microturbines and other emission-generating sources. The District cannot simply choose to arbitrarily apply the standards to a single technology, i.e., engines in Rule 1110.2.

Specific Comments (References refer to page numbers of the draft rule)

Page 5, Table II Concentration Limits

It is not technically feasible or cost effective to require existing engines to meet the proposed emission concentration limits proposed for 2010 or 2011. EMA recommends that the current emissions limits applicable to existing engines be maintained.

AQMD should rely on improvements in compliance assurance systems and current BACT standards for new engines to control emissions from stationary engines.

Page 6, Table III Concentration Limits for Landfill and Digester Gas-fired Engines

As noted in EMA's general comments above, AQMD should encourage the continued use of landfill and digester gases as a fuel to produce needed energy. The proposed emissions standards in Table III are not achievable and will deter the future use of waste gases for energy production, if not actually skew the economics of current utilization and make it too expensive, thereby forcing existing operators to shut down.

The contaminants in landfill and digester gas, as well as the variable energy content of the gas, makes the use of aftertreatment to control emissions problematic. The substantial costs to either pretreat the gas to improve its quality or to maintain and replace catalysts that are poisoned by the contaminants makes attaining the proposed emission standards prohibitive. Less stringent emissions standards are needed that are technically and economically feasible. EMA recommends that the AQMD establish separate and unique emissions standards for waste gas utilization and take into account the large benefits derived from use of such gas to the general public and California's energy balance and greenhouse gas emissions.

Finally, the requirement to burn 90% landfill or digester gas that was added to Section C should be removed to provide operators the necessary flexibility to keep operations running efficiently.

Page 6, Efficiency Factor

AQMD should retain the provisions related to the efficiency factor. Higher fuel efficiencies in all engines should be encouraged as a means to save energy and decrease the emission of greenhouse gases. The efficiency factor is a good way to provide an incentive for owners and operators to purchase and install the highest efficiency engines in the Basin. It also provides an excellent method to balance the benefits of lower emissions against higher energy efficiency.

Page 9, Section (E)

This section requires owners and operators of all engines that do not have a continuous emissions monitoring system to equip their engines with an Air Fuel Ratio Controller (AFR) and

oxygen sensor feedback control. The mandate to universally install an AFR should be removed from the regulation for the following reasons.

First, AFR's are not the most appropriate or best control technology for all engines. In particular, engine manufacturers use different control technologies to achieve very low and stable emissions on lean burn engines, and AFR's may not be the best technology available to control combustion and emissions.

Second, EMA generally opposes mandates for a specific technology since it locks the use of that technology into the regulation or facility permit and thus reduces innovation and the development of new and better technology. To avoid such situations, EMA supports the adoption of technology neutral performance standards, such as emission standards, that allow providers to develop and use the best technology available.

Page 9, Section F New-Non-emergency Electrical Generators

As discussed in EMA's general comments, this section should be removed. The proposed emissions standards are not technically feasible and are not achievable in the field with any internal combustion engine system. Adoption of these standards is a virtual ban on Distributed Generation in the Basin.

Page 17, Section 5 Stationary Engine Air-Fuel Ratio Controllers

As noted above, EMA recommends that this section requiring AFR's be removed.

Page 18, Section (A)(ii)

AQMD proposes to require the use CEMS on all engines where the aggregate horsepower at the same location is greater than 1000 hp and to add a requirement for a CO CEMS in addition to NOx CEMS.

First, CO CEMs should not be required for lean-burn engines. Lean burn engines by virtue of their lean combustion technology are naturally low in CO emissions. As indicated in the Staff Report, no lean-burn engines were found to be out of compliance for CO emissions during the District's compliance monitoring program. Adding a CO CEMS for lean burn engines is not necessary and would not result in additional compliance or reduced emissions. Consequently, CO CEMS on lean burn engines is simply an unnecessary and unwarranted expense for owners and operators.

Second, AQMD is apparently concerned that owners and operators would avoid the use of CEMS by installing several engines under 1000 hp as opposed to a single engine over 1000 hp. However, the proposed rule requiring engines under 1000 hp to share CEMS does not appear to be a viable option, and although it has been tried in the field, has not proved to be universally successful. Installing CEMS on each co-located engine is prohibitively expensive.

EMA recommends that the District provide an alternate approach to this issue. The size limit to install CEMS should be retained at 1000 hp. Administrative controls should be established to ensure that the installation of new multiple engines at a single location are needed for operational reasons and not to circumvent monitoring requirements. CEMS should not be required on engines under 1000 hp that are installed for legitimate operational reasons in close proximity to each other.

Page 28, Section 12

Engine emissions will vary between start-up and normal operations, and it is appropriate for the District to allow warm-up and normal operations prior to requiring compliance with the proposed emissions standards. There also should be a provision to indicate that no emissions testing or monitoring is required during start up or shut down periods.

EMA believes that a longer warm-up time is warranted to ensure that normal engine operations are achieved and that the aftertreatment and monitoring devices are functioning. The start-up exemption should extend to 30 minutes rather than the 15 minutes as proposed.