Summary of Rule 1110.2 Comments
by
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(Southern California Gas Company and San Diego Gas & Electric)
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Requirements – Subdivision (d)(1)(B) Table II
Concentration Limits effective July 1, 2010 or 2011

Sempra Energy Utilities (SEU) recommends that SCAQMD reassess the total potential impacts application of the Facility Modernization control measure will have on industrial facilities and on supply of emission reduction credits. It is likely that many facilities that are forced to modernize equipment as a result of this rule will make upgrades to their equipment. This could subject many operators to New Source Review, thereby increasing the demand for expensive emission reduction credit offsets that are already in short supply.

If the SCAQMD elects to move forward with the Facility Modernization concept for stationary engines, we recommend that higher emission limits for CO be considered. In the proposed rule, concentration limits for NOx, VOC and CO, equivalent to today's BACT, are used. These emission levels, particularly when applied to rich burn engines, allow for a very small operating window to concurrently meet both NOx and CO. Setting the CO limit at 500 ppm, while maintaining the NOx limit at 11 ppm (@ 15 % O2), will greatly enhance the operating range for an engine operator. While not as stringent as BACT, it would still reduce CO limits by 400%, from 2,000 ppm down to 500 ppm. We note that the SCAQMD is in compliance with federal CO standards. We also note that the SCAQMD has flexibility in choosing what emission limits to set in BARCT rules.

More Stringent VOC Limit for Stationary Sources

CARB RACT guidelines recommend a higher VOC limit for lean burn engines than rich burn engines. The proposed 30 ppm VOC limit does not take this into consideration.

Table II, Footnote 2: Using carbon or methane, as a basis will not affect the VOC concentration determined during the compliance test. However, the District should take into consideration that this will decrease mass emission calculations used for emission inventories by 25% since the molecular weight will go from 16 to 12. Methane is a widely used basis of measurement, and the District should probably stick with it.

Requirements – Subdivision (d)(1)(C)
Elimination of the Efficiency Correction for Stationary Engines

Retain the Compliance Limit Formula in the rule language to allow lean burn engine operators to take advantage of the significant engine efficiency advantages they have over rich burn technology. To assure accurate efficiency calculations, the District can specify the use of the American Society of Mechanical Engineers Performance Test Codes, PTC-17.

Requirements – Subdivision (d)(1)(E)
Engines required to have an AFRC with oxygen sensor and feed back control

Subdivision (d)(1)(E) should only pertain to rich burn engines. Lambda sensor based Air Fuel Ratio controllers (AFRC) are not appropriate for lean burn engines used in the SCAQMD. This is especially true for SEU 2-stroke engines, and 4-stroke engines with substantial intake/exhaust valve overlap. Other techniques are used that work just as well, or in some cases better. Such a requirement would lock everyone into a specific technology and not allow innovation.

It appears that the District misinterpreted two reports. First, the information on Page 40 is about engines that were simply leaned out to achieve lower NOx levels without any sophisticated AFRC (other than the carburetor). The controller was tested on one of these engines to see if it could be used to avoid detonation and to maintain engine efficiency, not specifically to maintain compliance. Any lean burn engine used in the SCAQMD already has a more sophisticated AFRC. For example, SEU operates CEMS equipped lean burn engines without lambda sensor based controllers successfully. Second, Appendix B of the staff report shows the typical AFR map that researchers and universities use to better define system operations. Just because the researcher tested the engine over a wide AFR doesn't mean the control system on a real world engine allows that much variation.

Requirements – Subdivision (d)(1)(F)
Adoption of CARB Guidelines for permitted engines used in Distributed Generation

Southern California Gas Company strongly urges SCAQMD to delay implementation of CARB's guidelines for permitted distributed generation at this time. We do realize that this recommendation is in line with CARB's Guidelines as developed under SB1298. However, because this is only a guideline, local air districts do have the legal authority to implement the guidelines if and when they choose.

New engine products are currently being developed to meet the incredibly low emission limits proposed in the CARB Guidelines for 2007. Preliminary testing on several new engine systems, including the Blue Point Energy EGR technology and the Gill Controller with 3-way catalyst, do show an ability to meet these limits over a short time period. However, these systems have yet to demonstrate their abilities to meet and to continuously maintain these low emission levels over extended time periods as is required to make them a viable product.

From an environmental standpoint, the District needs to also consider greenhouse gas (GHG) benefits from engine based CHP projects. Reciprocating engines with heat recovery offer heat rates over 13,000 Btu/kWh and corresponding GHG emissions of approximately 500 lbs. CO2/MWh. This compares favorably to the GHG Efficiency Standard of 1,100 lbs. CO2/MWh established by the CPUC for new power plants under SB1368. If fact, the California Action Team Report targets CHP for 2.7% (about 5 million metric tons of CO2) of the 2020 GHG reduction goals. This is 50 % greater than GHG emission goals projected for the California Solar Initiative.

In addition to its efficiency and GHG advantages, CHP provides California businesses an option to curb energy costs, improves power reliability and eases grid congestion. In California, CHP has become an important element of the State's energy and environmental policy. The California Energy Commission's (CEC) 2005 Integrated Energy Policy Report (IEPR) identified CHP as most cost-effective form of DG.

We recommend that SCAQMD form a committee with CARB and with engine manufacturers to further assess engine technologies and agree upon a more realistic timeframe to meet the CARB DG guideline emission limits.

Compliance – Subdivision (e)(Table VI)

The compliance schedule required by Section (e)(Table VI) should be changed to allow more time for operators to comply as follows:

- Initiate construction of engine modifications / control equipment Three months before the final compliance date or 60 days after the issuance of a final PTC, whichever is later.
- Complete construction of engine modifications / control equipment, by final compliance date or 120 days of the issuance of a PTC, whichever is later.
- Complete initial source testing 60 days after the final compliance date, or 180 days after PTC is issued, whichever is later.

SEU also recommends that the following text be added to this subdivision to allow permit applicants categorical "exceptions" from complying with the firm timelines in the event procurement processes are delayed beyond the permit applicant's control.

"At the discretion and approval of the Executive Officer, the compliance timelines can be extended upon written request by the permit applicant."

Compliance – Subdivision (e)(Table VII)

Installation of CEMS or modifying CEMS on existing engines, particularly when attempting to time share between two engines, can create complex problems to resolve. SEU is not sure there is ample time in the schedule shown in Table VII to complete CEMS installations. This will especially be true for companies with many engines requiring CEMS, and with the entire engine market putting a strain on the CEMS providers. Therefore, it is recommended that the time line in Table VII be extended.

Compliance - Subdivision (e)(5)(B)

With all the monitoring being required, it is not necessary to specify the AFR controller model on the permit. Although there are differences in design, all AFR controllers and all catalysts are functionally equivalent. Permits should be flexible to allow operators to easily upgrade to improved systems, and bid for cost effective solutions. An alternative approach to insure compliance is to simply require a source test any time changes are made to the AFR controller or the catalyst is changed out. This will help to reduce the permit staff workload and prevent additional burden on permit staff due to rule-driven equipment modifications. This will also alleviate frustration within the regulated community as operators are able to pursue the best options for maintaining a high level of compliance without unnecessary permitting delays.

Monitoring and Recordkeeping - Subdivision (f)(1)(A)(ii) Additional CEMS Requirements:

SEU recommends that the CEMs applicability remain the same, as it is in the existing rule, and should only apply to engines rated over 1,000 HP. Forcing operators with smaller engines that collectively exceed 1,000 hp to install CEMS is extremely expensive and completely unnecessary to accomplish reasonable assurance of emissions compliance. Based on SoCalGas' CEMS operating experience, a typical CEMS costs approximately $250,000 per unit (hardware, installation, and certification) with an annual maintenance / labor cost of about $30,000. We are not aware of any low-cost CEMS capable of meeting the requirements of SCAQMD Rules 218 and 218.1. We have contacted several CEMS suppliers and asked about system costs and their experience with time-sharing of CEMS between multiple engines. They indicated that time-sharing can be done, but with a maximum of 2 engines. If you apply this to an operator with four new 250 hp engines, installed costs for two shared CEMS would be about $500,000. An estimated cost for four new 250 hp engines is about $120,000. In this example, the monitoring equipment is about 4 times more expensive than the cost of new engines. Of course if you apply this monitoring approach to older existing engines, worth a fraction of the cost of new engines, these costs would look far worse. The real tragedy here is that these staggering costs would be pushed on operators with no real emissions benefit. The other proposed monitoring strategy, periodic monitoring with a portable analyzer, accomplishes the same thing, reasonable assurance of proper engine system operation and compliance with permit limits, at a fraction of the cost of a CEMS. We strongly urge the District to reassess how emission checks with portable analyzer technology can be successfully used with this engine market segment to meet compliance requirements.

Inclusion of a CO CEMS measurement is not necessary for lean burn engines which inherently meet the 2000 ppm limit. Requirement for a CO CEMS should not be required for lean burn engines until the lower CO limits go into effect in July 2010 for engines > 500 bhp and July 2011 for engines < 500bhp.

Also, it does not seem cost effective or practical to install CO-only CEMS on RECLAIM Process Units and Large Sources that will be excluded from the NOx CEMS requirement of Rule 1110.2.

Source Testing for Stationary Engines
Subdivision (f)(1)(C)(ii):

Requiring completion and a written report of a failed source test adds greater expense (about $1,000) to the operator in conducting a source test. An operator is generally not charged the full amount for tests that are not run to conclusion. SEU recommends that failed tests be documented in the maintenance logs, without the requirement to send in a final written report.

Regarding testing at peak load, as the District knows, it isn't always easy to reach peak load for testing; therefore, it is suggested to adopt the same language from EPA NESHAP Regulations (ICE MACT), which state, "The test must be conducted at any load condition within plus or minus 10% of 100% load." (Reference, 40 CFR 63.6620). Also, many units have driven equipment (generator, pump, compressor, etc.) with a lower rating than the engine. To account for those situations, the rule should allow peak load to be based on normal peak production of the driven equipment, rather than the engine rating.

A 40-hour moratorium on maintenance prior to the test appears to be excessive. The moratorium should exclude situations where the process is compromised or mechanical failure may occur.

Testing at multiple loads does not seem necessary. With CEMS equipped engines compliance will be determined continuously over the actual load range of the engine. With non-CEMS equipped engine, compliance will also be verified throughout the year as portable analyzer checks are done at various loads.

Subdivision (f)(1)(C)(iv)

The protocol should be assumed approved if the District does not respond after 60 days. Previously approved test plans may be referenced without the need to resubmit a new plan.

Subdivision (f)(1)(C)(vi):

Allow a longer period of time, (60 days), for the operator to submit the final source test report. This is to reflect the fact that the reports for third-party source tests may take longer than the proposed 45 days to be completed, reviewed and approved by the facility, and then forwarded to the District.

Subdivision (f)(1)(C)(vii)

The District should confirm whether having a mechanical lift available for access is acceptable, or if the standard for access is limited to a permanent platform only.

Inspection and Monitoring (I&M) Plan Compliance

In Subparagraph (f)(1)(D), the District is proposing to require that a formal I&M plan be developed by each facility for units not equipped with a CEMS. Language must be added to the rule to protect the regulated community from unnecessary delays in processing I&M plans. This is critical since these plans will be, by their very nature, enforcement mechanisms and many of the affected engines are located at Title V facilities subject to citizen enforcement. As such, we propose that language should be added to Section D along these lines:

> "The District shall provide the applicant with a written determination approving or denying the I&M plan within 30 days. A denial of the plan will detail the specific reasons for the denial so that the applicant can address them. The District shall not enforce provisions of the rule or the I&M plan until it has approved an I&M plan in writing."

Subdivision (f)(1)(D)(i):

The demonstration project conducted to support Rule 1110.2 development showed that much more work is needed to understand the correlation between NSCR rich burn engine operating parameters and compliance. Yet, the proposed rule presumes that fixed ranges can be established for the parameters that assure compliance. Through the demonstration project, and other activities, it has been shown that parameter monitoring is not sufficient for compliance determination with an NSCR system operating at the low levels mandated by the SCAQMD:

1. Engine load
   Engine load is a useful parameter to use when developing correlations, but it is unnecessary to monitor on an on-going basis if the AFR control system does not use it for control purposes. Load is not always easy to measure, so load surrogates are often used such as fuel flow, air manifold pressure, engine speed, etc., as cite conditions warrant.

2. Oxygen sensor voltage or equivalency ratio (phi)
   The demonstration test showed that the oxygen sensor output drifts as it ages. Therefore, it doesn't add any benefit to a monitoring system to know that its value is within a specific range. Also, establishing a specific range would defeat the purpose of some controllers that make automatic adjustments to the set point.

3. Catalyst inlet and outlet temperature, and the temperature rise
   Although the demonstration projects showed some promise in the correlation between change in the temperature rise and compliance, complex engine mapping and algorithm development would be needed to implement it. Even then, there is no guarantee it would work on all engines.

Therefore, SEU recommends that the District adopt the recommendation of the Task 2 Demonstration Project results by requiring that the I&M plan include monitoring of the parameters that are already available to the operator. This simple task itself is something that has not been required in the past, but will greatly improve compliance assurance by detecting AFR controller problems. For example, it would be reasonable to require the monitoring of catalyst inlet temperature. EPA NESHAP requirements specify a 750 – 1250°F range to assure catalyst reactions, yet not high enough to cause damage. Lower temperatures would be acceptable if testing shows compliance. If the AFR controller is equipped with alarms, they should also be monitored.

This section needs to clearly specify the differences between rich and lean burn engines. Lean burn engines do not require the oxygen sensor based controller, and not all lean burn engines are equipped with SCR. I&M for lean burn engines without SCR should be developed on a case-by-case basis.

Subparagraph (f)(1)(D)(ii):

The District is asking operators to establish malfunction indicating systems that should be developed by manufacturers. This requirement should be removed from the rule until such technology is available.

Subdivision (f)(1)(D)(iii):

SEU agrees that periodic checks with portable analyzers are currently needed to ensure compliance with emission permit limits. However, considering that the new rule also adds biennial compliance testing, portable analyzer checks when oxygen sensors are replaced, and frequent inspections of operating parameters as described in (f)(1)(D)(i), it is particularly burdensome and expensive to require portable analyzer checks on a weekly basis. (In Task 1 of the Engine Demonstrations Project, SCEC conducted weekly emissions checks with a portable analyzer for 3 months on six engines at a cost of approximately $42,000.) In a short period of time, the District has already observed a large improvement in engine compliance during audits. Weekly testing is not needed to drive the progress that the District is seeking. SEU recommends monthly as a minimum monitoring frequency. Monthly monitoring, coupled with the more frequent checks of operating conditions, is sufficient to force operators to pay closer attention to engine and control system operation to reasonably assure compliance. Moreover, SEU would like the District to add greater flexibility in this monitoring provision that will provide an incentive to operators to invest in improved technology as it enters the market. Proven engine/control systems should be allowed quarterly monitoring with portable analyzers after demonstrating this level of compliance. A quarterly monitoring schedule would also be in accordance with CARB guidelines. For example, SEU has recently tested new AFRC technology that has demonstrated excellent emissions control over several months, which would benefit from a

quarterly inspection schedule. (Gill Controller testing at Casa Dorinda –data provided to SCAQMD). Therefore, SEU recommends that this Subdivision be revised as follows:

> "Procedures for at least monthly or every 720 engine operating hours, whichever occurs later, emissions checks by a portable NOx, CO and oxygen analyzer. If an engine is in compliance for three consecutive emission checks, without any manual adjustments to the oxygen sensor set points, then the engine may be checked quarterly or every 2250 hours, whichever occurs later, until there is a noncompliant emission check or the oxygen sensor is replaced…."

Note that the word "manual" has been inserted above since some AFR controllers automatically adjust the oxygen sensor set-point.

Also, it is not necessary to include NO2 measurement on rich burn engines with Non-Selective Catalytic Reduction (NSCR) systems since there is very little NO2 in the exhaust. Operators of rich burn engines should be allowed to use lower cost portable monitors that do not include NO2 measurement.

Daily Monitoring Subdivision (f)(1)(D)(iv):

Daily monitoring is not practical for unmanned facilities, especially those that are not equipped with remote monitoring capabilities. The rule should be revised to include provisions for unmanned stations so that inspections are made during normal, routine activity required for the engine or facility. Item (IV) should be removed from the list of parameters as our testing showed that AFR controllers deviating from their set point are not the problem. See comments for (f)(1)(D)(i).

Subdivision (f)(1)(D)(vii):

It is not reasonable to expect an operator to fix / address engine non-compliance issues within 24 hours. The focus of monitoring activities should be to find ways to maintain compliance. SEU recommends that an operator be allowed 72 hours to fix non-compliant events. Suggested rule language is:

> "A portable NOx analyzer or any other method approved by the Control Officer shall be used to take NOx emission readings to determine compliance with permit limits during time periods in which a source test is not performed. An instrument reading in excess of the emission compliance values shall not be considered a violation of this rule, so long as the problem is corrected and a follow-up inspection is conducted within 72 hours of the initial inspection. The instrument readings for each parameter identified in the inspection plan, a description of the corrective actions taken, a determination of whether or not the engine is in compliance, and the initials of the person recording the measurement shall be recorded on an inspection log."

Subparagraph (h)(12)

While most engine startups are accomplished in a 15 minute period, SEU is concerned that is this will not always be possible. Operating conditions, and particularly natural gas pipeline pressures, may result in a longer period of time to reach loaded conditions. Larger engines may also need longer to warm up before being loaded. A 30 minute period would be more appropriate.

Portable Monitoring Protocol

SEU recommends that portable analyzer manufacturers be consulted to verify that the technical requirements of the protocol are appropriate. Of particular concern is the fact that CTM-030 is dated; it is our understanding that the stability check and linearity checks are no longer considered necessary.

The protocol should clearly state that an NO2 cell is not needed when testing rich burn engines which will allow the use of lower cost portable analyzers for rich burn engines.

For low level measurements, the span gas calibration range specified in Section 3.1 is not practical. For example, if the NO measurement was 1 ppm, the protocol as written would require a span gas between 0.25 and 1.5 ppm. As an alternative, the protocol should also allow the use of a gas that accurately verifies compliance. For example, when measuring exhaust on a rich burn engine, a 40 ppm NO gas is right at the raw equivalent of the 11 ppm limit. This is in agreement with earlier correspondences with Testo which indicated that the low level linearity of their cells would be adequate to make lower level measurements.

Section 7 should be deleted because breakdown compliance should be covered in Rule(s) rather than a test protocol.