

# SCIENTIFIC REVIEW COMMITTEE MEETING

September 23, 2004

## MEETING HIGHLIGHTS

### SRC Members

Todd Wong (represented by Larry  
Vettraino, by phone)

Stan Romelczyk (by phone)

Katy Wolf

Hal Taback (by phone)

William Dennison

Martin Ledwitz

Anoosheh Mostafaei

Philip Hodgets (absent)

Nahid Zoueshtiagh (represented by Joe  
Lapka, by phone)

Greg Adams

Ron Joseph (absent)

Karl Lany

Steve Simons

Ted Guth

Russell Greenhouse (absent)

Ronald Wilkness (absent)

### Attendees

Dave Hatfield (by phone)

Lance Green

Tracy Saville (by phone)

Carol Kaufman

Noel Muyco

Mark Abramowitz

Dennis Acton

Nick Nikkila

Todd O'Connor

Daniel McGivney

Keith Davidson

Viji Sadasivan

James Harber

Linda Arsenault

### AQMD Staff

Marty Kay

Howard Lange

Alfonso Baez

The handouts and audiotapes can be obtained through the Public Records Section of the Chief Prosecutor's Office. There may be a fee for this service.

Marty Kay welcomed the SRC members and the audience to the meeting. The topics listed below were discussed during the meeting.

- Minutes of July 22nd Meeting
- Responses to Comments from July 22nd Meeting
- New and Updated BACT - Part B Listings
- Proposed amendments to Part D (MSBACT) Guidelines
- Other Business

## Minutes of the July 22nd Meeting

A committee member had the following questions:

1. Page 3, last full paragraph, last sentence: "PM" did not make sense. Staff responded that it was an error and should be "VOC".
2. Page 5, first full paragraph of Setton Pistachio: the minutes suggested that a special type venturi carburetor is used in the Tecogen engine. An audience member clarified that it is not special, just a typical venturi carburetor.
3. Page 5, second paragraph under Setton Pistachio: does AQMD have a policy as to whether nameplate power or site-rated power should be used in calculating emissions in terms of g/bhp-hr?

**Discussion:** Staff responded that the BACT team encourages use of a ppm limit in permits, calculated from the BACT g/bhp-hr limit and the nameplate power rating of the engine; however, practices may vary among engineers issuing permits. An audience member asked whether this means that BACT for engines is trending toward ppm rather than g/bhp-hr. Staff responded that it is. A committee member suggested that it may be better to keep BACT in terms of g/bhp-hr and continue to compute ppm limits based on engine power rating in each case.

4. Page 6, under "New MSBACT for Distributed Generation": public comments have not yet appeared in the BACT Docket on AQMD's web site. Staff responded that the comments are there, under "Distributed Generation".

*(Greg Adams, Los Angeles County Sanitation Districts; Marty Kay, AQMD; Karl Lany, SCEC; Howard Lange, AQMD)*

## Responses to Comments from the July 22nd Meeting

Staff stated that changes in the listings presented at the July 22nd meeting that had been agreed upon at the meeting, as well as any agreed-upon changes in the minutes from the

prior meeting, had been made. Committee and audience members were advised that they could check the listings and minutes as posted on AQMD's web site.

Staff was to report back on the following items:

1. Regarding the process heater used for hydrogen production at the Chevron refinery (A/N 411357), which had been presented at the May meeting, discussion about the ammonia analyzer had continued at the July meeting, and committee members had asked what certification criteria in 40CFR60, Appendices B and F the analyzer could pass. Staff reported that the vendor, Analytical Specialties, had not yet certified any of its products because some procedures called for in Appendices B and F cannot be accomplished for this type (cross-stack) analyzer. However, U.S. EPA has now developed a draft performance specification for ammonia analyzers. AQMD's Monitoring & Source Test Engineering group is reviewing that document as well as other information and is now formulating QA/QC policy to address the Analytical Specialties ammonia analyzer.
2. Regarding the I.C. Engines operated by NEO California Power for peaking power (Tehama County Permit No. 220), which were originally presented to Committee in September 2003, discussion had continued at the July meeting, and committee members had asked staff to obtain information on the amount of operation that those engines have seen and whether there is a lube oil specification. Staff reported operation hours as of September 21. Engine No.1, which operates most, had operated 5571 hours, and operating hours on the other 8 engines ranged from 2952 to 4741 hours. There is no lube oil specification, and NEO reported that lab tests have shown that the lube oil is not causing catalyst performance to degrade. NEO has performed general maintenance on the engines and SCR system, and NOx levels as measured in the last quarterly portable analyzer check are now more comfortably below the 9 ppm limit. However, they have ordered replacement catalyst ahead of schedule (the SCR vendor estimated 6000-8000 hours adequate performance before cleaning) and are now formulating a catalyst cleaning/rotation/replacement strategy.
3. Regarding the I.C. Engine operated by Tidelands Oil (A/N 405789), a committee member had asked whether the engine really operates at or near full load all the time. Staff reported that it does operate essentially all the time. The oil field produces approximately 95% water, which is pumped back into the field. Staff had also been asked to find out whether the facility is possibly desulfurizing the field gas well below the 40 ppm maximum required by Rule 431.1. Staff reported that the facility does desulfurize the field gas down to approximately 10 ppm.
4. Regarding the I.C. engines located at Setton Pistachio (San Joaquin Valley Unified APCD A/N S-512-24-0), a committee member had asked how much operation those engines have seen. Staff reported that, as of September 16, the "north" engine had operated 6520 hours (53% on-line factor) at an average load of 69 kW, and the "south" engine had operated 7200 hours (59% on-line factor) at an average load of 70 kW. Staff had also been asked to verify that the permit requires testing only every two years as opposed to requiring annual testing until

two successive tests are passed. Staff reported that the permit simply requires testing every two years.

*(Howard Lange, AQMD)*

## New Listings in Part B, Section I: AQMD LAER/BACT Determinations

### **Dryer or Oven—Sargent Fletcher, A/N 413559**

This is a direct-fired makeup air heater for a spray booth. Air drawn through the booth is heated to a desired temperature for what is occurring in the booth—either application or curing of coating material. The maximum working temperature in the booth is 130F. The NO<sub>x</sub> limit is 30 ppmvd@3%O<sub>2</sub>, which is NO<sub>x</sub> BACT for an oven. Coating is applied by manually by a person working in the booth, and the air heater must therefore meet an ANSI requirement of 5 ppmvd CO (uncorrected).

Although permits for direct-fired air heaters have been issued in the past, this is the first case in which compliance with the 30 ppm NO<sub>x</sub> limit was clearly demonstrated in a source test. The low-NO<sub>x</sub> burner that was used also met the 5 ppm CO ANSI limit.  
*(Howard Lange, AQMD)*

**Discussion:** A committee member pointed out that (1) utilization of this low-NO<sub>x</sub> technology in other applications may be limited by the turndown capability of the burner and (2) determination of the corrected NO<sub>x</sub> level in a source test is difficult in low-temperature cases because of the high O<sub>2</sub> level in the flue. Staff responded that BACT is always a case-by-case determination, and the burner would not be required if it could not meet the requirements of the application. Staff agreed that it is more difficult to determine the corrected NO<sub>x</sub> in low-temperature cases. *(Bill Dennison, Dennison & Associates; Marty Kay, AQMD)*

### **Catalyst Regeneration, Fluidized Catalytic Cracking Unit—BP West Coast Products, A/N 397357**

This is an application of SCR downstream of a fluidized catalytic cracking unit (FCCU) catalyst regenerator. The FCCU is present in virtually all refineries to convert hydrocarbons to forms more amenable to production of gasoline. The catalyst becomes coked in this process, and the regenerator burns off the coke. Gas from the regenerator passes through a waste heat boiler and then through parallel electrostatic precipitators (ESPs) to remove catalyst fines. Ammonia is injected upstream of the ESPs to condition the ash. Vent gas from this process contains NO<sub>x</sub> and ammonia. Addition of SCR downstream of the ESPs enables combination of ammonia and NO<sub>x</sub> to produce water and nitrogen thus reducing emissions of both pollutants.

In addition to being a second example of SCR application to FCCU regenerator outlet gas (the first such application was at ExxonMobil [September 2003 SRC meeting]), this case establishes new BACT for ammonia emissions from a FCCU. The BACT determination for ammonia was 10 ppmvd@0%O<sub>2</sub>. Limits on NO<sub>x</sub>, SO<sub>x</sub> and CO are to be negotiated

with U.S. EPA as part of a settlement between U.S. EPA and the refinery. The SCR was source tested in December 2003, including ammonia, and additional ammonia tests were performed in December 2003, February 2004 and May 2004. All tests have shown compliance. The catalyst bed is plugging more rapidly than expected, and it now appears that it will have to be cleaned annually. The original exhaust stacks from the ESPs have been retained and can be used to bypass the SCR. The facility was granted a permit modification so that the SCR may be bypassed upon notification of AQMD. The SCR was bypassed June through August 2004. It is to be hoped that cleanouts will not require this much time in the future.

The facility experiences difficulty in meeting the ammonia limit at times because of lower than expected NO<sub>x</sub> levels in the regenerator outlet gas. NO<sub>x</sub> levels are about 40 ppm as opposed to 155 ppm design. This causes levels of unreacted ammonia to be higher than expected. The lower NO<sub>x</sub> levels resulted from introduction of NO<sub>x</sub> reduction technology in the regenerator, which was part of the settlement with U.S. EPA and apparently worked better than expected. At times, the facility must purposely increase the NO<sub>x</sub> level in the regenerator outlet gas to maintain the ammonia level at the SCR outlet within the 10 ppm limit. (*Howard Lange, AQMD*)

**Discussion:** A committee member noted that the listing mentioned difficulty in simultaneously meeting both the PM and ammonia limits and asked whether the PM emissions had increased. Staff responded that the facility had not indicated any increase in PM emissions but had pointed out that amounts of ammonia needed for PM control tended to cause ammonia slip to exceed the permit limit unless NO<sub>x</sub> in the regenerator outlet gas is deliberately increased. Staff also noted that Rule 1105.1 requires that, starting December 31, 2006, FCCU emissions of ammonia not exceed 10 ppmvd@3% O<sub>2</sub> and also limits PM emissions.

A committee member asked whether the source test results were actually reported at 3% O<sub>2</sub> as stated in the listing even though the permit limits are in terms of concentrations corrected to 0% O<sub>2</sub>. Staff confirmed that this was indeed the case.

(*Bill Dennison, Dennison & Associates; Greg Adams, Los Angeles County Sanitation Districts; Howard Lange, AQMD; Marty Kay, AQMD*)

### **Fugitive Emission Sources—Chevron Products, A/N 388982**

This is a gas recovery system that recovers gas from process vents in a refinery and routes these gases to the refinery fuel gas system. These vent gases had normally been flared. The gas recovery system is connected to a flare, and gas bypasses to the flare in the event of a major emergency release. Recovered vent gases are treated for sulfur removal before entering the fuel gas system. Gas sent to flares in the refinery are not required to be desulfurized, so the gas recovery system reduces SO<sub>x</sub> as well as VOC emissions. The gas recovery system has reduced the amount of gas burned in this flare by an average of 1.8 MSCFD, which is a 98% reduction. (*Marty Kay, AQMD; Howard Lange, AQMD*)

### **Gas Turbine, Simple Cycle—PPL Wallingford, A/N 189-0195**

Because important new information was received shortly before the meeting, this item was deferred to the next meeting. (*Marty Kay, AQMD*)

## New Listings in Part B, Section II: Other LAER/BACT Determinations

### I.C. Engine, Landfill Gas Fired—MM Tajiguas Energy, A/N 9788

This is a merchant power plant located on a landfill and consisting of one 4231 hp lean-burn engine driving a generator. The permit was issued by San Joaquin Valley Unified APCD. NO<sub>x</sub> is limited to 108 ppmvd@3%O<sub>2</sub> and either 0.149 lb/MMBtu or 0.53 g/bhp-hr. The 0.53 g/bhp-hr limit is consistent with the ppm limit and an engine HHV efficiency of about 31%, which was determined as part of source testing. The engine specification sheet shows a 35% HHV efficiency. VOC is limited to 20 ppmvd@3%O<sub>2</sub> as hexane and either .061 lb/MMBtu or 0.216 g/bhp-hr. The .061 lb/MMBtu limit does not seem to be consistent with the ppm limit. The permit also limits fuel sulfur to 50 ppm as H<sub>2</sub>S and PM<sub>10</sub> to .066 g/bhp-hr. Another permit condition is that the engine must not operate below 90% rated power. AQMD BACT guidelines for NO<sub>x</sub> and VOC for this equipment category are 0.6 g/bhp-hr and 0.8 g/bhp-hr, respectively. There have been two annual source tests, both of which showed compliance. It is noted in the listing that engines capable of meeting these NO<sub>x</sub> and VOC limits may not be available in all sizes. (*Howard Lange, AQMD; Marty Kay, AQMD*)

**Discussion:** Two committee members noted that engine manufacturers can probably guarantee about 0.5 g/bhp-hr NO<sub>x</sub> for operation on landfill gas.

An audience member asked what NO<sub>x</sub> limit current AQMD rules require for this type of equipment. Staff responded that Rule 1110.2 requires 36 ppmvd@15%O<sub>2</sub>, which is the same as 108 ppmvd@3%O<sub>2</sub>, multiplied by engine HHV % efficiency divided by 25, and BACT requires 0.6 g/bhp-hr. Rule 1110.2 may be the basis for the 108 ppm NO<sub>x</sub> limit in the permit, but should have been multiplied by the efficiency ratio.

A committee member asked whether the engine can be partially fueled on natural gas when needed to maintain operation at or above 90% full power. Staff responded that there is no mention of natural gas in the permit.

A committee member asked whether SCR has been tried on engines of this type. An audience member commented that landfill gases contain siloxanes, which generally poison catalysts. Staff noted that NO<sub>x</sub> reduction using cyanuric acid was being developed for application to engines. A committee member commented that Southern California Edison tried this technology on a diesel engine at Pebbly Beach and found it to be more costly than SCR.

A committee member asked what is the difference between U.S. EPA Method 25.3 and AQMD Method 25.3. Staff present were not able to answer that question.

(*Bill Dennison, Dennison & Associates; Karl Lany, SCEC; Keith Davidson, Tecogen; Stan Romelczyk, San Diego APCD; Greg Adams, Los Angeles County Sanitation Districts; Marty Kay, AQMD; Howard Lange, AQMD*)

## Flare, Landfill Gas from Non-Hazardous Waste Landfill—NEO Tajiguas, A/N 9788

This is an enclosed ground flare with a hexagonal ring type burner, as typically used on landfills. It is under the same permit as the landfill gas fired engine discussed previously, but has a different owner. This flare also has a smaller, ring type burner. The flare operates in either a high-flow or a low-flow mode. The low-flow mode is the normal case, with the engine operating, and the high-flow mode is used when the engine is not operating. The low-flow mode (up to 8.19 MMBtu/hr) uses the ring burner only, and the high-flow mode (up to 62.8 MMBtu/hr) uses both burners.

NO<sub>x</sub> and VOC limits are 35 and 15 ppmvd@3%O<sub>2</sub>, respectively, with VOC being expressed as hexane. The NO<sub>x</sub> and VOC limits in this LAER/BACT determination are more stringent than AQMD's requirements for this equipment category, which are .06 lb/MMBtu for NO<sub>x</sub> (BACT Guidelines, Part B, Lopez Canyon) and 98% removal or 20 ppmvd@3%O<sub>2</sub> as hexane for VOC (Rule 1150.1). There have been two annual source tests, both showing compliance. (*Howard Lange, AQMD*)

**Discussion:** A committee member asked whether PM had been included in the source test. Staff responded that it was not. The committee member noted that the PM limit was included in the BACT determination and suggested that it may not properly be part of the BACT determination. Staff responded that this is a Section II listing and simply documents San Joaquin Valley Unified APCD's LAER/BACT determination.

Staff commented that the source test data show that the engine produces higher emissions of NO<sub>x</sub>, CO and hydrocarbons than the flare; however, the engine produces power whereas the flare does not. A committee member commented that comparisons between flares at different landfills and between engines and flares at the same landfill may not be totally valid since landfill gas Btu content is affected by how much of the gas is drawn from the core versus the boundary of the landfill. Engines tend to be supplied mainly on core gas whereas flares may at times be drawing a lot of boundary gas.

A committee member asked what was the height of this flare. Staff did not have that information.

(*Greg Adams, Los Angeles County Sanitation Districts; Bill Dennison, Dennison & Associates; Howard Lange, AQMD; Marty Kay, AQMD*)

## Proposed Update of Part D, Guidelines for Non-Major Polluting Facilities (MSBACT)

### I.C. Engine, Stationary

Staff proposed updating the PM<sub>10</sub> guidelines to add compliance with Rule 1470. Rule 1470 is a new rule that implements CARB's Air Toxics Control Measure (ATCM) for reduction of diesel particulate emissions. Since the rule limits the number of hours per year allowed for maintenance and testing of emergency diesel engines to less than 50 in some cases, a footnote in the guideline stating that 50 hours per year is normally allowed

will be altered by adding “or less if required by Rule 1470”. Also, the definition of testing in the footnote was to be clarified to include compliance testing. (*Marty Kay, AQMD*)

**Discussion:** A committee member noted that some parts of the rule do not take effect until future dates. Staff responded that the intent is to simply have the BACT guidelines require compliance with the rule, including whatever effective dates are included in the rule.

An audience member asked why compliance with the rule is required for non-emergency engines. Staff responded that in some cases non-emergency engines are allowed to use diesel fuel.

Several committee members and one audience member were of the opinion that compliance testing should not be included in the maintenance and testing hours. Staff responded that it would check this point and change the wording if necessary.

(*Bill Dennison, Dennison & Associates; Karl Lany, SCEC; Martin Ledwitz, Southern California Edison Co.; Dan McGivney, Eastern Municipal Water District, Marty Kay, AQMD*)

### **Gas Turbine, Natural Gas Fired**

The NO<sub>x</sub> guideline for gas turbines rated at  $\geq 3$  MW<sub>e</sub> and  $< 50$  MW<sub>e</sub> is 2.5 ppm multiplied by the % HHV efficiency divided by 34, and staff had been asked whether the efficiency ratio multiplier was intended only to benefit gas turbines with  $> 34\%$  efficiency (higher NO<sub>x</sub> limit allowed) or could also penalize less efficient turbines (lower NO<sub>x</sub> limit required). Staff had checked the staff report in which the efficiency ratio multiplier was first introduced and had determined that the multiplier was intended only to benefit more efficient turbines and not to penalize less efficient turbines. Staff therefore proposed that a footnote be added to the guideline to clarify this point.

**Discussion:** A committee member noted that in the NO<sub>x</sub> guideline for gas turbines rated  $\geq 50$  MW<sub>e</sub> the NO<sub>x</sub> limit is simply multiplied by efficiency, which appears incorrect. Staff agreed that there should be a divisor and will look into this and make the correction. Another committee member commented that he thought the “1990” adoption date of the NO<sub>x</sub> guideline for “Gas Turbine, Landfill or Digester Gas Fired” was incorrect. His recollection was that that guideline had been adopted more recently than 1990. He said he would check his records on this. (*Bill Dennison, Dennison & Associates; Greg Adams, Los Angeles County Sanitation Districts; Marty Kay, AQMD*)

### **Proposed MSBACT Guideline for Distributed Generation**

Staff stated that a status report on the MSBACT proposal for distributed generation (DG) that had been distributed a week earlier was now out of date. At the time that the status report had been written, the AQMD planned to evaluate the capability of I.C. engines to comply with an intermediate NO<sub>x</sub> emission standard of 5 ppm. However, the AQMD had since decided to go back to the original proposal of requiring the CARB 2007 DG standards. That decision was based on the high incidence of non-compliance that has been found, using portable analyzer checks, in the AQMD’s population of I.C. engines. Staff noted that the technologies that meet the 2007 standards are inherently low-emitting

and do not tend to have high-emission episodes whereas I.C. engines are prone to drifting into extremely high-emission modes. Staff stated that additional written information will be submitted to the committee for the November meeting, and the subject can be discussed further at that time.

**Discussion:** An audience member asked whether CARB has set a target date for setting standards for DG equipment requiring a district permit. Staff responded that CARB does not set BACT but does provide guidance for what BACT should be. CARB is now updating their DG BACT guidance. No date has been set; they are trying to complete it as soon as possible.

The audience member asked about the test program being performed by Tecogen. Staff responded that the main significance of that program now will be to provide information on how engines can better comply with the existing I.C. engine BACT.

The audience member commented that DG engines generally operate at fairly constant load whereas pump engines, etc. are more load-following and AQMD's finding that most engines are out of compliance might be based on a sampling of mostly non-DG engines. Staff responded that both types have been tested. At least half have been engines driving generators, and their compliance rate is no better than average. The audience member asked whether most of the DG engines tested were relatively small. Staff answered that they were. The audience member commented that smaller generators are more affected by load changes than larger generators. Staff responded that non-compliance was observed for both constant load and load-following generators.

A committee member asked whether the AQMD felt that it had sampled a sufficient variety of engine makes and models. Staff responded that the program has surveyed virtually every engine make. Another committee member commented that the AQMD's conclusion that sufficiently low emissions cannot be achieved on engines should really be that engine emissions aren't monitored closely enough, and engine emissions actually can be very low if the emissions are closely watched and all parameters are kept in adjustment. Staff responded that this may be true but it hasn't been demonstrated to the AQMD's satisfaction. The first committee member commented that the AQMD should address the problem of engine noncompliance via rulemaking rather than via BACT since rulemaking gets more public scrutiny. Staff responded that the AQMD's procedure for changing BACT does involve a lot of public scrutiny.

An audience member commented that the current compliance strategy for I.C. engines seems to be inadequate and needs updating. The audience member asked whether the current DG BACT proposal would allow engines to be permitted for DG if they can meet the CARB 2007 standards or simply would not allow engines to be used for DG. Staff responded that the proposed DG BACT would allow engines to be permitted for DG if the applicant can convince the AQMD that the engine can meet the standards on a continuous, reliable basis, which may require continuous emission monitoring. A committee member commented that he had understood that the purpose of the test program to be undertaken by Tecogen was to demonstrate that an engine could achieve the standards on a continuous basis. Staff responded that the purpose of that test was to demonstrate an intermediate NOx limit, not as stringent as the CARB 2007 standards, and the AQMD does not have confidence that it will be continuously met. The

committee member responded that determining whether the limit can be continuously met is the purpose of the test. Staff responded that continuous compliance cannot be proven without continuous emission monitoring and, while the test program may provide good information for engines in general, it will not be sufficient to provide a basis for new BACT.

An audience member asked whether the AQMD was returning to the March 25 proposal or the May 19 revision of the proposal. Staff responded that it was returning to what was discussed at the May 19 meeting. The audience member asked whether it is still considered a draft white paper or is now a draft rule. Staff responded that it is still a draft white paper, which will become a staff report to go to the board probably in December and be discussed probably at the November SRC meeting. The audience member asked when it would be heard by the Stationary Source Committee. Staff responded probably November. The audience member asked whether the matter can go to the Stationary Source Committee before having been discussed again by the SRC. Staff responded that it can.

An audience member asked whether the proposed DG BACT emission limits could be relaxed if the applicant agrees to have continuous emission monitoring. Staff responded that BACT limits cannot be relaxed in exchange for continuous emission monitoring. The audience member commented that BACT limits also cannot be unachievable. Staff responded that the proposed DG BACT limits can be achieved by some types of DG equipment. The audience member responded that there are some DG applications for which there is no technology that can meet the proposed limits. Staff responded that DG is not a necessity for any facility, and purchase of power from the grid is always an option.

A committee member asked whether the BACT Team is sending anyone to the October 22 meeting of the CARB DG technology workgroup. Staff responded that it monitored the previous meetings and will also monitor the October meeting.

*(Dan McGivney, Eastern Municipal Water District; Karl Lany, SCEC; Steve Simons, Southern California Gas Company; Keith Davidson, Tecogen; Greg Adams, Los Angeles County Sanitation Districts, Marty Kay, AQMD)*

## Other Business

Marty Kay thanked all attendees for their participation.

There was no further discussion, and the meeting was closed.