

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460
JUN 8 1992

OFFICE OF
AIR AND RADIATION

MEMORANDUM

SUBJECT: Response to Request for Guidance Concerning Installation of
Nitrogen Oxides Continuous Emissions Monitoring Systems

FROM: John B. Rasnic, Director
Stationary Source Compliance Division (EN-341W)
Office of Air Quality Planning and Standards

TO: Jehuda Menczel, Chief
New Jersey/Caribbean Section
Region II

This memorandum is in response to your memorandum of April 9, 1992 to Sally Mitoff, Chief, Policy and Guidance Section of the Stationary Source Compliance Division (SSCD). Your memo requests guidance regarding whether the application of a Continuous Emissions Monitoring System (CEMS) for nitrogen oxides (NO_x), sulfur dioxide (SO₂), flue gas flow rate, temperature, and moisture content has been demonstrated or is technically feasible when used with an internal combustion engine (ICE).

Eli Lilly, the source, claims that no NO_x monitor has been successfully installed and operated on an ICE, and you have asked SSCD to identify locations of similar units. Also, Eli Lilly claims that the cost of installing the CEMS would be prohibitive, and you have asked SSCD to provide cost estimates. Zofia Kosim, of the Inorganic Chemicals Section, researched these issues and has found the following:

Using CEMS for oil fired ICEs is technically feasible;

Sources in Hawaii and Iowa utilize NO_x CEMS on ICEs; and

Kilkelly Environmental Associates determined that the capital cost of SO₂, NO_x, O₂, volumetric flow, and opacity CEMS for a small diesel utility unit is \$119,000, with an annual operation and maintenance cost of \$30,000. For NO_x and O₂, the capital cost for CEMS is \$62,500 and the annual operation and maintenance cost is \$15,000.

These findings are contained in the attached memorandum dated April 17, 1992 from Zofia Kosim to Barrett Parker.

We also recognize that the memorandum from Zofia Kosim raised a Prevention of Significant Deterioration (PSD) issue that has already been addressed in a previous enforcement action. As Clara Poffenberger of SSCD discussed with Steve Riva of Region II, EPA policy with regard to modifying a permit due to errors made in the original permit requires evaluation of the source's ability to meet the limit within the Best Available Control Technology (BACT) strategy (see November 19, 1987 memorandum, also attached, from Gary McCutchen and Michael Trutna to J. David Sullivan, Request for Determination on Best Available Control Technology Issues -- Ogden Martin Tulsa Municipal Waste Incinerator Facility). The policy does not require current BACT to be applied where an error was made despite good faith representations. The policy does state that if a revision of the permit is determined to be appropriate, the revision must also address all other PSD requirements which may be affected by an allowable increase in permitted or newly regulated emissions.

Your April 9, 1992 memo incorrectly states that a revision that involves a less than significant increase would qualify as a "minor modification". Any time a permit limit founded in BACT is being considered for revision, a corresponding reevaluation of the original BACT determination is necessary. This re-evaluation is necessary even if the permit limit is exceeded by less than a "significant" amount. The significance levels in the PSD regulations define applicability cutoffs and are not to be used when evaluating source compliance with PSD permit limits. As a result of the discussions with Steve Riva, we understand that all policy requirements were fulfilled in conjunction with the activities performed to develop a previous enforcement action.

If there are questions regarding these issues, please contact Scott Nelson of my staff at (703) 308-8707.

cc: Fred Porter, ESD
Steve Hoover, SSCD
Zofia Kosim, SSCD
Paul Reinerman, SSCD
Pat Foley, Region II
David Solomon, AQMD
Gary McCutchen, AQMD

Attachments (2)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711
NOV 19 1987

MEMORANDUM

SUBJECT: Request for Determination on Best Available Control Technology
(BACT) Issues--Ogden Martin Tulsa Municipal Waste Incinerator Facility

FROM: Gary McCutchen, Chief
New Source Review Section, SIB, CPDD (MD-15)

Michael Trutna, Chief
Air Toxics Program Section, SIB, CPDD (MD-15)

TO: J. David Sullivan, Chief
ALO Enforcement Section, Region VI (6T-EA)

This is in response to your October 20, 1987, memorandum requesting assistance in clarifying BACT issues for a modification to the existing prevention of significant deterioration (PSD) permit for the Ogden Martin Tulsa municipal waste incineration facility.

As you are aware, no final Agency policy exists as yet on the more general issue of PSD permit modifications regardless of the status of the source (operating, under construction, etc.) or of the type or magnitude of the change requested. However, we currently plan to have a permit modifications package available by the end of this fiscal year. It will more comprehensively address the issue of permit modifications, including the group of issues dealing with BACT. In the interim, this memorandum addresses only BACT changes for this source and operating sources in similar situations.

First and most important, the source and permitting agency must understand that the source is obligated to meet all applicable permit conditions. Conditions in the existing permit remain in effect and are enforceable until such time as relief may be granted (as in the case of a revised permit being issued). Accordingly, it is important to recognize that enforcement actions have and will serve as the primary mechanism in ensuring compliance. The BACT guidance described in this memorandum is applicable only if EPA finds that the BACT determination in the original permit is inappropriate. Any questions on what constitutes appropriate grounds for enforcement actions should be referred to Rich Biondi, Stationary Source Compliance Division.

The information that you have submitted indicates that on December 23, 1982, a PSD permit was issued for the construction and operation of three municipal waste incinerator/boiler units, each rated at 230 tons per day of municipal waste. Prior to construction, in February 1984 and again in May 1984, permit modifications were issued to the source resulting in a final permit for the construction of two 375 tons per day incinerator units. The units were constructed in conformity with the modified permit and subjected to compliance testing in 1986. Measured nitrogen oxides (NO_x), sulfuric acid mist (H₂SO₄) and mercury emissions exceed the permit limit by a "significant" amount as defined in 40 CFR 52.21(b)(23)(i). The source has requested that the permit be revised to reflect the actual measured emissions of these pollutants.

You have requested a determination on whether the exceedance of permitted emissions by "significant" amounts, or the determination of a new "significant" pollutant by performance testing triggers the reopening of the BACT review process for the Ogden Martin facility. If BACT review is reopened, which pollutant(s) would be subject, to what degree should the limitations and economics of the existing facility come into play, and would the June 26, 1987, "Operational Guidance on Control Technology for New and Modified Waste Combustors" apply to this facility?

Based on the information presented, this response assumes that errors, faulty data, or incorrect assumptions contained in the original or modified permit applications have resulted in what may be inappropriate BACT emission levels and unpermitted significant emissions, and there is no indication that the applicant intentionally acted to misrepresent or conceal data in their original and modified permit applications and BACT analysis. This guidance does not apply to any other type of noncompliance scenario.

Any time a permit limit founded in BACT is being considered for revision, a corresponding reevaluation (or reopening) of the original BACT determination is necessary. This is necessary even if the permit limit is exceeded by less than a "significant" amount. The significance levels in the PSD regulations define applicability cutoffs and are not to be used when evaluating source compliance with PSD permit limits.

As discussed above, and prior to any attempt to revise or readjust an existing BACT limit, the source has an initial obligation to comply with the permit. At a minimum the source should be required to investigate and report to the permitting agency all available options to reduce emissions to a lower (if not the permitted) level. If compliance with the permit can be reasonably achieved, the source should be required to take steps to reduce emissions. If sufficient emission reductions down to the permitted level cannot be reasonably achieved, then a reevaluation of the permit may be warranted. In the process of reevaluating BACT, current BACT technology and requirements must be considered. For municipal waste combustors, the June 26, 1987, "Operational Guidance on Control Technology for New or Modified Municipal Waste Combustors" would apply; however, in this case, where the source is already operating, certain retrofit costs and other costs associated with an already existing facility may be considered.

For H₂SO₄, if potential emissions cannot be reduced below the significance level, a PSD review is required and the results must be incorporated in the source's PSD permit. As with NO_x and mercury emissions, the BACT analysis considers current technology and requirements while weighing the additional retrofit costs and other costs associated with an already existing facility.

If a revision to the permit is determined to be appropriate, the revision must also address all other PSD requirements which may be affected by an allowable increase in permitted or newly regulated emissions (e.g., protection of the standards and increments, additional impacts, monitoring). The control of emissions of toxic air pollutants is an important aspect of PSD review. This memorandum does not address potential air toxics issues. Questions on those matters may be addressed to Mike Trutna at FTS 629-5345 or Kirt Cox at FTS 629-5399, of the Air Toxics Programs Section.

The revised permit, just like the initial permit, must also go through a public review period before it may be issued.

If you have any questions regarding this matter, please have your staff contact David Solomon of the New Source Review Section at 629-5375.

cc: Richard Biondi
Judith Katz
Greg Foote

Memorandum

Date: 04/17/92

Subject: NOX CEMS for Internal Combustion Engines at Eli Lilly

From: Zofia Kosim, SSCD

Through: Linda Lay, Section Chief, ICS

To: Barret Parker, Acting Section Chief
Guidance and Policy Section

I have received a copy of a request from Region II for guidance on a proposed PSD permit for Eli Lilly in Carolina, Puerto Rico. The Eli Lilly pharmaceutical plant has constructed a cogeneration facility providing electricity, steam, and hot water from two No.6 oil-fired internal combustion engines (ICES) rated at 2.2 MW and 2.8 MW. A PSD permit for the construction of the cogeneration facility was granted in 1986 and established an annual NOx emission limit at 306 tons.

Due to Eli Lilly's error in calculating NOx emissions, the NOx emissions limitations specified in the 1986 PSD permit were underestimated and the permit had to be revised and modified. The revised permit increases the amount of NOx emissions to 345 tons/year and requires installation and operation of continuous emission monitors (CEMS) for NOx, O2, and the flue gas flow rate.

In its comments on the proposed permit, Lilly claims that the use of these monitors is a cost-prohibitive, technically undemonstrated practice, and not feasible for this particular situation. Lilly also claims that no CEMS has been successfully installed and operated on a similar unit.

Region II has requested that SSCD identify other comparable cogeneration units firing the same or similar type of fuel that have installed and operated CEMS, as well as the costs of installation and operation of these CEMS.

To respond to the Region's II request, I checked the following sources of information:

AIRS.

Acid Rain Division data base.

Experience in Region IX.

California.

Hawaii.

Experience in Region VII. 2

Fred Porter of RTP.

According to Mark Antell, AIRS does not have any data on ICE.

The Acid Rain Division has limited data on CEMS for ICES. Kilkelly Environmental Associates (KEA) in their 1991 report estimate that the capital cost of CEMS for SO₂, NO_x, O₂, volumetric flow, and opacity for small diesel or dual-fuel electric utility units operating on the average 40 hr/year, range between \$98,000 and \$140,000. The annual operation and maintenance (O&M) costs for these units range from \$25,000 to 35,000, with a 15-year annualized cost of \$58,602. This cost estimate does not include the costs of certification tests. Since the Lilly's units will be used extensively, the O&M cost figures may be different. The KEA report does not indicate that the installation of NO_x, CEMS on internal combustion engines is impossible or overly difficult.

Steven Frey, an EPA CEMS coordinator for Region IX, indicated that California requires CEMS under a PSD review for units emitting more than 40 tons/year of NO_x, that internal combustion engines emit large quantities of NO_x (approximately 100 tons/year/1000 Hp), and that BACT should be able to reduce NO_x emissions by 80%.

Mike Cecconi from the South Coast Air Quality Management District, stated that internal combustion engines larger than 1000 Hp must install and operate NO_x, CEMS. Orange County will soon use NO_x CEMS on a sewage-gas-fired ICE. He also indicated that there may be a problem with the flue gas flow rate determination caused by the pulsations of the engine. It is possible that there may be no commercially available flow monitors for the pulsating flow of the flue gas. He suggested that EPA may recommend using a combination of NO_x, and O₂ concentrations (on the dry basis), fuel flow rate, and the F factor to calculate the flue gas flow rate.

Nolan Hirai of the Hawaii Department of Health, Clean Air Branch (CAB), indicated that there are two, #2 oil-fired units, 12.5 MW each, equipped with NO_x and O₂ (or CO₂) CEMS in the state. Both units must comply with Nox concentration limitations (expressed in ppm) as well as with hourly emission limitations. Mr. Hirai will send me a copy of a permit for these units.

Hawaii also has a small, 2 MW unit where CEMS were not required. The CAB issued a permit for that unit several years ago and the cost, not technical infeasibility, was the only reason for not requiring CEMS. Mr. Hirai indicated that if a similar unit applied for a PSD permit today, CAB would probably require installation and operation of CEMS.

Region VII, with many small ICEs, reports no ICE equipped with NO_x CEMS due to the high cost. Region VII controls NO_x emissions instead of monitoring them. To control NO_x, the Region requires using very advanced BACTs on ICEs (one ICE has installed and 3 operated Selective Catalytic Reduction). This approach may change, as Iowa has already issued a permit for two ICEs (2850 and 2700 Hp) located at a natural gas compressor station to install NO_x monitors. Jon Knodel, a Regional CEMS Coordinator, indicated the importance of the adequacy of the averaging time for CEMS due to the specifics of the ICE operation..

Fred Porter, an OAQPS regulatory expert, agreed that CEMS is technically feasible although costly for small ICEs. He also added that if the engine is used extensively, the cost of a monitor may be reasonable. Fred Porter suggested that monitoring of alternative parameters would suffice.

The review of the collected information indicates that:

Using CEMS for NO_x on oil-fired ICEs is technically feasible.

There are a few examples of NO_x CEMS on ICEs.

The high cost of NO_x CEMS becomes more reasonable when the ICE is used extensively.

The requirement of NO_x CEMS for Eli Lilly may also be justified by the proximity of the plant to the rain forest. Although the plant's arguments against the NO_x CEMS due to the high costs have some validity, the conditions of the modified PSD permit do not appear to be unreasonable.

I believe that the PSD permit should have required more stringent BACT (e.g., a higher fuel injection retard value, or even SCR) to prevent No_x, emissions rather than using costly CEMS to monitor the allowable emissions that are very high and only slightly controlled (mostly by restricting the fuel use). It appears, that the BACT that is already required in the permit should be capable of reducing the emission rate to less than the allowable 607 ppm. Also, modifying the permit to increase the allowable NO_x emissions may not have the most desirable impact on the environment. Pat Foley from Region II insisted that these issues are beyond his control at this moment and that the Region is anxious to issue the permit.

cc: Steven Hoover
Paul Reinermann
Scott Nelson
Fred Porter, RTP