

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV
345 COURTLAND STREET
ATLANTA, GEORGIA 30365

MEMORANDUM

DATE: November 14, 1988

SUBJECT: Request for Administrator to Initiate Review of PSD Permit for
Columbia Gulf Transmission Company, Clementsville Compressor Station,
Kentucky

FROM: Greer C. Tidwell
Regional Administrator

TO: Lee M. Thomas
Administrator

I am requesting that, pursuant to 40 C.F.R. §124.19, you review the Prevention of Significant Air Quality Deterioration (PSD) portion of the air pollution permit issued by the Commonwealth of Kentucky to Columbia Gulf Transmission Company (Columbia Gulf) for the construction of a stationary natural gas-fired turbine at Clementsville, Kentucky. The failure of the Kentucky Division for Air Quality (Division) to properly require best available control technology (BACT) for the nitrogen oxides (NO_x) emissions is the basis for reviewing the Division's actions in issuing the permit and for staying the effectiveness of the permit until all PSD requirements have been met. As explained below, if you agree that review of this permit pursuant to Section 124.19(b) is appropriate, you will have to notify the permittee by November 15, 1988, that you are initiating review of the PSD portion of the permit. Conversely, if you determine that it is more appropriate to initiate review under Section 124.19(a), it will, likewise, be necessary to serve copies of the appeal on the appropriate parties as identified below.

This permit was issued on October 13, 1988, by the Division under various authorities including EPA's PSD permitting authority, 40 C.F.R. §52.21, which has been delegated to the Division. The area in which the construction is contemplated is classified as attainment for all pollutants. My staff has concluded that the permit does not adequately control NO_x emissions under the applicable PSD regulations. The analysis of the NO_x control technology undertaken by the Division fails to demonstrate that the system selected would provide the best degree of emission control currently available.

The Delegation of PSD Authority to the Kentucky Division for Air Quality

EPA Region IV delegated PSD review authority to the Kentucky Division for Air Quality pursuant to 40 C.F.R. §52.21 on January 25, 1978, at 43 Federal Register 3361, as amended at 45 Federal Register 52741, August 7, 1980 (see 40 C.F.R. §52.931). (See Enclosure 6.)

Applicability of NOx Requirements to Columbia Gulf

Columbia Gulf's consultant, Entrix Inc., filed a permit application with the Division on or about May 26, 1988, requesting approval for the construction and installation of one 11,864 horsepower (8.9 MW) gas turbine at the Clementsville Compressor Station in Clementsville, Kentucky. Supplemental information was filed on June 13 and August 22, 1988. The existing facility consists of two turbine compressor sets, three emergency generator sets, two boilers, and seven gas compressors. The facility has the potential to emit NOx from these sources in the amount of 1583.22 tons per year (TPY). The primary uncontrolled pollutants emitted by the new unit would be 282.5 TPY of NOx, 7.4 TPY of unhalogenated hydrocarbons (UHC), and 2.9 TPY of CO. Therefore, the proposed construction constitutes a major modification for NOx emissions to an existing major source. See 40 C.F.R. §52.21(b). Clementsville is located in a county designated as attainment for all pollutants. See 40 C.F.R. §81.318. Therefore, the emissions of Nox are subject to review under the PSD regulations contained in 40 C.F.R. §52.21, authority for the implementation of which has been delegated to the Division by EPA, as set forth above.

BACT Emission Limit for NOx

The permit establishes an emission limit of 178 parts per million volume (ppmv) NOx when burning natural gas. This limitation is below the 196 ppmv NOx limit specified in the New Source Performance Standards (NSPS) Subpart GG limitations for turbines less than 30 MW; however, this limit is substantially less stringent than BACT limitations imposed in pending and existing PSD permits for other stationary turbines of approximately the same size, and that use the same type fuel. My staff has determined that BACT for this facility consists of water injection for NOx control to reduce emissions to about 0.2 lb NOx per mmBtu when burning natural gas. Such a reduction is normally achieved at a cost of about \$3,000-\$6,500 per ton of NOx removed.

The State BACT Analysis

The preliminary determination dated June 20, 1988, submitted by the Division to EPA during analyzed by Columbia Gulf:

1. Selective Catalytic Reduction (SCR)
2. Water Injection
3. Dry Controls

The Division rejected SCR because of temperature constraints and water injection because of increased CO emission, operating costs, and fuel consumption. The Division determined that dry controls represents BACT. "Dry controls," which Columbia Gulf proposed to use, merely means that the Solar turbines were designed in such a way to meet the minimum requirements of Subpart GG (which was promulgated almost 10 years ago). Since its promulgation, more efficient turbine designs, such as the Solar Mars turbine, have been developed, resulting in better combustion and lower Nox formation. Based on the degree of NOx reduction, however, "dry controls" should not be considered a "top" control option, but merely a more efficiently designed turbine.

Public Comment Period

By letter dated June 20, 1988, the Division notified EPA that a public notice announcing the commencement of the public comment period had been sent to the newspaper on June 13, 1988. Attached was a copy of the preliminary determination, modeling analysis, and a copy of the proposed permit (see Enclosure 1). The preliminary determination stated that BACT for the proposed turbine was the use of dry controls. EPA Region IV reviewed this material and provided comments to the Division on July 21, 1988 (see Enclosure 2). Region IV's primary concern was that BACT for the NO_x emissions had not properly been determined. Region IV stated that, in the absence of an acceptable technical or economic justification to the contrary, a valid BACT determination regarding NO_x emissions from this source would be water injection, resulting in a NO_x limit of about 0.2 lb NO_x per mmBtu.

By letter dated October 13, 1988, the same date as the permit issuance, the Division notified Region IV of their final determination. The final determination did not adequately address all of Region IV's comments regarding BACT, and concluded that BACT for the proposed turbine was dry controls. The NO_x emission limit in the final permit was below the NSPS emission level but above a level determined by Region IV to be BACT in this case.

The following is a brief summary of EPA's responses made during the comment period regarding the Division's BACT determination.

Division Position: The proposed turbine will operate approximately 6000 hours per year and the incremental reduction cost associated with the use of water injection would be \$2,121 per ton of NO_x removed. This cost is unreasonable; therefore, water injection should not be considered as BACT.

Region IV's Response: Historically, water injection has been used to control NO_x emissions from gas turbines without adverse effects. Because it is a "top" technology, we feel that water injection should be considered as BACT. Additionally, incremental reduction cost of \$2,121 per ton of NO_x is not unreasonable.

Division Position: The addition of water injection controls would increase fuel consumption by 2.2 percent. This 2.2 percent increase represents a 7 percent decrease in fuel efficiency gain.

Region IV's Response: The 2.2 percent increase is insignificant and therefore would not be considered a unique and convincing argument against the use of water injection in this case.

Division Position: Previously permitted Solar turbines did not require water injection as BACT.

Region IV's Response: Because BACT determinations are made on a case-by-case basis, the fact that other permitted Solar turbines were not required to install water injection controls is irrelevant. According to the BACT/LAER Clearinghouse, the use of water injection for gas turbines is technically feasible. Unless unique and convincing arguments are presented showing that the use of water injection controls will pose a financial hardship on the company, we feel that water injection is economically feasible.

Additionally, there is at least one permitted Solar Mars turbine that is using water injection as a result of a NSR determination and two other permits pending that will require water injection.

In addition to the above written comments, the following comments were made after the public comment period during a telephone conversation on October 26, 1988, between William Eddins of the Kentucky Division for Air Quality and Bruce P. Miller of EPA, Region IV:

Division Position: Although the use of water injection would reduce Nox emissions, CO emissions would increase threefold.

Region IV's Response: It is true that CO emissions could increase from 2 TPY to 6 TPY with the use of water injection; however, NOx emissions will be reduced from 193 TPY to 79 TPY, a 114 TPY reduction. The large reduction in NOx emissions compared to the small increase in CO emissions justifies using NOx controls.

Division Position: An annualized cost of \$243,000 to reduce the maximum annual average impact by 0.02 ug/m³ is unreasonable when the NAAQS is 100 ug/m³.

Region IV's Response: The predicted impact of this source is independent of the requirement to apply BACT. Although Columbia Gulf has indicated its intent to operate this facility only 6000 hours per year, there are no operating restrictions in the permit. Therefore, at full operation, with no controls, this source could emit approximately 282 TPY of NOx.

Division Position: EPA's comparison of Columbia Gulf's BACT analysis with other projects subject to LAER or other local restrictions is inappropriate since the analyses have different requirements.

Region IV's Response: Regardless of what pollution controls other projects were required to install, the modification of this source triggered a PSD review, which in turn requires a "top-down" BACT analysis. The "top-down" BACT analysis requires that the most stringent controls be evaluated first, the second most stringent controls evaluated second, and so on. Only after convincing arguments are presented showing that a control is either technically infeasible or is unreasonable based upon energy, environmental or economic concerns, can this control be rejected as BACT.

Region IV has determined that regardless of what other similar sources were required to do, the facility has not made unique and convincing arguments to obviate water injection as BACT.

Division Position: Pollution controls installed on turbines used for co-generation should not be compared to turbines used at gas transmission compressor stations
Region IV's Response: It is true that co-generation facilities should not routinely be compared to facilities without heat recovery when selective catalytic reduction controls are being evaluated. The use of water injection on gas turbines, however, is not affected by heat recovery systems or lack thereof.

The turbines at these two facilities can be compared to each other because each turbine used in the comparison use the same fuel (natural gas), have the same energy rating (8.9 MW), and are the same model (Mars, manufactured by Solar). Regardless of what type of facilities the turbines are installed at, each will create NOx in the combustion chamber while producing electricity. Since water injection is considered technically feasible for reducing NOx emissions for the chosen turbines located at co- generation facilities, water injection appears to be feasible as BACT for the turbine to be installed at Columbia Gulf's facility.

Recommendation

I am asking that you initiate review of the Columbia Gulf permit with respect to compliance with the PSD review procedures applicable to BACT determinations. Specifically, the review should address the adequacy of the review and determination of BACT for NOx emissions.

Procedures and Time Limitations

If you desire to evaluate these important issues as they relate to this permit, review procedures must be initiated within the time period allowed by the regulations, 40 C.F.R. Part 124. Under Section 124.19(a), if this is construed as a petition for review, the petition must be filed within 30 days of service of the notice by the Division of its final permit decision, and the Administrator must issue an order granting the review within a reasonable time following the filing of the petition. Section 124.19(c). If for any reason you determine that Section 124.19(a) is not the proper procedure, we would request you to initiate review on your own initiative under Section 124.19(b), which likewise requires you to act within the initial 30 days.

Based on the permit issuance date of October 13, 1988, we calculate that the 30 day period from the issuance of the permit will end on November 12, 1988. Pursuant to Section 124.20(a), the time began to run on the day after permit issuance. Since service of the Division notice was by mail, we have added three days to the prescribed time in accordance with Section 124.20(d). The thirty-third day after October 13, 1988, is November 15, 1988. If this is construed as a review on your own initiative pursuant to Section 124.19(b), notice must be given by this date. If this is construed as a petition for review, it must be served as specified in 40 C.F.R. }124.10. I have enclosed, for your review, a draft Notice of Decision to Review Permit (Enclosure 7).

The regional office filed comments on the draft permit within the Division comment period. We construe the definition of person in Section 124.41, as well as that in the Act, 42 U.S.C. }7602, to include an EPA regional office and/or an EPA Regional Administrator. Therefore, the Region, and/or the Regional Administrator, as a person on whose behalf comments were filed, is a proper party to file a petition for review under Section 124.19(a).

Section 124.19(a) requires a statement that the issues being raised for review were raised during the comment period to the extent required by Part 124. All facts or issues raised herein except as noted above were raised during the public comment period.

Notice of the initiation of the review procedures or service of this document as a petition for review should be sent to:

1. Mr. William Eddins, Director
Division for Air Quality
Kentucky Department for Environmental Protection
Frankfort Office Park
18 Reilly Road
Frankfort, Kentucky 40601

2. Mr. Richard D. Bayley
Manager of Design Engineering
Columbia Gulf Transmission Company
P. O. Box 683
Houston, Texas 77001

3. Mr. Daniel Ransbottom
Senior Consultant
Entrix, Inc.
P. O. Box 56288
Houston, Texas 77256-6288

Enclosed are copies of the following documents upon which this request is based:

1. Letter dated June 13, 1988, from William Eddins, Kentucky Division for Air Quality to Winston Smith, EPA, transmitting the Division's preconstruction review and preliminary determination for Columbia Gulf Transmission Company's construction of a Solar Mars Turbine at their Clementsville Compressor Station located in Clementsville, Kentucky.
2. Letter dated July 21, 1988, from Bruce P. Miller, EPA, to William Eddins, Kentucky Division for Air Quality, acknowledging receipt of the preliminary determination for Columbia Gulf Transmission Company and providing comments on their determination.
3. Letter dated August 22, 1988, from William Eddins, Kentucky Division for Air Quality to Winston Smith, EPA, transmitting Columbia Gulf Transmission Company's rebuttal to EPA's July 21, 1988, comments on the preliminary determination.
4. Letter dated September 23, 1988, from Bruce P. Miller, EPA, to William Eddins, Kentucky Division for Air Quality responding to Columbia Gulf Transmission Company's rebuttal to EPA's comments on the preliminary determination.
5. Final determination and permit dated October 13, 1988, issued by the Kentucky Department for Environmental Protection to Columbia Gulf Transmission Company to construct a Solar Mars Gas Turbine at the Clementsville Compressor Station located in Clementsville, Kentucky.
6. Letter dated May 19, 1980, from Rebecca W. Hanmer, EPA, to Jackie Swigart delegating authority for all portions of the Federal PSD program, as described in 40 CFR 52.21, to the Commonwealth of Kentucky. (See 45 Federal Register 52741, August 7, 1980).
7. Draft Notice of Decision to Review Permit