



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

/date stamped July 5, 2000/

AR-18J

Donald E. Sutton, P.E., Manager
Permit Section, Division of Air Pollution Control
Illinois Environmental Protection Agency
P.O. Box 19506
Springfield, IL 62794-9506

Dear Mr. Sutton:

Thank you for your letter dated May 30, 2000, in which you requested USEPA's assistance in determining Best Available Control Technology (BACT) under Prevention of Significant Deterioration (PSD) rules found at 40 CFR 52.21 for a simple-cycle natural gas turbine peaker project proposed by Standard Energy Ventures (SEV). Specifically, you asked for our perspective on the nature of aeroderivative turbines and whether they should be treated as a separate category of equipment from other turbines. SEV has proposed 25 parts per million (ppm) and water injection as BACT for control of emissions of nitrogen oxides (NO_x).

Instead of determining whether turbines derived from those used in the aerospace industry, known as aeroderivative turbines, warrant treatment under PSD as a separate category of equipment from other turbines, we chose alternatively to look at other aeroderivative turbines around the country and see what BACT determinations there were. Our investigation of BACT for units similar to those described in the application (Pratt & Whitney FT8 "Twin Pacs", two 25 megawatt (MW) natural gas-fired aeroderivative turbines driving one electric generator), showed that catalytic control of NO_x emissions, to below the 25 ppm level proposed by SEV, is technically feasible. We found that several slightly larger, yet arguably similar aeroderivative units in other States utilize selective catalytic reduction (SCR) and/or water injection to control NO_x emissions down to 15 ppm and even as low as 5 ppm permitted levels, with actual tested levels below these values.

The Texas Natural Resource Conservation Commission (TNRCC) permits simple cycle peakers in the 9 to 15 ppm NO_x range, according to phone conversations with their staff and information obtained from their web page: http://www.tnrcc.state.tx.us/air/nsr_permits/files/turbine.pdf. From their March 1, 2000 guidance memo on BACT for gas turbine peakers, including simple cycle:

2. NO_x emissions - 9 to 15 ppmvd

Because of the limited operation of a peaking unit, TNRCC has, in practice, allowed a higher NO_x BACT for peaking units....TNRCC will continue its practice of recommending higher NO_x BACT for peaking units not to exceed 15 ppmvd.

We checked the BACT/LAER Clearinghouse on the Internet (<http://www.epa.gov/ttn/catc>) and found a simple cycle LM6000 project using SCR and water injection for NO_x and oxidative catalyst for carbon monoxide (CO) that was permitted by the Sacramento Metro Air Quality Management District (Sacramento) of Sacramento, California. Since the beginning of operation in 1996, four tests have been performed, all indicating the units were in compliance with the 5 ppm limit. Although this constituted "California BACT," which is generally equivalent to the Lowest Achievable Emission Rate (LAER) for the turbines, PSD regulations require that LAER be the starting point for a top-down BACT analysis. This and another similar Sacramento determination found in the BACT/LAER Clearinghouse are referenced in the enclosure. This determination is described in California Air Resource Board's "Guidance for Power Plant Siting and Best Available Control Technology" (found on the Internet at: <http://www.arb.ca.gov/powerpl/guidocfi.pdf>):

The most stringent BACT limit for a simple-cycle gas turbine was specified in the preconstruction permit issued for Carson Energy Group in Sacramento County, California. The permit establishes a limit of 5 ppmvd NO_x at 15 percent oxygen averaged over 3 hours with ammonia slip limited to 20 ppmvd at 15 percent oxygen. The determination was made for a 42 MW General Electric LM6000 gas turbine with water injection and selective catalytic reduction. This turbine has been in operation since 1995. (page 23)

In addition to SCR, we believe that other commercially available catalytic controls such as SCONOX and XONON should also be evaluated for the FT8s. It is our understanding that SCONOX was previously tested on similar small—about 25 MW—units at much lower levels of emissions than SEV has proposed, and that SCONOX offers the advantages of not using ammonia, therefore eliminating ammonia-slip concerns, and the fact that one catalyst controls both NO_x and carbon monoxide (CO). SEV's PSD permit application includes a BACT proposal for CO which proposes to install oxidation catalyst. There are likely to be cost savings associated with installing one catalyst for both CO and NO_x.

The source may choose to demonstrate that the cost of a control option renders that option infeasible. Should SEV choose to do so, the uncontrolled level of emissions of all regulated pollutants must be compared to the level of emissions after the control option or strategy, for example SCR/water injection, is applied.

For the above reasons, USEPA believes that the SEV PSD application's proposal for BACT does not meet the requirements of the Clean Air Act.

I want to thank you again for the opportunity to discuss BACT for natural gas-fired turbines. Turbine issues continue to take high priority, considering recent advances in control technology, electric industry deregulation and citizen concerns. Please let me know if I can be of any further assistance, or feel free to contact John Kelly, of my staff, at (312) 886-4882.

Sincerely yours,

/Genevieve Damico for/

Pamela Blakley, Chief
Permits and Grants Section (IL/IN/OH)
Air and Radiation Division

enclosure

ENCLOSURE

Carson Energy Project - Installed a 450 MMBTU/hr LM6000 simple cycle turbine
Used SCR and water injection to achieve a NO_x limit of 5 ppm
BACT/LAER Clearinghouse ID = CA-0846

Sacramento Cogeneration Authority, Procter & Gamble -
Installed a 421 MMBTU/hr LM6000 simple cycle turbine
Used SCR and water injection to achieve a NO_x limit of 5 ppm
BACT/LAER Clearinghouse ID = CA-0810