Aug 23 1999

4APT-ARB

Mr. John E. Hornback, Director
Division for Air Quality
Department for Environmental Protection
Natural Resources and Environmental
  Protection Cabinet
803 Schenkel Lane
Frankfort, Kentucky 40601-1403

SUBJ: Draft PSD/Title V Permit for Calvert City Power I, L.L.C. Combustion Turbine Facility, Calvert City, Kentucky (Permit No. V-99-037)

Dear Mr. Hornback:

The United States Environmental Protection Agency (EPA) has reviewed the Preliminary Determination/Statement of Basis and draft Prevention of Significant Deterioration (PSD)/Title V permit for the Calvert City Power I, L.L.C. (Calvert City Power) facility to be located in Calvert City, Kentucky. We have also reviewed the latest revised permit application dated July 1999. The proposed facility will primarily consist of two Siemens Westinghouse 501FD combustion turbines and one Siemens Westinghouse 501F combustion turbine, with all combustion turbines (CTs) to be operated in simple cycle mode. Calvert City Power proposes to use CTs with water injection-type combustors for control of nitrogen oxides emissions. Based on Calvert City Power's emission estimates, the facility will be a major source under PSD and Title V permitting regulations. Also, based on the applicant's estimates, the facility is subject to PSD review for the following pollutants: nitrogen oxides (NO_x), sulfur dioxide (SO_2), carbon monoxide (CO), volatile organic compounds (VOC), and particulate matter (PM and PM_{10}).

Section 505(b)(1) of the Clean Air Act and Section 70.8 of 40 C.F.R. Part 70 requires EPA to object to the issuance of a proposed Title V permit in writing within 45 days of receipt of the proposed permit and all necessary supporting information if EPA determines that the permit is not in compliance with the applicable requirements under the Clean Air Act, the applicable State Implementation Plan (SIP) or 40 C.F.R. Part 70. Following its review of the Calvert City Power permit, EPA has determined that the proposed Title V permit is not in compliance with the applicable requirements under the Clean Air Act, the Kentucky SIP, and 40 C.F.R. Part 70.

Although it is not clear to EPA that 401 KAR 50:035(5)(3) provides for concurrent EPA review periods for a combined draft PSD permit and proposed Title V operating permit, I understand that the Kentucky Division for Air Quality (KYDAQ) interprets the regulations to provide concurrent review periods, and that therefore, EPA has before it for review a draft PSD permit/proposed Title V operating permit. Accordingly, this letter serves as EPA's formal objection to the issuance of the combined permit to Calvert City Power pursuant to 40 C.F.R. § 70.8(c). See also 401 KAR 50:035(9)(3). If, on the other hand, the Title V permit review is not considered to be a concurrent review and that, therefore, EPA has before it for review a draft PSD permit/draft Title V permit, EPA reserves the right to supplement and reissue its objection at the appropriate time.

Pursuant to 40 C.F.R. § 70.8(c), Enclosure A provides a statement of the reason for EPA's objection and a description of actions that can be taken to respond to the objection. Stated generally, the permit does not comply with PSD requirements applicable to Calvert City Power under the Clean Air Act, the Kentucky SIP and 40 C.F.R. Part 70. In particular, the permit is not in compliance with the Best Available Control Technology (BACT) requirements applicable under PSD because the BACT analysis for the proposed facility is legally deficient. These deficiencies are described in Enclosure A.

Under 40 C.F.R. § 70.1(b), "all sources subject to Title V must have a permit to operate that assures compliance by the source with all applicable requirements." Applicable requirements are defined in Section 70.2 to include: "(1) any standard or other requirement provided for in the applicable implementation plan approved or promulgated by EPA through rulemaking under Title I of the [Clean Air] Act . . . " As you know, KYDAQ defines an "applicable requirement" in a similar fashion in 401 KAR 50:035(1)(7) to include "federally enforceable requirements," which also include "standards or other requirements in the State Implementation Plan that implement the relevant requirements of the [Clean Air] Act." 401 KAR 51:017.

Thus, the applicable requirements for Calvert City Power include the requirement to obtain a PSD permit that in turn complies with applicable PSD requirements. Those requirements include use of BACT for each regulated pollutant which would be emitted in significant amounts and at each emissions unit at which an emissions increase would occur. In determining BACT, as in implementing other aspects of the PSD program, the State exercises considerable discretion. That discretion is bounded, however, by the fundamental requirements of administrative law that agency decisions not be arbitrary or capricious, be beyond statutory authority, or fail to comply with applicable procedures. Consequently, as EPA advised KYDAQ in approving its PSD program as part of the SIP, State-issued PSD permits must conform to the applicable requirements of the Clean Air Act and the SIP, and failure to do so may result in corrective action by EPA. See 55 FR 23547 (June 11, 1990). In assessing whether a BACT determination complies with applicable requirements, under longstanding policy, EPA looks to whether the State has met two core criteria. First, the State should consider all of the available control technologies, including the most stringent. Second, the selection of a particular control system as BACT must be justified in terms of the statutory BACT criteria and supported by the record, and must adequately explain the basis for the rejection of other, more stringent, control options. See, e.g., 61 FR 38250, 38272 (July 23, 1996) (notice of proposed rulemaking to revise

PSD regulations). In this case, the Region believes that KYDAQ did not adequately evaluate all of the information before it to make a determination of BACT, and that consequently, its BACT analysis was flawed. Therefore, Region 4 has concluded that KYDAQ's BACT analysis does not follow the fundamental requirements of administrative law and does not conform to applicable requirements of the Clean Air Act and the SIP.

We expect that within 90 days after the date of this letter, the Commonwealth will resubmit a proposed operating permit to EPA revised to meet the objections raised above. As you are aware, Section 505(c) of the Clean Air Act and 40 C.F.R. § 70.8(c)(4) provide that if KYDAQ fails to do so, EPA will issue or deny the permit. In addition, we are also hereby notifying you of our present intent to issue the Commonwealth a Finding of Noncompliance under Section 113(a)(5) of the Clean Air Act if KYDAQ issues the final PSD permit without resolving the issues raised in this letter to EPA's satisfaction. Pursuant to Sections 113 and 167 of the Clean Air Act, EPA may take certain actions upon a finding that a State is not acting in compliance with any requirement or prohibition of its SIP or the Act relating to the construction of new sources. See 55 FR 23547. Therefore, we urge that you not issue the final PSD permit in its present form. If the Commonwealth has already issued the final PSD permit, we ask that you notify us of this immediately so we may respond accordingly.

We are committed to working with you to resolve these issues. Please let us know if we may provide assistance to you and your staff. If you have any questions or wish to discuss this further, please contact Mr. Gregg Worley, the manager of our permits section, at (404) 562-9141, or Mr. Jim Little, the lead PSD permit reviewer, at (404) 562-9118.

Sincerely,

Winston A. Smith
Director
Air, Pesticides & Toxics
Management Division

Enclosure

cc: Calvert City Power I, L.L.C.

Enclosure A
U.S. EPA Comments on Proposed Title V Permit
For Calvert City Power I, L.L.C.
Calvert City, Kentucky

The following comments explain the basis for EPA Region 4's objection to the issuance of a Title V permit as proposed for the Calvert City Power I, L.L.C. (Calvert City Power) project in Calvert City, Kentucky. At the end of these comments is a conclusion section discussing actions that would resolve our objection.

PSD ISSUES

1. The issue of most concern to us is the proposed best available control technology (BACT) for NO_x emissions. We disagree with the applicant's contention that dry low-NO_x (DLN) turbine design capable of achieving emissions less than 25 ppmvd (at 15% oxygen) is not "available" for this project. Our determination is that a NO_x emission rate of 25 ppmvd using water injection does not represent BACT for simple cycle combustion turbines. This determination is based on the following considerations:

    a. The definition of best available control technology in Section 169(3) of the Clean Air Act refers to an emission limitation which the permitting authority, on a case-by-case basis, "determines is achievable for such facility through application of production processes and available methods, systems, and techniques . . . " The definition of BACT in federal PSD regulations (40 CFR 51.166 and 52.21) essentially repeats the Clean Air Act definition. Our view is that DLN technology achieving a NO_x emission rate less than 25 ppmvd is an available method under the general Clean Air Act concept of BACT. The lead time required to obtain an available control system is not taken into account specifically in either the Clean Air Act or in the implementing federal regulations.

    b. On page 5-22 of the permit application (July 1999 revision), Calvert City Power refers to the U.S. Environmental Protection Agency's (EPA's) Draft October 1990 *New Source Review Workshop Manual* in discussing the concept of availability. In particular, the applicant refers to the phrase on page B.17 of the *New Source Review Workshop Manual* stating that "a technology is considered 'available' if it can be obtained by the applicant through commercial channels or is otherwise available within the common sense meaning of the term." We have two comments about the quoted phrase. First, it refers to a "technology" and not to a specific piece of equipment, and it does not denote one way or the other whether a time delay in ordering a technology is outside the bounds of the common sense meaning of available. Second, and more important, the quoted phrase appears after the following sentences: [paragraph] "In step 2, the technical feasibility of the control options identified in step 1 is evaluated. This step should be straightforward for control technologies that are demonstrated – if the control technology has been installed and operated successfully on the type of source under review, it is demonstrated and it is technically feasible. For control technologies that are not demonstrated in the sense indicated above, the analysis is somewhat more involved." [new paragraph] "Two key concepts are important in determining whether an undemonstrated technology is feasible: 'availability' and 'applicability.'" [emphasis added] In other words, the phrase cited by Calvert City Power applies within the context of an undemonstrated technology. Use of DLN simple cycle combustion turbines to achieve NO_x emissions less than 25 ppmvd is clearly a demonstrated technology.

c. Understandably, the applicant's concern is with starting up the facility by the desired date of summer 2000. However, this was a startup commitment date elected by the applicant at the applicant's own risk before having any assurance that the facility could be permitted as proposed or permitted in time to meet the desired startup date. The U.S. Environmental Protection Agency (EPA) certainly has no wish to hinder a power developer's ability to enter a market at an opportune time. However, EPA has an obligation to consider long-term environmental effects over the entire lifetime of 20+ years that could be expected for a simple cycle combustion turbine facility. Starting up a facility with a control technology that is already out of date and that cannot be replaced except at great cost (see comments below) is not consistent with the objective of long-term environmental protection.

d. In the application's discussion of availability (Section 5.3.2.1), the applicant does not say that all DLN turbines were unavailable. On page 5-22, the applicant states that "Westinghouse 501F turbines with DLN were not considered by the Project because of the lack of reduction in NO_x emissions." Even if Siemens Westinghouse was unwilling to commit to a DLN turbine emission rate less than 25 ppmvd at the time when originally approached by Calvert City Power, the potential for eventually achieving a lower emission rate with DLN is much greater than with water injection. According to information received from Siemens Westinghouse, the DLN combustors in their turbines potentially can be retrofitted at reasonable cost (and with little disruption in operation) as expected NO_x reduction features are developed. The likelihood of this expectation is evidenced by two recent permit applications we have reviewed. One applicant committed to an emission rate of 20 ppmvd for simple cycle 501F DLN turbines by April 2001 and 15 ppmvd by April 2002. Another applicant committed to an emission rate of 15 ppmvd for simple cycle 501FD DLN turbines at startup in the second quarter of 2001. Our understanding, based on comments from Siemens Westinghouse and from Calvert City Power, is that retrofitting water-injected turbines would be cost prohibitive. Therefore, the potential long-term benefits of DLN turbines that might be available to meet the applicant's desired schedule were not taken into account.

e. The Preliminary Determination contains the following statement on page 16 with reference to the range of NO_x emissions that can be achieved by DLN CTs: "GE is promising 9 ppm only for certain future 7FA's. Current lowest is 15 ppm (GE 7FA), 25 ppm for Westinghouse, ABB, RR, Siemens." All of the permit applications for simple cycle facilities with GE 7FA turbines received by Region 4 in recent months indicate that GE is guaranteeing a 9 ppmvd NO_x emission rate for operating loads between 70 and 100 percent of base load. Furthermore, recent permit applications for Siemens Westinghouse DLN turbines have contained a commitment for NO_x emissions less than 25 ppmvd either at startup or within at most two years after startup.

f. KYDAQ (page 20 of the Preliminary Determination) refers to the Lakeland project in Florida and the Dynegy project in North Carolina as evidence that 9 to 15 ppmvd emission levels will not be available on Siemens Westinghouse DLN turbines until after the 2001-2002 time frame. Although this point has some merit, it does not tell the complete story. In the case of the Dynegy project (Rockingham Power), the project developer was able to obtain Siemens Westinghouse 501F DLN turbines for startup in April 2000 with a commitment to obtain a NO_x emission rate of 20 ppmvd by April 2001 and an emission rate of 15 ppmvd by April 2002. Therefore, by ordering DLN turbines, the project developer was able to obtain equipment that could be improved within a short period of time to achieve lower long-term emission rates. In the case of the Lakeland project (which we assume to mean the City of Lakeland McIntosh Power Plant project), the acceptance of a 25 ppmvd initial NO_x emission rate (for a G-class CT) was contingent on the owner achieving a much lower emission rate by May 2002. The lower emission rate is to be achieved by an improved DLN combustor or high-temperature selective catalytic reduction (SCR) system if the facility remains in simple cycle mode or by use of a conventional SCR system if the facility converts to combined cycle mode.

EPA's interest in effective control of nitrogen oxides stems not just from the goal of providing environmental protection for the local site area. NO_x is a pollutant with regional consequences because of its role in ozone formation. Reducing NO_x emissions or at least reducing the growth in NO_x emissions is a high priority environmental goal for states throughout the eastern U.S., especially for NO_x SIP call states such as Kentucky.

2. As part of the justification for proposing a 25 ppmvd CT emission rate for NO_x, the applicant is committing to use of natural gas as the only fuel to be burned. The applicant states that exclusive use of natural gas at an emission rate of 25 ppmvd is equivalent to other CT projects that have lower emission rates when burning natural gas but that also burn fuel oil as a backup fuel with higher emission rates. Our response to this point is that the applicant elected to restrict fuel use to natural gas and therefore the BACT determination should be based on the selected fuel. When reviewing CT projects proposing both natural gas and backup fuel oil, BACT determinations are based on individual fuels and not on fuel combinations. Furthermore, the applicant's evaluation of the selective catalytic reduction (SCR) control option takes advantage of the fact that the

annual emissions used to derive a cost effectiveness value reflect voluntary restrictions on fuel type and hours of operation.

3. We have the following comments on the evaluation of selective catalytic reduction as an alternative for control of nitrogen oxides emissions:

   a. The applicant states the following on page 5-17 of the July 1999 revised permit application: "The above information clearly demonstrates a high likelihood of technical difficulties that could preclude the successful use of high-temperature SCR for the Project. For this reason, high-temperature SCR is considered a technically infeasible control technology alternative. However, at the request of KYDAQ, an economic evaluation of this technically infeasible control option has been addressed in Section 5.3.2.1." Although EPA Region 4 to date has concluded that SCR is not required BACT for simple cycle combustion turbine projects, we have been consistent in stating our opinion that high-temperature SCR is technically feasible. (In this regard, Table 5-4 of the permit application showing that hot SCR was considered technically infeasible for six recent CT projects in Region 4 does not reflect EPA's position.) We also note the following statement in KYDAQ's Preliminary Determination (page 15) referring to high-temperature SCR: "However, the Division has included this technology as a possible control option and has not eliminated this technology based on technical feasibility."

   b. We are in agreement with KYDAQ's apparent opinion (see page 20 of the Preliminary Determination) that the most recent permit application submitted by the applicant (dated July 1999) contains a questionable cost evaluation for high-temperature SCR as a NO_x control alternative. Both the capital investment and annual operating costs in the applicant's evaluation are much higher than those in recent applications for similar projects, resulting in a much higher cost effectiveness value (dollars per ton removed) even taking into account differences in the tons removed amount.

      The capital investment cost components in question are as follows:

      - The extremely high capital contingency cost of $1.5 million, which is 20 percent of the total purchased equipment cost.

      - The enclosure building cost of $1.3 million without a supporting vendor quote.

      - The overall magnitude of the capital investment cost ($15.2 million) compared to other similar projects.

      The annual operating cost components in question are as follows:

- The extremely high annual contingency cost of $2.75 million (25 percent of total direct costs). A reasonable contingency cost to allow for a new technology is expected, but an initial high operating contingency cost should decrease over time and not remain constant. For the 10-year SCR lifetime assumed by the applicant, the cumulative annual contingency costs amount to $27.5 million, which is nearly three times the estimated total direct cost of a complete new system.

- The energy cost of nearly $1 million due to extended startups. The assumed number of startups per year (150) seems high for a "peaking" facility. Also, the energy cost is taken to be the value of lost electric power sales and not the direct cost of natural gas fired during the extended startup period. Finally, confirmation should be obtained from an SCR system vendor that the required extended time for startup due to SCR operation is as long as one hour, the time duration assumed by the applicant.

- The catalyst replacement cost of approximately $3.6 million. Information in the Englehard Budgetary Proposal (page C-39 in the July 1999 permit application) seems to indicate a cost for a "Replacement ZNX Module" as $1.8 million for a Siemens Westinghouse 501F turbine operating 3,500 hours per year.

- The interest rate of 10 percent used to calculate a capital recovery cost. The 10 percent rate differs from the 7 percent interest rate referenced in the current edition of EPA's *OAQPS Control Cost Manual* (EPA 453/B-96-001, Fifth Edition). The applicant's explanation for the 10 percent interest rate is that it reflects the applicant's "true cost of capital." No supporting information is provided to verify this statement.

c. We accept that a NO_x emission rate of 25 ppmvd can be used as the baseline level for calculating a cost effectiveness value for SCR control. On the other hand, since the 25 ppmvd level proposed by Calvert City Power is based on water injection, the SCR cost evaluation should include a credit for the extra power output resulting from water injection.

d. The applicant discusses the impact of frequent startups as an impediment to effective use of SCR control technology and even includes an energy cost penalty of nearly $1 million in the SCR cost evaluation (as indicated above). Yet nothing in the draft permit would prevent the applicant from operating each turbine nearly 5 months (3,500 hours) continuously each year without frequent startups. In fact, the draft permit would allow continuous year-round operation of the facility if the applicant chose to operate each of the three turbines sequentially rather than concurrently for the entire 3,500 hours per year allotted to each turbine.

e. Judging the appropriateness of high-temperature SCR in this case should take into account that the applicant elected to start with an inherently higher-emitting turbine design, placing greater importance on the need for emission controls.

We conclude that high-temperature SCR added to the proposed water injection CTs would represent BACT for this project if the applicant selected this approach as an alternative to the use of DLN CTs to achieve a NO_x emission rate of 15 ppmvd or less.

4. We are also concerned with the proposed emission rates for CO. CO emissions from turbines with wet injection combustors tend to be higher than CO emissions from turbines with DLN combustors. The proposed “rated capacity”(base load) CO emission rate of 30 ppmvd (at 15% oxygen) is higher than the CO emission rate determined to be BACT for many other recent simple cycle DLN turbines when operating at base load. In addition, KYDAQ proposes a CO emission limit of 90 ppmvd “under other operating load conditions.” This means that at load levels equal to 99.99 percent of rated capacity or less, the proposed turbines will be allowed to emit three times the amount of CO compared to the rated capacity emission limit. An emission rate of 90 ppmvd is much higher than the emission rates determined to be BACT for recent simple cycle DLN turbines when operating at reduced loads.

At a minimum, we recommend that the higher CO emission rate be reduced and allowed only for load levels less than or equal to 70 percent of rated capacity. In support of this recommendation, we note that the permit application lists only two combinations of CO emission rate and load level: an emission rate of 30 ppmvd at base load (see Section 5.4.2.3 of the application) and an emission rate of 90 ppmvd at 70 percent load (see Appendix B of the application). The application makes no mention of the need to have an elevated CO emission limit for all operating conditions less than base load.

5. The following comments are related to the air quality impact analysis provided in the permit application:

a. Complex Terrain - The air quality impact area for the proposed project includes complex terrain. The application incorrectly indicates the ISCST3 model with NWS meteorological data is appropriate for complex terrain impact assessments. EPA’s modeling guidelines require representative on-site meteorological data for application of ISCST3 to complex terrain assessments.

An additional analysis was provided to further determine the affect of complex terrain on the controlling ambient concentrations. The application compares the ISCST3 modeled maximum concentrations obtained with and without the COMPLEX1 option - the complex terrain component of ISCST3. This comparison analysis revealed essentially identical maximum concentrations for the two ISCST3 runs. Therefore, although the impact assessment used a non-guideline modeling procedure, the provided air quality impact assessment is adequate for this application given the fact that the controlling ambient impact concentrations are associated with simple terrain and all modeled concentrations are less than the PSD significant impact levels.

b. Class I Area Impacts - Visibility and AQRV analyses for the Class I areas were not performed based on modeling results that showed insignificant impacts at the nearest Class I area. Regional haze was also not addressed. Although the nearest Class I areas are about 160 km away, the responsible federal land managers for these areas (Mingo National Wilderness Area, Mammoth Cave National Park, and Sipsey National Wilderness Area) should be notified of the project and given an opportunity to review and comment on this air impact assessment.

6. The following are PSD-related comments regarding conditions in the draft permit:

a. For the combustion turbine emissions units, Section 1 (Operating Limitations) specifies that the maximum annual hours of operation for each turbine shall not exceed 3,500 hours. We recommend that the limit be stated as not exceeding 3,500 hours per consecutive 12 months.

b. As previously discussed, the draft permit allows a CO emission rate of 90 ppmvd under any operating load conditions other than the "rated capacity output" condition. The allowance for higher CO emission rates should be restricted to operating conditions of 70 percent of rated capacity or less.

c. Condition 4 in the permit sections for the combustion turbine emissions units provides an exclusion for NO_x and CO emissions during startup and shutdown periods. The applicant's BACT analysis for high-temperature SCR includes an assumption of 150 startups per year (implying an equal number of shutdowns). If the actual number of startups and shutdowns is close to this amount, NO_x and CO emissions during a considerable block of time will be excluded from the requirement to investigate excess emissions.

Also related to the startup/shutdown exclusion, it is EPA's policy (see January 28, 1993 memo from John B. Rasnic to Region 1) that BACT applies during all normal operations and that automatic exemptions should not be granted for excess emissions. Startup and shutdown of process equipment are part of the normal operation of a source and should be accounted for in the planning, design, and implementation of operating procedures for the process and control equipment. Accordingly, it is reasonable to expect that careful and prudent planning and design will eliminate violations of emission limitations during such periods.

OTHER ISSUES

In addition to the issues outlined above, EPA has concerns with other issues as identified below. These issues relate to the practical enforceability of the permit and/or the basis for specific permit conditions. Therefore, EPA also objects to the PSD/Title V operating permit because it fails to ensure practical enforceability of the referenced permit conditions below:

7. Emission Unit 05 (emergency diesel fire-water pump/engine) – In the Specific Monitoring Requirements section, no monitoring frequency is specified in Condition 4.2. The permit should specify that each batch of fuel received for use should be monitored. Also, Condition 5.3 requires the source owner to perform monthly calculations to ensure compliance with hourly emission standards for NO_x, CO, and PM. It is unclear how the source owner will demonstrate compliance with an hourly standard using monthly calculations.

8. Emission Unit 07 (natural gas heater) – Condition 4 (Specific Monitoring Requirements) should specify that the permittee will monitor gas fuel sulfur content monthly. Also, Condition 5.2 requires the source owner to perform monthly calculations to ensure compliance with hourly emission standards for NO_x, CO, and PM. It is unclear how the source owner will demonstrate compliance with an hourly standard using monthly calculations.

CONCLUSION

The actions that would resolve our objection to the issuance of a PSD/Title V permit are as follows:

9. Use of an alternative that would achieve a NO_x emission rate for the combustion turbines of 15 ppmvd or less.

10. Restriction of CO emissions from the combustion turbines to less than 90 ppmvd at load levels less than base load and greater than 70 percent of base load.

11. Revision of the permit conditions as indicated in Item 6.a. above.

12. Revision of the permit condition for Emission Unit 05 as indicated in Item 7. above and resolution of the question in Item 7. concerning compliance with an hourly standard.

13. Revision of the permit condition for Emission Unit 07 as indicated in Item 8. above and resolution of the question in Item 8. concerning compliance with an hourly standard.