State of New Jersey
Department of Environmental Protection
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Commissioner

MEMORANDUM

TO: William O'Sullivan, Administrator
Air Quality Permitting Program

September 30, 1998

THROUGH: Joann L. Held, Chief
Bureau of Air Quality Evaluation

FROM: Alan Dresser, Research Scientist I
Bureau of Air Quality Evaluation

SUBJECT: Disagreement between New Jersey DEP and Pennsylvania DEP Concerning the Warren County Sulfur Dioxide Nonattaniment Area Study

INTRODUCTION

A Technical Advisory Group was formed earlier this year to help resolve technical issues related to the Warren County Sulfur Dioxide Nonattaniment Area Study and assist in bringing the study to completion. The following groups are represented in the Technical Advisory Group: EPA Region II, EPA Region III, NJDEP, PADEP, Pennsylvania Power and Light (PP&L), GPU, TRC Inc. (consultant for PP&L), and ENSR Corp. (consultant for GPU). As will be detailed in this memo, the Technical Advisory Group has reached an impasse on additional modeling. This impasse threatens to:
1) cause further delay in completing this study, which has already taken more than 10 years; and
2) sanction the use of an inferior modeling technique which could allow two Pennsylvania power plants to avoid necessary reductions in their sulfur dioxide emission.

BACKGROUND

EPA declared portions of Warren County nonattainment with respect to the sulfur dioxide (SO_2) National Ambient Air Quality Standard in December of 1987. This redesignation was related to the permitting of the Warren County RRF and was based on impacts predicted by a very simple screening modeling analysis. At that time New Jersey DEP, Pennsylvania DEP, EPA Region II, and EPA Region III agreed that regulatory action to eliminate the nonattainment area, such as reducing the SO_2 emissions from a specific source, would wait until the results from a more refined air quality modeling analysis were available. Because the initial screening modeling indicated emissions from their Martins Creek Power Plant were the principal cause of nonattainment, PP&L was made responsible for conducting the refined air quality modeling compliance study.

In January 1998 the initial results from the refined air quality compliance study as originally conceptualized were released and in June 1998 the study was completed. The principal reason for the ten year duration of the study was PP&L's desire to model the emissions from the

Martins Creek Power Plant using the non-EPA guideline dispersion model LAPPES. In order for PP&L to use a non-guideline model, a comparison study had to be conducted to demonstrate that LAPPES predicts Martins Creek Power Plant's impact in the Warren County nonattainment area more accurately than an EPA recommended model. The recently completed refined modeling compliance study identified two areas in New Jersey where the 3 and 24-hour SO_2 national ambient air quality standards (NAAQS) were violated. These violations are in the nonattainment area, but generally not in the vicinity where the eight ambient SO_2 monitors are located.

1. Some violations were in the immediate vicinity of the Hoffmann-LaRoche Belvidere facility. These violations were caused by emissions from four existing boilers that are permitted to burn 1 % sulfur fuel oil. The Department has already met with Hoffmann-LaRoche on this issue, and they have submitted permit revisions for the boilers to change to No. 2 oil with a sulfur content of 0.05 %. This 95% reduction in SO_2 emissions eliminates these very localized NAAQS violations.

2. Other violations are on the elevated terrain portions of the nonattainment area, specifically Scotts Mountain and Jenny Jump Mountain. These violations were caused by emissions from two coal-burning Pennsylvania power plants: PP&L's Martins Creek Power Plant and GPU's Portland Power Plant. These plants are allowed to burn up to 2.8 percent sulfur coal with no scrubbers. They have avoided installing scrubbers or burning lower sulfur coal to comply with Title IV of the CAAA by taking advantage of emissions trading. These modeled violations on Scotts Mountain and Jenny Jump Mountain are 20-30% over the NAAQS as summarized below. No modeling was done for the high terrain in Pennsylvania so it its unknown whether there are violations there.

Compliance Study Model Results		
Averaging Time	Maximum SO_2 Violation (ug/m^3)	SO_2 NAAQS (ug/m^3)
3-hour	1721 [a]	1,300
24-hour	426 [b]	365

a. Martins Creek P.P. contribution = 56 %, Portland P.P. contribution = 43 %, other sources/background = 1%.
b. Martins Creek P.P. contribution = 55 %, Portland P.P. contribution = 39 %, other sources/background = 6 %.

NEW MODELING STUDY AGREEMENT

GPU's response to this finding was that the EPA guideline model used to model the Portland Power Plant's emissions was too conservative. They threatened legal action unless they too were given the opportunity to use a non-EPA guideline dispersion model such as LAPPES. GPU proposed that a new model comparison study be done in which both the Martins Creek and Portland Power Plants would be modeled with the non-guideline LAPPES. Although we have concerns about using the old model comparison database for this new study, we agreed to it as long as there was a tight schedule for its completion. All parties (EPA Region II, EPA Region III, NJDEP, PADEP, PP&L, and GPU) agreed to the schedule in late July/early August of 1998. The schedule called for completion of the new model compliance study by January 15, 1999 and any new emission limits would be imposed by April 9, 1999. The first milestone of the schedule, release of a protocol for the new model comparison study by August 28, 1998, has been met.

CURRENT DISAGREEMENT

The problem that has arisen involves a different non-guideline model now being proposed for use in the new modeling study by GPU and PP&L. For the first ten years of the study a version of LAPPES, which will now be referred to as LAPPES I, was used. A different version of LAPPES, which will be referred to as LAPPES II, is now being proposed in place of LAPPES I. Because LAPPES II uses a different set of wind speed data, its maximum SO_2 predictions are in different locations and generally 30-50 % lower than those of LAPPES I. We believe LAPPES I is the more appropriate model for the following reasons:

LAPPES I Historical Precedent - LAPPES I has been used for all modeling conducted in the Warren County Sulfur Dioxide Nonattainment Area Study up to the present time. Decisions such as locating the SO_2 monitors used in the comparison study were based on LAPPES I results.
LAPPES I Model Accuracy - Although the new comparison study has not been conducted, based on the results of the previous model comparison study it is likely that LAPPES I is more accurate than LAPPES II. As proposed, the new model comparison study does not allow a comparison of the two models.
Correction of LAPPES II Underprediction by Adjustment Factors - PP&L has indicated the model comparison study will show LAPPES II underpredicts monitored concentrations by approximately 30 to 50 percent. To correct for this underprediction, they propose to use model adjustment factors. As discussed in EPA's modeling guidance, adjustment factors add error and significant uncertainty to the results of a modeling analysis. Therefore, we believe their use should be avoided if at all possible.
No Technical Justification for LAPPES II - The protocol gives no satisfactory explanation of why LAPPES II is a technically better model than LAPPES I.

POSITIONS OF THE REGULATORY AGENCIES

NJDEP - NJDEP has requested that the new model comparison study include LAPPES I as well as LAPPES II. NJDEP has already compromised with PADEP and the utilities on a number of issues, such as agreeing to a new comparison study which would model the Portland Power Plant with a nonguideline model and include LAPPES II. If this or other disagreements cause the new modeling study to fall significantly behind schedule, or an entirely new modeling study is proposed by one of the utilities, interim emission reductions should be required based on the June 1998 modeling results.

PADEP - PP&L and GPU believe that only LAPPES II should be included in the new model comparison study as the non-guideline model. If LAPPES II underpredicts, adjustment factors will be applied as deemed necessary. PADEP is in agreement with their position.

EPA Region II - Their management's principal concern is to complete the modeling study, achieve any necessary emission reductions, and redesignate in the most expeditious fashion possible.

EPA Region III - They prefer that a new, more advanced EPA model known as AERMOD be used by PP&L and GPU to predict impacts in the nonattainment area. However, PP&L has rejected the use of this model. Therefore, EPA Region III's position is that the best currently

available model be used in the model compliance study. To determine what this best model is, they believe both LAPPES I and LAPPES II should be included in the model comparison study. If Pennsylvania is unwilling to include both LAPPES I and LAPPES II in the model comparison study, Region III would consider issuing a SIP call.

PROJECT IMPORTANCE

It is important that the impact of these two power plants be determined following established EPA procedures and in a technically correct fashion. There are two environmental reasons why New Jersey is concerned about these two power plants.

Location - Both power plants are located along the Delaware River on the New Jersey-Pennsylvania state line. Meteorological data collected at a site near the power plants indicates that during most hours their emissions are transported directly into New Jersey.

Magnitude of SO_2 Emissions Relative to New Jersey Sources - In order to compare the magnitude of the emissions from these two power plants to those of New Jersey sources, the data in the 1996 emission statements submitted to New Jersey and Pennsylvania were reviewed. The table below lists the emissions reported by the two power plants and all the utilities and independent power producers in New Jersey. Most New Jersey facilities either use scrubbers or low sulfur coal to achieve lower emissions. The emissions from these uncontrolled, high sulfur coal burning Pennsylvania power plants not only affect SO_2 concentrations in the state, but may also have to be examined in the future for their impact on PM-2.5 levels and visibility in New Jersey.

Emission Source	1996 Actual Sulfur Dioxide Emissions (tons per year)
Martins Creek Power Plant, Pennsylvania	28,333
Portland Power Plant, Pennsylvania	25,788
Total of Martins Creek and Portland Power Plants	**54,121**
All New Jersey Utilities and Independent Power Producers	46,225