UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

AUG 1 2000

4APT-APB

Alan W. Klimek, P.E., Director
Division of Air Quality
North Carolina Department of
Environment & Natural Resources
1641 Mail Service Center
Raleigh, North Carolina 27699-1641

Dear Mr. Klimek:

Region 4 participated in a June 7, 2000, meeting with you and your staff to continue discussions on the sulfur dioxide (SO_2) National Ambient Air Quality Standards (NAAQS) violations at several Duke Energy power plants in North Carolina and possible resolutions. The following summarizes: (1) methods for determining the good engineering practice (GEP) stack height to use in the dispersion modeling, (2) the Environmental Protection Agency (EPA) Model Clearinghouse's position on using the ISC-PRIME model versus fluid modeling to establish the new stack height, and (3) background for the fluid modeling requirement. The GEP stack height is the height necessary to ensure that emissions from the stack do not result in excessive concentrations of air pollutants in the immediate vicinity of the source as a result of downwash, eddies and wakes which may be created by the source itself, nearby structures or nearby terrain. The ISC-PRIME model is the Industrial Source Complex (ISC) model with the Plume Rise Model Enhancements (PRIME) downwash model developed by the Electric Power Research Institute (EPRI).

The State agreed in the meeting that Duke Energy should demonstrate compliance with the stack height regulations for each of the stacks involved to resolve identified violations of the SO_2 NAAQS. This demonstration requires Duke Energy to establish the GEP stack height using air dispersion modeling before credit is allowed in air dispersion modeling with a higher stack height. The GEP stack height (H_g) is the greater of: (1) 65 meters (i.e., *de minimis* height), (2) the height determined by a mathematical formula (either $H_g = 2.5H$ or $H_g = H + 1.5L$, depending on the date of stack construction, where H is the nearby structure's height, and L is the lesser dimension of height or width of the structure), or (3) the height demonstrated by fluid modeling or a field study to ensure emissions from the stack are not excessive [see 40 *Code of Federal Regulations (CFR)* §51.100(ii)].

As a result of the June 7th meeting, Region 4 contacted the Model Clearinghouse (C/H) on the use of the ISC-PRIME model versus fluid modeling to establish a new GEP stack height. The fluid modeling requirement is cited in the EPA Modeling Guideline and in the stack height regulations. Duke Energy proposes that the GEP height be determined through simpler means than fluid modeling, and that the ISC-PRIME model, which is available and better characterizes

building downwash effects, should be allowed for this use. This approach would apply a nonguideline dispersion model to a situation where the regulations do not allow the use of an air dispersion model, but instead require fluid modeling. According to the C/H, in order to entertain the source's proposal, the Office of General Counsel (OGC) would need to be consulted on this matter. Such an effort would take some time, from both a technical and legal standpoint. Although the ISC-PRIME model is currently proposed for regulatory status, it will remain a nonguideline model until the revisions to the EPA Modeling Guideline are promulgated, which will take more than a year. This model has yet to undergo extensive public review and application. The C/H and Region 4 agreed that the preferred approach is for the fluid modeling to be conducted, due to the many uncertainties and anticipated delays if the ISC-PRIME model is used.

The stack height regulations recommend technical demonstrations involving a field monitoring study or fluid modeling for determining a GEP stack height that differs from that determined by the GEP mathematical formulas. The purpose of fluid modeling is to produce an accurate representation of the atmosphere using the flow of air or water in a test facility for situations involving building or terrain with downwash influences. In the 1980's, mathematical models were not considered adequate to calculate concentrations of pollutants when the plume was affected by obstructions such as hills and buildings. The ISC-PRIME model proposes to better approximate the plume's behavior for the structures used in the field studies and model evaluation, however, it remains to be demonstrated that the two approaches predict GEP stack height within a comparable degree of accuracy.

Region 4 continues to require that fluid modeling be performed to justify building and using a higher stack to demonstrate compliance with the SO_2 NAAQS. A letter addressing the procedures that will be used to demonstrate State Implementation Plan compliance by Duke Energy should be submitted to EPA by September 15, 2000. If questions arise, please do not hesitate to contact me or have your staff contact Kay Prince at (404) 562-9026 or Brenda Johnson at (404) 562-9037.

Sincerely,

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