



CH2MHILL

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February 21, 1997

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BUREAU OF
AIR REGULATION

Mr. Martin Costello
Florida Department of Environmental Protection
Division of Air Resources Management
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Dear Mr. Costello:

Subject: Modeling Protocol
Proposed Standby Power Generators
Miami-Dade Water and Sewer Department
Alexander Orr Water Treatment Plant

The Miami-Dade Water and Sewer Department (WASD) will apply for a permit to operate standby generators at three of its facilities: the Central District Wastewater Treatment Plant, located on Virginia Key in Miami; the Alexander Orr Water Treatment Plant, located at 6800 SW 87th Avenue in Miami; and the John E. Preston Water Treatment Plant, located at 1100 W 2nd Avenue in Hialeah. The Central District and Alexander Orr facilities are major sources of criteria pollutant emissions with respect to prevention of significant deterioration (PSD), and estimated emissions from the standby generators at the desired level of operation will constitute a significant net emissions increase. The Preston facility is a minor source of criteria pollutant emissions, but the estimated emissions increase from the standby generators at the desired level of operation will constitute a major source by itself. As such, permitting of these sources will be subject to PSD review. Separate permit applications will be submitted for each source.

CH2M HILL has prepared this Modeling Protocol in order to obtain consensus from Florida Department of Environmental Protection (FDEP) on the approach to be taken for the air quality impact analyses that will be required as part of the PSD reviews for these projects. The contents of the proposed modeling protocol are based on recent communications with Mr. Cleve Holliday of your staff, as well as our experience in conducting previous dispersion modeling studies in Florida.

Project Background

PSD permit applications will be prepared and submitted for the following sources:

- At the Central District Wastewater Treatment Plant, three existing (previously exempt) 3,600 horsepower (hp) diesel-fueled internal combustion (IC) engines, each driving an associated 2,500 kilowatt (kW) electrical generator; and one new 3,800 hp diesel-fueled IC engine, driving a 2,700 kW electrical generator.
- At the Alexander Orr Water Treatment Plant, five 3,800 hp diesel-fueled IC engines (four existing - previously exempt - and one new), each driving an associated 2,700 kW electrical generator;
- At the John E. Preston Water Treatment Plant, three existing (previously exempt) 3,600 hp diesel-fueled IC engines, each driving an associated 2,500 kW electrical generator; and three new 3,800 hp diesel-fueled IC engines, each driving an associated 2,700 kW electrical generator.

Pollutants to be Evaluated

The proposed projects will increase emissions of NO_x, sulfur dioxide (SO₂), and particulate matter (PM₁₀) by significant quantities (as defined by the PSD regulations). Emissions of these pollutants will be evaluated in the PSD applications. Emissions of other pollutants are not expected to be significant as a result of operating the proposed sources, but will be evaluated in each application.

Emissions Inventory (Proposed Emission Sources)

An emissions inventory will be prepared for proposed operation of the standby generators to facilitate a comprehensive dispersion analysis of PSD pollutants emitted. The inventory will be based on the worst-case scenario of operating each plant entirely on power produced by the standby generators. Plant loads are approximately 7,000 kW (Central District - including electrical load from the future oxygen plant); 8,000 kW (Alexander Orr); and 9,000 kW (John E. Preston). Therefore, it will be necessary that the plants be capable of operating 3 standby generator sets (Central District) or 4 generator sets (Alexander Orr and John E. Preston) simultaneously in order to accommodate worst-case demand scenarios. Additional generator sets are present at each facility and will be operated; however, maximum operation will not exceed the levels stated above.

The emissions inventory will be utilized to determine the source's PSD increment consumption (NO_x, SO₂, and PM₁₀) and to demonstrate compliance with the national ambient air quality standards (NAAQS) for these pollutants. The general approach will be to perform initial modeling and screening analyses using a single year of meteorological data in order to identify the area of significant air quality impacts. Subsequent detailed modeling will be conducted for pollutants having a significant impact on air quality using all five years of meteorological data. The results of the detailed 5-year modeling will be included in the permit application submittal in both hard copy and electronic format.

Best Available Control Technology Demonstration (BACT)

BACT will be utilized for all pollutants that will be emitted in significant quantities (NO_x, SO₂, and PM₁₀). BACT will be determined by obtaining information from EPAs RACT/BACT/LAER Clearinghouse database and by contacting select state and agency personnel to ensure that the most recent PSD permit determinations will be considered in the determination of what constitutes BACT. In accordance with State and Federal guidance, the BACT demonstration for this project will follow the "top-down" approach.

It is currently expected that BACT for NO_x emissions will consist of combustion air precooling plus fuel injection timing retard (FITR) technology. BACT for SO₂ and PM₁₀ emissions will consist of a fuel oil sulfur content restriction of 0.05 weight percent and efficient combustion practices (FITR).

Emission Inventory (Other Emission Sources)

If the predicted impact of the proposed source is greater than the PSD significant impact thresholds, it will be necessary to model other emission sources (using five years of meteorological data) along with the emissions from the proposed source for the purpose of determining PSD increment consumption and/or demonstrating compliance with the NAAQS. If this is necessary, a written request for an inventory of PSD and baseline emission sources will be submitted to FDEP. Such a request will specify the proposed location of the source and the predicted radii of significant impact of the facility (by pollutant).

Dispersion Model

The dispersion model to be used in the modeling analysis will be EPA's most recent version of the Industrial Source Complex Model (ISC3) as is available from EPAs Technology Transfer Network (TTN) Bulletin Board. The ISC3 model will be used for all averaging periods (including annual) for all pollutants to be modeled. Horizontal stacks, present at the Alexander Orr Water Treatment Plant, will be modeled with a negligible exit velocity (0.1 m/s) and an effective stack diameter to conserve stack flow rate while retaining the effect of thermal buoyancy.

Meteorological Data

In accordance with FDEP guidance, the meteorological data that will be used in the modeling will consist of five years of Miami International Airport surface air data and West Palm Beach upper air data. The data have been obtained from the EPA TTN bulletin board and processed using EPAs most recent meteorological data processing program, the Meteorological Processor for Regulatory Models (MPRM). The five year period of record for the data to be used will be 1987 - 1991.

Receptor Data

Maximum concentrations will be identified with a resolution of at least 100 meters in the receptor grid. The general approach will be to perform initial modeling with a coarse spacing not greater than 500 meters, followed by refined modeling with a closer receptor spacing of 100 meters. The initial modeling will allow the determination of the radius of significant impact of the facility by pollutant, averaging period, and year of meteorological data. Areas within the radii of significant impact where high concentrations are predicted will be subjected to increased scrutiny in the refined modeling.

Model Options

The regulatory default, simple terrain, and rural dispersion options will be selected for all model runs. Building heights for structures within 5L of the sources, where L is the minimum of the building height or the maximum projected building width, will be identified for modeling purposes to facilitate calculation of downwash and building wake effects by the model.

PSD Class I Areas

All three facilities are located within 100 kilometers (km) of the Everglades National Park, which has been designated a Federal Class I area. Since the Everglades National Park is a Federal Class I area, it will be necessary to evaluate the impacts of the proposed source on air quality related values. The Federal Land Manager will be contacted to determine the appropriate level of analysis.

Nonattainment Areas

There are no nonattainment areas for any pollutants located within 200 km of the proposed source. Therefore it is assumed that there will be no need to evaluate the impacts of the proposed source on any nonattainment area.

Background Air Quality Data

Preconstruction air quality monitoring data must be obtained and included in the air quality impact analysis for all PSD pollutants. It is our understanding that air quality monitoring data is available in the Miami area. If initial modeling of emission from the proposed source indicates that the pollutants will be present in excess of PSD significant impact levels, we will request that FDEP provide us with background ambient air quality levels for this area. The data will be used to demonstrate that the NAAQS will not be threatened or exceeded as a result of the operation of the proposed source.

Determination of PSD Increment Consumption

If the predicted impacts of the proposed source exceed the PSD significant impact levels for any criteria pollutants, then a modeling analysis will be conducted to predict the PSD increment consumption for those pollutants in the area surrounding the source. This will be accomplished by modeling, in conjunction with the proposed source emissions, all other

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PSD increment consuming sources identified and provided to the applicant by FDEP. The modeling will be conducted within the area of significant impact (for each pollutant) as determined by modeling only the proposed source emissions (see previous), using five years of meteorological data.

Demonstration of Compliance with NAAQS

If the predicted impacts of the proposed source exceed the PSD significant impact levels, a demonstration of compliance with the NAAQS will be conducted for all pollutants that have a significant impact. This will be conducted by modeling, in conjunction with the proposed source emissions, all other PSD and baseline emission sources identified and provided to the applicant by FDEP. The modeled impacts of all other PSD and baseline sources will be added to the ambient air quality background data that will be supplied by FDEP (see previous). The modeling will be conducted within the area of significant impact (for each pollutant) as determined by modeling only the proposed source emissions (see previous), using five years of meteorological data.

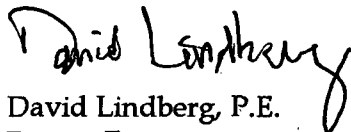
Modeling Results

The results of the modeling analysis will be summarized in a chapter of a PSD Permit Application Report that will be submitted to FDEP.

We request that FDEP provide us with written concurrence on the above described approach. If you should have any questions, comments, or suggestions regarding the above, please do not hesitate to call me at (619) 687-0110. My FAX number is (619) 687-0111.

Sincerely,

CH2M HILL



David Lindberg, P.E.
Project Engineer

cc: Bertha Goldenberg/Miami-Dade WASD
George Howroyd/CH2M HILL
John Castleberry/CH2M HILL

cc: a. unero
C. Holladay