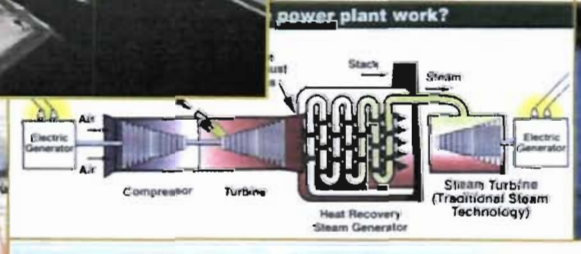
West County energy center

Unit 3



PSD Application: RAI Response

March 2008

FPL

SIGNATURE PAGE
TO SUPPORT EMISSIONS CALCULATIONS

APPLICATION INFORMATION

Professional Engineer Certification

1. Professional Engineer Name: **Kennard F. Kosky**
   Registration Number: **14996**
2. Professional Engineer Mailing Address...
   Organization/Firm: **Golder Associates Inc.****
   Street Address: **6241 NW 23rd Street, Suite 500**
   City: **Gainesville** State: **FL** Zip Code: **32653**
3. Professional Engineer Telephone Numbers...
   Telephone: **(352) 336-5600** ext.**516** Fax: **(352) 336-6603**
4. Professional Engineer Email Address: **kkosky@golder.com**
5. Professional Engineer Statement:

I, the undersigned, hereby certify, except as particularly noted herein, that:*

(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this application for air permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and

(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.

(3) If the purpose of this application is to obtain a Title V air operation permit (check here ☐, if so), I further certify that each emissions unit described in this application for air permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance plan and schedule is submitted with this application.

(4) If the purpose of this application is to obtain an air construction permit (check here ☒, if so) or concurrently process and obtain an air construction permit and a Title V air operation permit revision or renewal for one or more proposed new or modified emissions units (check here ☐, if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.

(5) If the purpose of this application is to obtain an initial air operation permit or operation permit revision or renewal for one or more newly constructed or modified emissions units (check here ☐, if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.

Signature 3/12/09
Date

(seal) KENNARD F. KOSKY LICENSE 14996 STATE OF FLORIDA PROFESSIONAL ENGINEER

* Attach any exception to certification statement.
** Board of Professional Engineers Certificate of Authorization #00001670

FDEP REQUEST FOR ADDITIONAL INFORMATION

Florida Department of Environmental Protection

Bob Martinez Center
2600 Blairstone Road
Tallahassee, Florida 32399-2400

Charlie Crist
Governor
Jeff Kottkamp
Lt. Governor
Michael W. Sole
Secretary

January 18, 2008

SENT BY ELECTRONIC MAIL – RECEIVED RECEIPT REQUESTED

Randall_R_LaBauve@fpl.com
Mr. Randall R. LaBauve, Vice President
Environmental Services Department
Florida Power and Light Company (FPL)
700 Universe Blvd.
Juno Beach, Florida 33408

Re: DEP File No. 0990646-002-AC (PSD-FL-396)
West County Energy Center
Nominal 1,250 megawatt (MW) Natural Gas-fired Unit 3

Dear Mr. LaBauve:

On December 6, 2007 we received your application for an Air Construction Permit pursuant to the Rules for the Prevention of Significant Deterioration (PSD permit) to construct a natural gas-fired power plant to be known as Unit 3 at the FPL West County Energy Center site in Palm Beach County. On December 21, 2007, we received supplemental information in support of the application submitted on December 6, 2007.

Pursuant to Rules 62-4.055, and 62-4.070 F.A.C., Permit Processing, the Department requests submittal of the additional information prior to processing the application. Should your response to any of the below items require new calculations, please submit the new calculations, assumptions, reference material and appropriate revised pages of the application form.

1. The supplemental information received on December 21, 2007 included an analysis with regards to all three units or the proposed ultimate capacity of the facility. Please provide additional information to complete this analysis, including a Class I Air Quality Related Values analysis, ozone impacts, impacts on soils, vegetation and wildlife along with sulfuric acid mist impacts. FDEP-1
2. Please provide a table summarizing the PSD air pollutant emissions and hazardous air pollutants (HAP) from Units 1, 2 and 3 combined. FDEP-2
3. Are there more future phases planned for the facility? FDEP-3
4. Provide estimates of ammonia (NH_3) emissions and strategies to minimize slip and fine particulate formation potential. What kind of ammonia is proposed to be used (aqueous or anhydrous)? What safety measures will be in place for the transportation and storage? FDEP-4

5. Table D-5 in the application submitted December 6, 2007 details the PM_{10} inventory for PSD increment modeling. The Atlantic Sugar facility has PSD increment consuming sources. Please explain why they were not included in the increment modeling analysis. FDEP-5

6. Table D-5 in the application submitted December 6, 2007 details the PM_{10} inventory for PSD increment modeling. Please explain why the U.S. Sugar Corp. Bryant Mill PSD increment consuming emission units are not modeled. FDEP-6

7. There are three "non-major" facilities within the Significant Impact Area for this project. Two of the facilities, Hubbard Construction and Palm Beach Aggregates, were considered as one source with regards to the PSD increment analysis for Unit 3. Are these facilities adjacent to each other? If the property line of each facility is not adjacent to each other, then there is ambient air between them, which should be modeled. FDEP-7

Comments have been received by the United States Environmental Protection Agency (EPA) Region IV and the National Park Service (NPS). These comments have been forwarded to Golder and Associates and to Jacquelyn Lorne, FPL Environmental Specialist, and are attached. Please address these comments.

Rule 62-4.050(3), F.A.C. requires that all applications for a Department permit must be certified by a professional engineer registered in the State of Florida. This requirement also applies to responses to Department requests for additional information of an engineering nature. Please advise the professional engineer to make sure he/she uses the correct seal in compliance with the applicable requirements of the Florida Board of Professional Engineers.

If there are any questions, please call Al Linero at 850-921-9523 or Debbie Nelson at 850/921-9537.

Sincerely,

Trina L. Vielhauer, Chief
Bureau of Air Regulation

TLV/dn

cc: Jim Little, EPA Region 4: little.james@epamail.epa.gov
Dee Morse, NPS: dee_morse@nps.gov
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Mayor, Village of Wellington: clynn@ci.wellington.fl.us
Scott Davis, EPA Region 4: davis.scott@epa.gov

Sandra Silva, U.S. Fish and Wildlife Service: Sandra_Silva@fws.gov

Comments from the EPA Region 4

From: Krivo.Stanley@epamail.epa.gov
Sent: Thursday, January 10, 2008 3:45 PM
To: Nelson, Deborah
Cc: Forney.Kathleen@epamail.epa.gov
Subject: Review Comments - AQ Modeling for WCEC

Debbie,

Thanks for the opportunity to review this PSD application. The following are my review comments on the West County Energy Center PSD permit application for the addition of a third 1,250 MW combined cycle unit (Unit 3) at the existing, but not operating, West County Energy Center (WCEC) facility near West Palm Beach, FL. These comments are provided for your use in your completion determination.

[Note: This review does not include the air quality modeling files provided with the application. Comments associated with the review of these files will be provided in a separate memorandum.]

1. Project Emissions – The WCEC received a permit for two combined–cycle units, with total capacity of 2,500 MW, in January 2007. The permitted facility has not yet operated. The proposed third unit of 1,250 MW at a facility that has not yet operated does not appear to qualify as a modification to an existing facility. This PSD application should be a revision to the initial PSD application as it redefines the West County Energy Center as a three-unit, 3,750 MW facility. From the discussion on page 34 of FL DEP's Technical Evaluation and Preliminary Determination (dated 1 March 2006) for the initial two unit PSD permit application; it appears that FPL planned this facility for an "Ultimate Site Capacity" of 3,300 MW. EPA-1

[Note: The 21 December 2007 supplemental information regarding the air quality analysis provides PSD Class II area impact modeling with the total WCEC emissions (e.g., all three combined cycle units etc.) as a single entity. Although this is not supplied as part of the permit application for Unit 3, it does provide some of the PSD Class II impact information to address the above concern. It does not provide the complete WCEC facility impacts required to support a PSD permit application. For example, PSD increment and AQRV impacts to the Everglades PSD Class I area were not provided. It also does not provide complete information on the modeling procedures (e.g., the

various operating load/fuel configurations used in the analysis and associated emissions and stack exit parameters).]

2. PM2.5 Standards – Although FL may not have adopted the following standards in their regulations; the following should be included or remove from Table 3-1. EPA-2
- PM2.5 annual (15 ug/m3) and 24-hour (35 ug/m3) NAAQS
- The 24-hour ozone standard of 0.08 ppm
- Remove the annual NAAQS for PM10

The PM2.5 NAAQS should also be included in the other applicable tables (e.g., Tables 2-1 through 2-7) and appropriate sections of the application.

3. AQRV Modeled Emissions – Section 6.1.2 incorrectly indicated only pollutants with emissions greater than the PSD significant emission rates (SER) are used in the AQRV modeling. All project pollutants affecting the particular AQRV should be included in the modeling even if less than the SER. EPA-3

4. Near-field Dispersion Model – AERMOD is proposed for the PSD Class II area air quality impact modeling. The impact modeling performed for Units 1 &2 in the initial PSD application used the ISCST3 model. Because of the substantial differences in the technical features and input data requirements of the two models, it is recommended that the impacts of the total WCEC facility be performed using the technically superior AERMOD modeling system. Although this recommendation adds support to the above comment that this modification is better treated as a revised PSD permit application, it is also appropriate if this PSD application continues to be considered a major PSD modification to an existing major facility. EPA-4

[Note: As indicated in comment #1, the 21 December 2007 supplemental air quality analysis provides PSD Class II area impact modeling for the total WCEC emissions (e.g., all three combined cycle units etc.) as a single entity. Although this is not supplied as part of the permit application for Unit 3, it does provide some of the PSD Class II impact information to address the above concern.]

5. Meteorological Data – Although the proposed 2001-2005 Palm Beach/Florida International University (PBI) meteorological data record was representative for the project using the ISCST3 model, these data were further reviewed to assess their representativeness EPA-5

for application using AERMOD. The surface parameters of the meteorological site and project site must be similar.

Direction independent average surface roughness, albedo and Bowen ratio for each site were developed for this comparison. Although a direction dependent evaluation should be performed, the average albedo and Bowen ration were found to be similar. The average roughness parameters, more significant in the assessment of representativeness, reveal significant differences. To access this difference the meteorological data were processed separately using the PBI and project surface parameters. The two data records were then used in an air quality modeling analysis. Comparison of the modeling results showed the meteorological data processed with the WCEC surface parameters produced lower concentrations. Therefore, as a compensating measure to address the differences in the surface characteristics of the project and meteorological observation site and to ensure the resulting controlling concentrations are not underestimated, the ambient impact modeling used the processed meteorological data producing the larger concentrations (i.e., PBI meteorological data processed with PBI surface parameters).
[Note: Review of Appendix C, which is a one page Table C-1, provides only the maximum concentrations for various modeled scenarios for the two meteorological input data sets. No explanation of the modeling procedures (e.g., receptor grid, operational loads, ambient temperatures, etc.) is provided. This information is needed to evaluate the appropriateness of the data in this table.]

6. Significant Impact Analyses (SIA) – The following comments are associated with the SIA for both PSD Class I and Class II areas. EPA-6

- The analyses included 12 scenarios: 2 loads (100 and 75%), 2 fuels (oil and natural gas), and 3 ambient temperatures (35, 59, and 95 F). The permit should limit the facility to these operating conditions. EPA-6.1

- CT operations without HRSG are not included in the modeling. Likewise, duct burners operating with oil fired CT was not included in the modeling. The permit should limit the facility to these operating conditions. EPA-6.2

- The operation scenario producing the maximum impact for each pollutant and averaging period are provided in Table 6-6: EPA-6.3

SO2 Annual	Natural Gas/ 95F/ 100% Load
SO2 24-hour	Same as SO2 Annual
SO2 3-hour	Natural Gas/ 59F/ 100% Load
PM10 Annual	Oil/ 59F/ 75% Load
PM10 24-hour	Oil/ 95F/ 75% Load
NO2 Annual	Same as SO2 Annual

Because the worst-case operating scenario varies with pollutant and averaging period, the appropriate worst-case WCEC operating scenario should be used in the cumulative AAQS and PSD compliance modeling. The WCEC emissions and stack exit parameters used in the compliance modeling should be provided.

- The Class I SIA should use the same maximum operating scenario as those used in the Class II analyses. Table 6-8 indicates 35F and 100% load was used for all pollutants for both natural gas and oil burning. The correct worst-case operating scenarios were not used in the PSD Class I area analyses. Because the resultant impacts are much less than the PSD Class I significant impact levels, it appears unlikely this error will change the provided result (i.e., no significant impact in the Class I area). EPA-6.4

7. Building Downwash – The text indicates the EPA Building Profile Input Program used to provide building downwash information was BPIP. The program that should be used with AERMOD is BPIPPRM. This program includes the consideration of the PRIME algorithm that is included in AERMOD. Review of the program run information reveals the correct BPIPPRM was used. EPA-7

8. Modeling Palm Beach Aggregates (PBA) and Hubbard Construction Company – The treatment of these two separate sources as one facility within the PBA owned property has not been justified. Three criteria must be satisfied to consider two separate facilities as a single source. The two companies must 1) be under common control, 2) be located on contiguous or adjacent property, and 3) have the same industrial grouping. One company operating on land leased from another is not sufficient to make the two facilities one source. Each company has different ambient air depending on the specifics of land ownership, location of the leased land, and barriers to the public provided by each company. [see Stephen Page Memorandum of 22 June 2007 found at (http://www.epa.gov/region07/programs/artd/air/nsr/nsrmemos/leaseair.pdf)] Eliminating the totally the property owned by Palm Beach Aggregates from impact assessment when emissions from both companies are included may not be a correct procedure. More detailed and specific information on each company should be provided as well as a figure showing plant layout for each facility including location of barriers to public access. EPA-8

9. Additional Impact Assessment – The following comments are associated with the section addressing additional impacts in the PSD Class II site area and Loxahatchee NWR. EPA-9

- Class II Area Visibility Impacts: Section 7.3.3 just states no EPA-9.1

visibility impacts are expected. It is suggested that VISCREEN modeling be performed at identified visibility sensitive receptors to quantify visibility impacts. This visibility assessment should include total emissions from the WCEC and not just those associated with the proposed Unit 3.

- Vegetation, Soils, and Wildlife: To address impacts to these environmental concerns the text just noted that the modeled cumulative concentrations were less than the FL AAQS and PSD increments. Because the AAQS were established to project the public health and welfare, no significant impact are expected from this modification. Tables 7-1 through 7-3 provide exposure/concentrations where effects on these environmental components have been observed. Because these target exposure/concentration values are applicable to vegetation, soils, and wildlife in both the Class I area, Class II area, and Loxahatchee, it is suggested that a similar comprehensive assessment be performed for these environmental components as was performed for them in the Everglades Class I area. EPA-9.2

10. Deposition Impacts to Loxahatchee – The deposition impact in Loxahatchee should be performed using the total emissions from WCEC and not just those associated with the proposed Unit 3. The CALPUFF modeling procedures used for this assessment, including input emission rates, should be provided. The resultant modeled deposition values should be compared to the FLM determined acceptable target values (i.e., 0.01 kg/ha/yr for eastern U.S. sulfur and nitrogen deposition). These target values are associated with an annual average at a receptor not a spatial average over a large area. EPA-10

11. Impacts to Everglades PSD Class I Area AQRV – Unlike the PSD Class I significant impact levels and increment, the acceptable target values for the AQRV are based on ambient concentrations, visibility, etc. identified to be of concern for a source. The target values are not designed for comparison with individual emission component/unit at a source. Therefore, the total emission from the WCEC, not just the proposed Unit 3 emissions, should be included in the modeling. The emissions include all pollutant affecting the AQRV of concern. The following are comments on the Everglades AQRV impact assess. EPA-11

- The comparison of the impacts from the proposed Unit 3 emissions provided in Table 7-4 to the known sensitive ambient concentrations in Tables 7-1 through 7-3 is not appropriate. EPA-11.1
- The emissions to be used in this visibility assessment should be the total emissions from WCEC not just those from the proposed Unit 3. EPA-11.2
- The deposition analyses should include the total emissions from EPA-11.3

WCEC.
- The National Park Service federal land manager should be provided an opportunity to review and comment on this PSD permit application. Their comments on the AQRV analyses at Everglades should prevail. EPA-11.4

Please let me know if you have any questions.
Thanks...sjk

Stanley J. Krivo
US Environmental Protection Agency, Air Planning Branch Atlanta Federal Center, 61 Forsyth Street, SW Atlanta, Georgia 30303
404/562-9123 (Phone) 404/562-9019(Fax)

Comments from the National Park Service

From: Dee_Morse@nps.gov
Sent: Wednesday, January 16, 2008 4:10 PM
To: Nelson, Deborah
Cc: John_Bunyak@nps.gov; John_Notar@nps.gov; Dan_Kimball@nps.gov; Meredith_Bond@fws.gov; Krivo.Stanley@epamail.epa.gov
Subject: Re: FW: Review Comments - AQ Modeling for WCEC

Debbie,

We reviewed the West County Energy Center (WCEC) Unit 3 PSD application. According to the WCEC PSD application, Florida Power & Light (FPL) will construct a 1,250 MW combined cycle unit (Unit 3) which will be in operation in 2011. It is our understanding that FPL is also constructing two (Units 1 and 2) 1,250 MW combined cycle units at WCEC. Unit 1 is expected to be in operation by mid 2008 and Unit 2 in operation a year later. Supplemental modeling files show that FPL conducted an air quality increment analysis with emissions from all three units which showed no significant impact on Class I increments at Everglades National Park. However, FPL conducted an AQRV analysis which only included emission from Unit 3. We ask that FPL conduct an AQRV modeling analysis and include emissions from Units 1, 2, and 3 in order for us to properly assess impacts at Everglades National Park, Big Cypress National Preserve and Biscayne National Park. We also ask that the AQRV modeling analysis follow the WCEC modeling protocol we reviewed in November 2007. NPS-1

I will alert the USFWS Air Quality Branch about potential air quality concerns at Loxahatchee National Wildlife Refuge since the WCEC site is located adjacent to the refuge.

Dee

Dee Morse
Environmental Protection Specialist
Air Resources Division
Natural Resource Program Center
National Park Service
Phone: 303 969-2817
Fax: 303 969-2822
e-mail: dee_morse@nps.gov

FDEP RESPONSES

FDEP COMMENTS

Comment FDEP-1. The supplemental information received on December 21, 2007 included an analysis with regards to all three units or the proposed ultimate capacity of the facility. Please provide additional information to complete this analysis, including a Class I Air Quality Related Values analysis, ozone impacts, impacts on soils, vegetation and wildlife along with sulfuric acid mist impacts.

Response FDEP-1: The information submitted to the Florida Department of Environmental Protection (FDEP) on December 21, 2007, contained supplemental air analyses addressing the air quality impacts of all three units at West County Energy Center (WCEC) with respect to ambient air quality standards and Prevention of Significant Deterioration (PSD) Increments. The information contained in this submittal contains additional information to address the predicted impacts of the three units at WCEC in the vicinity of the plant as they relate to air quality impacts on soils, vegetation, and wildlife and on the Class I Air Quality Related Values (AQRVs) at the Everglades National Park (NP).

PSD Class II Analysis

The potential impacts from the proposed Unit 3 at WCEC on soils, vegetation, and wildlife; visibility; and ozone concentrations were addressed in Section 7.0 of the PSD Permit Application. The effect levels related to the potential impacts to vegetation and wildlife were included in this section. The information provided in Section 7.0 has been supplemented in tabular format in Table FDEP-1-1 to address the potential impacts from the three units at WCEC in the near-field areas of the plant, including the Loxahatchee National Wildlife Refuge (NWR). Table FDEP-1-1 presents a summary of impacts for sulfur dioxide (SO_2), nitrogen oxides (NO_x), particulate matter (PM), carbon monoxide (CO), sulfuric acid mist (SAM), and ozone (O_3). The maximum impacts from the three units predicted in the plant vicinity were also assumed to represent impacts that could occur at the Loxahatchee NWR. This is a conservative assumption since lower impacts would be predicted in the Loxahatchee NWR. Potential sulfate and nitrate deposition impacts for the three units were predicted at the Loxahatchee NWR (see Response EPA-10-1) and shown in Table FDEP-1-1.

Because effects on vegetation and wildlife are based on pollutant concentrations for various averaging times, additional modeling runs were performed for several pollutants to obtain the maximum impacts that were not readily available from the previous modeling. These runs were performed to obtain the

1-, 3-, and 8-hour average nitrogen dioxide (NO_2) concentrations and 1- and 8-hour average particulate matter with aerodynamic diameter of 10 microns or less (PM_{10}) concentrations. These impacts were based on the same modeling assumptions and procedures described in the PSD Application and included the worst-case operating loads [in these cases, base load and 35 degrees Fahrenheit (°F)]. A summary of these impacts is provided in Table FDEP-1-2.

Impacts on Soils, Vegetation, and Wildlife

As shown in Table FDEP-1-1, potential impacts from all three units at WCEC are orders of magnitude lower than potential effect levels and are expected to be insignificant or no threat to the soils, vegetation, and wildlife in the vicinity of the site. It should be recognized that the maximum concentrations predicted for all three units at WCEC occur at a single location for the specific averaging time. At other locations, as well as other times at the maximum location for the shorter term averaging times (e.g., 3-hour), the concentrations would be much lower. In addition, the worst-case operating conditions (e.g., 35°F turbine inlet) are assumed to occur for all predicted concentrations, which would not occur under all the meteorological conditions evaluated. As a result, the predicted impacts are conservative and representative of worst-case impacts.

Visibility Impacts

No visibility impairment in the vicinity of WCEC is expected due to the types and quantities of emissions for the three units. The opacity of the plume exiting each of the combustion turbine/heat recovery steam generator (CT/HRSG) stacks will be 10 percent or less under normal operation using either natural gas as the primary fuel or ultra low-sulfur light oil as the backup fuel. These fuels are the cleanest fossil fuels and have virtually no visible plume during normal operation.

Ozone Impacts

As stated in the PSD Permit Application, volatile organic compound (VOC) and NO_x emissions are precursors to the formation of O_3. O_3 is not directly emitted from fuel combustion, but is formed downwind from emission sources when VOC and NO_x emissions react in the presence of sunlight. Natural (i.e., without man-made sources) ambient concentrations of O_3 are normally in the range of 20 to 39 micrograms per cubic meter ($\mu g/m^3$) [0.01 to 0.02 parts per million (ppm)].

The nearest monitors to the WCEC that measure O_3 concentrations are located in Palm Beach County (see Table 5-1 and Figures 7-17 and 7-18 in the PSD Permit Application). These stations measure

concentrations according to U.S. Environmental Protection Agency (EPA) procedures. Based on the O_3 monitoring concentrations measured over the last several years, the region is in attainment of the existing 1-hour O_3 ambient air quality standard (AAQS) as well as the new 8-hour O_3 AAQS.

Total VOC emissions in Palm Beach County are estimated to be approximately 54,600 tons per year (TPY) [149.7 tons per day (TPD)] and 49,900 TPY (136.7 TPD) for 2005 and 2015, respectively, for stationary and mobile sources from the *Air Quality Maintenance Plan (2005-2015); Dade, Broward, and Palm Beach Counties* (FDEP, 2002). Similarly, total NO_x emissions in Palm Beach County are estimated to be approximately 55,000 TPY (150.7 TPD) and 39,500 TPY (108.3 TPD) for 2005 and 2015, respectively.

The maximum potential VOC emissions increase due to all three units at WCEC is 247 TPY (0.67 TPD), which represents less than a 0.5-percent increase in regional VOC emissions estimated through 2015. The maximum potential NO_x emissions increase due to all three units at WCEC is 1,072 TPY (2.9 TPD), which represents a less than 3-percent increase in regional NO_x emissions estimated through 2015.

The potential change in O_3 concentrations in Palm Beach County, as a result of increases in VOC and NO_x emissions from the three units at WCEC relative to the existing total VOC and NO_x emissions, is expected to be insignificant.

PSD Class I AQRV Analysis

An AQRV analysis has been performed to address the predicted impacts of the three units for the WCEC for impacts on soils, vegetation, and wildlife; regional haze; and sulfate and nitrate deposition at the PSD Class I area of the Everglades NP. Similar to Table FDEP-1-1, the information has been summarized in tabular format in Table FDEP-1-3 to address the potential impacts from the three units at WCEC at the Everglades NP PSD Class I area. Table 2 from the December 2007 submittal has been updated [Table 2 (revised)] to include CO and SAM concentrations.

Impacts on Soils, Vegetation, and Wildlife

As shown in Table FDEP-1-3, the maximum potential impacts from all three units at WCEC on the Everglades NP Class I area are orders of magnitude less than the potential effect levels and are expected to have an insignificant impact on soils, vegetation, and wildlife. In addition, the maximum potential impacts were determined using worst-case operating conditions and meteorological

conditions and, therefore, represent conservative impacts. As a result, no threat to the soils, vegetation, and wildlife in the Everglades NP are expected to occur as a result of WCEC.

Regional Haze and Sulfate/Nitrate Deposition

An overall summary of the 24-hour visibility impairment in the form of regional haze predicted for all three units at WCEC at the Everglades NP is presented in Table FDEP-1-3. A detailed summary of these impacts is presented in Table FDEP-1-4.

Using the conservative Method 2 approach in determining regional haze, the maximum visibility impairment for natural gas-firing and ultra low-sulfur light oil-firing are predicted to be 6.45 and 10.3 percent, respectively, which are greater than the visibility impairment criteria of 5 percent. There were 2 and 6 days over the 5-percent criteria for natural gas-firing and fuel oil-firing, respectively. It should be noted that the second highest visibility impairment predicted for fuel oil-firing is 6.04 percent and is 40 percent lower than the maximum value, occurring in a different year than the year for which the maximum impairment value was predicted. Since fuel oil is used as backup fuel for a maximum of 500 hours a year and there were a limited number of predicted impacts greater than the 5-percent criteria, the probability of this weather condition occurring with this fuel is very low.

Further, the highest visibility impairment values were predicted using Method 2 and do not account for periods when natural visibility impairment conditions occur. Since the visibility impacts ignore periods when natural visibility conditions are already obscuring visibility, such as rain, fog, etc., results predicted during these periods produce unrealistically high visibility impacts. The highest predicted visibility impacts for all three units at WCEC were predicted to occur during periods when natural visibility impairment conditions were occurring. As a result, additional analyses should consider those days when natural visibility impairment occurs and exclude days where visibility impairment is caused by natural phenomena.

The results of Method 2 for days over 5 percent predicted visibility impairment were evaluated for periods when naturally occurring visibility impairment was occurring. This is referred to as Method 2 with natural obscuration adjustment. For the Everglades NP, the weather data from Miami and Palm Beach International Airports were reviewed for each of these days for occurrences of existing visibility-obscuring phenomena (e.g., fog) and precipitation. From those observations, there were hours with mist and light rain that occurred during the days when the highest impacts were predicted.

As indicated in Table FDEP-1-3, there would still remain several days when the predicted visibility impacts for fuel oil-firing remain greater than the 5-percent criteria. Based on the review of these weather data and infrequent occurrences of regional haze impacts from all three units at WCEC, the Method 2 results suggest that WCEC will not have an adverse impact on visibility at the Everglades NP.

The use of Method 2 is recognized as a conservative assessment of regional haze and will likely be changed in the future with alternate methods that represent newer science. An alternative approach to assess visibility impairment has been recommended by the federal land managers (FLM) and EPA for sources that are affected by the Best Achievable Retrofit Technology (BART) regulations. This approach, commonly known as the BART approach, estimates visibility impacts using Class I area specific monthly regional haze adjustment factors (referred to as Method 6). In Method 6, the 8th highest daily average visibility impairments are determined for each year for the purpose of comparing the results to whether the source contributes to or causes visibility impairment. The 8th highest daily average visibility impairment, which corresponds to the 98-percentile daily value during 1 year, is recommended by the FLM and EPA to account for the frequency of the contributions to visibility impairment caused by the source based on the natural variability of meteorology (70 FR 39121).

Table FDEP-1-5 provides the 24-hour visibility impairment due to WCEC Units 1, 2, and 3 at the PSD Class I area of the Everglades NP using CALPOST Visibility Method 6.

Monthly relative humidity factors at the Everglades NP used with Method 6 were obtained from Table A2 of the document *Guidance for Estimating Natural Visibility Conditions Under the Regional Haze Rule* (EPA, 2003). A Rayleigh scattering coefficient of 10 inverse mega-meters was used. The remainders of the modeling procedures were the same as used for the Method 2 visibility impairment predictions for Units 1, 2, and 3, and described in the PSD application.

The predicted 24-hour highest and 8th-highest visibility impairment (in percent) at the Everglades NP is presented in Table FDEP-1-5. The highest predicted values are lower than those predicted using Method 2 with only one value above the 5-percent threshold. The results of Method 6 together with the Method 2 results indicate that all three units at WCEC will not significantly contribute to regional haze in the Everglades NP.

An overall summary of the annual sulfur and nitrogen deposition predicted for the three units at WCEC is presented in Table FDEP-1-3; a detailed summary of these impacts is presented in Table FDEP-1-6. As shown in these tables, the maximum annual sulfur and nitrogen depositions are 0.0059 kilogram per hectare per year (kg/ha/yr) and 0.0036 kg/ha/yr, respectively. Both these values are less than the FLM project-only sulfur and nitrogen deposition analysis threshold of 0.01 kg/ha/yr.

Comment FDEP-2. Please provide a table summarizing the PSD air pollutant emissions and hazardous air pollutants (HAP) from Units 1, 2 and 3 combined.

Response FDEP-2: Summaries of the PSD air pollutant emissions and HAPs from Units 1, 2, and 3 combined are presented in Tables FDEP-2-1, FDEP-2-2, and FDEP-2-3, respectively. Table FDEP-2-1 also includes $PM_{2.5}$ emissions as requested by EPA (see Comment EPA-2 and response). The $PM_{2.5}$ emissions have been based on PM_{10} emissions to be conservative.

Comment FDEP-3. Are there more future phases planned for the facility?

Response FDEP-3: There are no current plans for future additions to WCEC beyond Unit 3.

Comment FDEP-4. Provide estimates of ammonia (NH_3) emissions and strategies to minimize slip and fine particulate formation potential. What kind of ammonia is proposed to be used (aqueous or anhydrous)? What safety measures will be in place for the transportation and storage?

Response FDEP-4: The ammonia emissions for WCEC Unit 3 will be limited to 5 ppm corrected to 15-percent oxygen as authorized for WCEC Units 1 and 2. The ammonia emission rate at 5 ppm corrected to 15-percent oxygen is 17.3 pounds per hour (lb/hr) at 59-degree turbine inlet and baseload conditions. Ammonia is minimized through the selective catalytic reduction (SCR) control system that incorporates control signals from the NO_x continuous emission monitoring system (CEMS). In addition, annual compliance tests will be conducted. Aqueous ammonia (19 percent) is expected to be used. Safety measures such as facility design, standard operating procedures, and operator training will be implemented for aqueous ammonia handling, as is standard practice for handling such materials at FPL facilities.

Comment FDEP-5. Table D-5 in the application submitted December 6, 2007 details the PM_{10} inventory for PSD increment modeling. The Atlantic Sugar facility has PSD increment consuming sources. Please explain why they were not included in the increment modeling analysis.

Response FDEP-5: Atlantic Sugar Association (ASA) has not operated since the spring of 2006 and is unlikely to operate in 2008, but the air operation permit is currently active. For the AAQS analyses, the maximum potential emissions from the ASA sources were used. For the PSD Class II Increment consumption analyses, the baseline sources were modeled only since the facility has not operated since the spring of 2006 (i.e., actual current emissions were assumed to be zero).

The supplemental modeling analyses performed to assess the cumulative source impacts were based on the significant impact analyses for WCEC Units 1, 2, and 3. These analyses were performed to assess compliance with the annual and 24-hour SO_2, annual and 24-hour PM_{10}, and annual NO_2 AAQS as well as the PSD Class II Increments for the same pollutants. The emission rates for the ASA sources were the same as those used for the modeling performed for the PSD permit application submitted for WCEC Unit 3, except that the NO_x emissions were included. For the annual NO_2 AAQS modeling, the ASA sources were modeled using the current maximum potential emissions. For the annual NO_2 PSD Class II Increment modeling, both the baseline NO_x emissions were modeled with the current maximum potential emissions. However, the supplemental modeling for the PSD Class II analysis did not include SO_2 and PM_{10}. Therefore, additional modeling was performed for this response to assess the compliance with the SO_2 and PM_{10} PSD Class II Increments by including the current ASA SO_2 and PM_{10} emissions.

Since the ASA facility is located about 12 kilometers (km) from the WCEC site and is expected to have minimal impacts near the WCEC site, additional PSD Class II Increment consumption modeling was performed to predict the 24-hour and annual SO_2 and PM_{10} impacts for the ASA sources only, using baseline and current emissions. For this modeling, the current ASA emissions were based on the maximum potential emissions to provide a conservative estimate (i.e., higher than expected) of potential increment consumption. Modeling was performed using the 5 years of meteorological data and receptor grids used in the previous analyses.

Based on this modeling, the maximum changes in 24-hour and annual SO_2 and PM_{10} impacts from the ASA sources are predicted to be minimal, less than 1 $\mu g/m^3$ (i.e., for the 24-hour period: 0.8 $\mu g/m^3$ for SO_2, 0.6 $\mu g/m^3$ for PM_{10}; and for the annual period: 0.0 $\mu g/m^3$ for SO_2, 0.01 $\mu g/m^3$ for PM_{10}).

Even if these impacts were added to the maximum 24-hour SO_2 and PM_{10} impacts predicted in the cumulative impact analysis, independent of time period and receptor location, the total impacts would be well below the allowable PSD Class II Increments for SO_2 and PM_{10}. Using this conservative approach, the maximum SO_2 and PM_{10} impacts from PSD sources will still comply with allowable PSD Class II Increments.

Comment FDEP-6. Table D-5 in the application submitted December 6, 2007 details the PM_{10} inventory for PSD increment modeling. Please explain why the U.S. Sugar Corp. Bryant Mill PSD increment consuming emission units are not modeled.

Response FDEP-6: The facility did not operate in 2007 and relinquished the air operating permit for the Bryant facility. As a result, the air emission sources from the facility were not included in either the AAQS impact analysis or the PSD increment modeling.

Comment FDEP-7. There are three "non-major" facilities within the Significant Impact Area for this project. Two of the facilities, Hubbard Construction and Palm Beach Aggregates, were considered as one source with regards to the PSD increment analysis for Unit 3. Are these facilities adjacent to each other? If the property line of each facility is not adjacent to each other, then there is ambient air between them, which should be modeled.

Response FDEP-7: The information is presented below.

INTRODUCTION

The original modeling analysis located Hubbard Construction (Hubbard) and Palm Beach Aggregates (PBA) adjacent to each other based on the information in the minor source operating permits. There is no "ambient air" between these minor sources as they were originally modeled.

In further evaluating the relationships between PBA and Hubbard, additional inquiry was made to PBA related to the industrial activities and relationships on their property. This inquiry revealed that two other facilities are operating on land leased from PBA and within the PBA property: Adonel Concrete Palm Beach Inc. (Adonel; AIRS ID 0990653) and Continental Florida Material Inc. (Continental; AIRS ID 0990554). These two concrete batch plants are operating under the FDEP air general permit rule pursuant to Rule 62-210.310(5)(b), F.A.C. It was also determined that the

location for PBA sources identified by the UTM coordinates in the PBA permit is the location of their office building. The actual locations of the PBA sources are farther to the north than those previously modeled. As a result, the locations of these sources were corrected.

Hubbard, Adonel, and Continental operate on leased property that is entirely within the property owned by PBA. All the leased property is entirely within the properties owned and controlled by PBA. The access road to PBA properties has a guarded entrance and the general public does not have access. Hubbard, Adonel, and Continental also receive their raw material from PBA. These aggregate minor source emission units should be considered as one single source for modeling purposes since public access is restricted by the PBA fence-line and other measures noted above.

Because of the additional minor sources within the area of significant impact of WCEC and additional information from sources on leased areas and source locations, a revised PM_{10} air quality analysis was conducted. Air dispersion modeling was performed to predict the maximum PM_{10} concentrations to determine compliance with the PSD Increments and AAQS for PM_{10}.

METHODOLOGY

PBA owns all the land on the eastern side of the WCEC property up to the L-8 Canal, except for the ponds in the northeast owned by the South Florida Water Management District (SFWMD). Figure FDEP-7-1 shows the PBA property and the Adonel, Continental, and Hubbard emissions sources within the leased PBA property. As indicated above, PBA limits access to the entire property with security, drainage canals, berms and fences. The leased properties of Adonel, Continental, and Hubbard are entirely within the PBA property with no boundary exterior to the PBA property. Business invitees of these companies, and not the general public, are allowed to access the PBA property via PBA road to conduct business. The boundaries for these facilities generally consist of drainage ditches and other physical impediments (e.g., berms).

The Adonel and Continental facilities operate under the FDEP air general permit requirements. The amount of primary raw material (aggregate and sand) was obtained from PBA. Emissions were calculated using the amount of raw materials and the emission factors for concrete batching from AP-42, which is summarized in Table FDEP-7-1. For the PBA sources, the same emission rates presented in the original application were used. However, the fugitive emissions were modeled using three separate volume sources (source parameters were kept the same as the previous modeling) to

conform to the area where activities are occurring. The truck traffic fugitive emissions were modeled using a re-drawn line source to represent the actual haul road used. Fugitive emissions from Hubbard were also modeled using three separate volume sources to include the area of fugitive emissions. Emission rates and hours of operation for Hubbard were obtained or estimated from the FDEP Query Report.

PBA, Hubbard, Adonel, and Continental were modeled as separate emission units with ambient air represented by the property ownership boundaries of PBA and FPL, as well as other locations considered to be ambient air (e.g., SFWMD ponds, Canal L-8 and property to the east, U.S. Highway 441, and sugar cane field to the west). PSD increment-consuming sources and AAQS sources were included in the modeling. The PSD increment-consuming sources included all three units at WCEC; the minor sources for Adonel, Continental, Hubbard, and PBA; and other sources identified in the original SCA and PSD application. Receptors were placed within the significant impact area (SIA) for PM_{10} excluding the properties of WCEC and PBA (PBA property and lands leased by PBA to Adonel, Continental, and Hubbard). However, receptors were also placed on the boundaries between WCEC, PBA, and SFWMD. The receptor grid is shown in Figure FDEP-7-2. Receptors were not placed on PBA property since the general public does not have access to the property owned by PBA to which public access is restricted. For the AAQS analysis, the background PM_{10} concentrations used were the same as those used in the original application.

RESULTS

Modeling results are summarized in Table FDEP-7-2 for the analyses comparing the maximum predicted impacts to the PSD and AAQS. As shown Table FDEP-7-2, the maximum impacts are predicted to be less than the PSD Class II Increments and AAQS for the 5 years modeled. The locations of the maximum predicted impacts occur on the boundaries closest to the fugitive sources associated with PBA, Adonel, Continental, and Hubbard. This result was expected since fugitive sources have low-level release heights and no associated plume rise.

An additional analysis was performed to determine the maximum PM_{10} impacts from PSD increment sources except all three units at WCEC. This additional analysis was performed to provide some insight as to the potential contribution of WCEC to the maximum PM_{10} impacts from existing PSD increment sources. The results of this analysis are shown in Table FDEP-7-3 and show that the incremental impact of WCEC is a very small portion of the total PSD Class II Increment consumption

in the vicinity of WCEC. As shown in Table FDEP-7-3, the receptor locations and averaging times for the maximum impacts are identical to those in Table FDEP-7-2. This indicates that all three units at WCEC contribute no more than 0.19 and 0.44 $\mu g/m^3$ to the maximum annual and 24-hour average PSD Class II Increment consumption, respectively. These predicted contributions from all three units at WCEC to the maximum PSD Class II concentrations from modeled sources are less than the significant impact levels.

ATTACHMENTS TO FDEP RESPONSES

TABLE FDEP-1-1
MAXIMUM PREDICTED IMPACTS ON SOILS, VEGETATION, WILDLIFE, AND VISIBILITY
IN THE WCEC VICINITY, INCLUDING THE LOXAHATCHEE NWR
WCEC UNITS 1, 2, AND 3

AQRV/ Pollutant	Averaging Time	Maximum Impact from WCEC [a]	Maximum Impact Reference	Potential Effect Levels	Effect	Effect Level Reference	Conclusion
<u>Impacts on Soil</u>							
Sulfur Deposition	Annual	0.25 kg/ha/yr	Table EPA-10-1	None	Maximum deposition small compared to background of 4.9 to 5.6 kg/ha/yr. Natural sea-salt background is 0.7 kg/ha/yr. Average deposition over 20 times lower than natural background.	Section 7.4.5.2	No threat
Nitrogen Deposition	Annual	0.076 kg/ha/yr	Table EPA-10-1	None	Maximum deposition small compared to background of 3.4 to 4.8 kg/ha/yr. Average deposition over 40 times lower than natural background.	Section 7.4.5.2	No threat
<u>Impacts on Vegetation</u>							
SO_2	Annual	1.3 $\mu g/m^3$	Table 1 (Letter 12/21/07)	8 $\mu g/m^3$	Damage to sensitive species such as lichens.	Section 7.2.2.1	No threat
	3-Hour	16 $\mu g/m^3$	Table 1 (Letter 12/21/07)	790 $\mu g/m^3$	Injury to sensitive plants such as ragweed, legumens, blackberry, southern pine, and red and black oak.	Section 7.2.2.1	No threat
NO_x	1-Hour	58.8 $\mu g/m^3$	Table FDEP 1-2	3800 $\mu g/m^3$	Acute exposure (1-, 4-, and 8-hour), foliar injury to sensitive plants.	Section 7.2.2.2	No threat
	3-Hour	45.2 $\mu g/m^3$	Table FDEP 1-2	3800 $\mu g/m^3$	Acute exposure (1-, 4-, and 8-hour), foliar injury to sensitive plants.	Section 7.2.2.2	No threat
	8-Hour	43.7 $\mu g/m^3$	Table FDEP 1-2	3800 $\mu g/m^3$	Acute exposure (1-, 4-, and 8-hour), foliar injury to sensitive plants.	Section 7.2.2.2	No threat
	Annual	1.6 $\mu g/m^3$	Table 1 (Letter 12/21/07)	2000 $\mu g/m^3$	Chronic exposure, yield loss and chlorosis in plant tissue.	Section 7.2.2.2	No threat
PM	8-Hour	21.5 $\mu g/m^3$	Table FDEP 1-2	210 $\mu g/m^3$	Damage to plant foliage in the form of higher leaf area/dry weight ratio.	Section 7.2.2.3	No threat
CO	1-Hour	73.8 $\mu g/m^3$	Table 1 (Letter 12/21/07)	6.85E+06 $\mu g/m^3$	Cytochrome c Oxidase inhibition in corn, sorghum, millet, and Guinea grass.	Section 7.2.2.4	No threat
SAM [b]	--	-- --	--	-- --	--	--	No threat
Ozone [c]	--	-- --	--	-- --	--	--	

TABLE FDEP-1-1
MAXIMUM PREDICTED IMPACTS ON SOILS, VEGETATION, WILDLIFE, AND VISIBILITY
IN THE WCEC VICINITY, INCLUDING THE LOXAHATCHEE NWR
WCEC UNITS 1, 2, AND 3

AQRV/ Pollutant	Averaging Time	Maximum Impact from WCEC [a]	Maximum Impact Reference	Potential Effect Levels	Effect	Effect Level Reference	Conclusion
Impacts on Wildlife							
SO_2	1-Hour	16 (3-hour) $\mu g/m^3$	Table 1 (Letter 12/21/07)	427 $\mu g/m^3$	Respiratory stress in guinea pigs.	Table 7-3	No significant effects expected
	Annual	1.3 $\mu g/m^3$	Table 1 (Letter 12/21/07)	13 $\mu g/m^3$	Long-term effect - decreased abundance in deer mice.	Table 7-3	No significant effects expected
NO_x	3-Hour	45.2 $\mu g/m^3$	Table FDEP 1-2	1917 $\mu g/m^3$	Respiratory stress in mice.	Table 7-3	No significant effects expected
	Annual	1.6 $\mu g/m^3$	Table 1 (Letter 12/21/07)	96 $\mu g/m^3$	Long-term effect - respiratory stress in guinea pigs.	Table 7-3	No significant effects expected
PM	1-Hour	28.6 $\mu g/m^3$	Table FDEP 1-2	100 $\mu g/m^3$	2-Hour exposure of 100 $\mu g/m^3$ $NiCl_2$ is reported to cause respiratory stress in rats.	Table 7-3	No significant effects expected
Impacts on Visibility							
Opacity		10 % (or less)		-- %	Based on oil-firing used as backup fuel; with natural gas-firing, opacity expected to be 0%.		No significant effects expected

[a] Maximum impacts predicted within the WCEC plant site vicinity. As a conservative approach, these impacts are assumed to represent impacts in the Loxahatchee NWR. For sulfur and nitrogen deposition, maximum impacts based on those predicted in the Loxahatchee NWR.

[b] No significant adverse effects on vegetation are expected from SAM because of no threat from SO_2 concentration.

[c] Total VOC and NO_x emissions increase of 247 and 1,042 TPY for WCEC Units 1, 2, & 3 is less than 0.5 and 3, respectively, of the projected VOC and NO_x emissions. Therefore, the O_3 monitoring concentrations presented in Section 6.11 of the PSD Permit Application are not expected to significantly change due to the these units.

TABLE FDEP-1-2
MAXIMUM PREDICTED 1-HOUR AND 8-HOUR AVERAGE PM_{10} IMPACTS AND 1-HOUR, 3-HOUR, AND 8-HOUR AVERAGE NO_2 IMPACTS
WCEC UNITS 1, 2, AND 3

Averaging Time and Rank	Modeled Concentration [a] ($\mu g/m^3$)	Receptor Location UTM- East (m)	Receptor Location UTM- North (m)	Time Period (YYMMDDHH)
PM_{10} [b]				
1-Hour, Highest	18.6	561,650	2,952,100	01110507
	23.3	562,150	2,954,200	02123124
	25.1	562,150	2,954,200	03010102
	28.6	562,273	2,952,064	04090323
	21.7	561,850	2,954,100	05011402
8-Hour, Highest	12.1	561,977	2,951,856	01042616
	11.6	561,750	2,954,200	02123124
	11.6	561,985	2,953,986	03042516
	21.5	562,450	2,953,800	04090508
	15.5	561,750	2,953,800	05102408
NO_2 [b]				
1-Hour, Highest	44.8	562,270	2,952,265	01111904
	48.1	562,150	2,954,200	02123124
	51.9	562,150	2,954,200	03010102
	58.8	562,273	2,952,064	04090323
	44.8	561,850	2,954,100	05011402
3-Hour, Highest	29.6	561,350	2,952,300	01100821
	30.4	562,304	2,954,028	02061415
	30.2	562,250	2,954,400	03010103
	45.2	562,450	2,953,800	04090506
	37.5	561,750	2,954,100	05071006
8-Hour, Highest	24.6	561,977	2,951,856	01042616
	23.8	561,750	2,954,200	02123124
	23.7	561,985	2,953,986	03042516
	43.7	562,450	2,953,800	04090508
	31.6	561,750	2,953,800	05102408

Note: YYMMDDHH = Year, Month, Day, Hour Ending

[a] Concentrations are based on concentrations predicted using five years of meteorological data from 2001 to 2005 of surface and upper air data from the National Weather Service stations at Palm Beach and Miami International Airports, respectively.

[b] Based on firing oil at base load and 35 °F conditions.

TABLE FDEP-1-3
PREDICTED IMPACTS ON AQRVs IN THE EVERGLADES NATIONAL PARK PSD CLASS I AREA
WCEC UNITS 1, 2, AND 3

AQRV/ Pollutant	Averaging Time	Maximum Impact from WCEC	Maximum Impact Reference	Potential Effect Levels	Effect	Effect Level Reference	Conclusion
Impacts on Soil							
Sulfur Deposition	Annual	0.0059 kg/ha/yr	Table FDEP 1-6	None	Potential effect level not available. 765,000 eq/ha is the buffering capacity (sensitivity to acid inputs) of dominant soil type in Everglades NP.	Section 7.4.5.2	No significant impact
Nitrogen Deposition	Annual	0.0036 kg/ha/yr	Table FDEP 1-6	None	Potential effect level not available. 765,000 eq/ha is the buffering capacity (sensitivity to acid inputs) of dominant soil type in Everglades NP.	Section 7.4.5.2	No significant impact
Impacts on Vegetation							
SO_2	Annual	0.0066 $\mu g/m^3$	Table 2 (Letter 12/21/07) (Revised 022108)	8 $\mu g/m^3$	Damage to sensitive species such as lichens.	Section 7.2.2.1	No threat
	3-Hour	0.48 $\mu g/m^3$	Table 2 (Letter 12/21/07) (Revised 022108)	790 $\mu g/m^3$	Injury to sensitive plants such as ragweed, legumens, blackberry, southern pine, and red and black oak.	Section 7.2.2.1	No threat
NO_x	1-Hour	1.66 $\mu g/m^3$	Table 2 (Letter 12/21/07) (Revised 022108)	3800 $\mu g/m^3$	Acute exposure (1-, 4-, and 8-hour), foliar injury to sensitive plants.	Section 7.2.2.2	No threat
	3-Hour	1.28 $\mu g/m^3$	Table 2 (Letter 12/21/07) (Revised 022108)	3800 $\mu g/m^3$	Acute exposure (1-, 4-, and 8-hour), foliar injury to sensitive plants.	Section 7.2.2.2	No threat
	8-Hour	0.88 $\mu g/m^3$	Table 2 (Letter 12/21/07) (Revised 022108)	3800 $\mu g/m^3$	Acute exposure (1-, 4-, and 8-hour), foliar injury to sensitive plants.	Section 7.2.2.2	No threat
	Annual	0.0058 $\mu g/m^3$	Table 2 (Letter 12/21/07) (Revised 022108)	2000 $\mu g/m^3$	Chronic exposure, yield loss and chlorosis in plant tissue.	Section 7.2.2.2	No threat
PM	8-Hour	0.72 $\mu g/m^3$	Table 2 (Letter 12/21/07) (Revised 022108)	210 $\mu g/m^3$	Damage to plant foliage in the form of higher leaf area/dry weight ratio.	Section 7.2.2.3	No threat
CO	1-Hour	2.32 $\mu g/m^3$	Table 2 (Letter 12/21/07) (Revised 022108)	6.85E+06 $\mu g/m^3$	Cytochrome c Oxidase inhibition in corn, sorghum, millet, and Guinea grass.	Section 7.2.2.4	No threat
SAM [a]	Annual	0.0025 $\mu g/m^3$	--	-- --	--	--	No threat
Ozone [b]	--	-- --	--	-- --	--	--	

TABLE FDEP-1-3
PREDICTED IMPACTS ON AQRVs IN THE EVERGLADES NATIONAL PARK PSD CLASS I AREA
WCEC UNITS 1, 2, AND 3

AQRV/ Pollutant	Averaging Time	Maximum Impact from WCEC	Maximum Impact Reference	Potential Effect Levels	Effect	Effect Level Reference	Conclusion
Impacts on Wildlife							
SO_2	1-Hour	0.61 $\mu g/m^3$	Table 2 (Letter 12/21/07) (Revised 022108)	427 $\mu g/m^3$	Respiratory stress in guinea pigs.	Table 7-3	Impacts insignificant compared to effect level
	Annual	0.0066 $\mu g/m^3$	Table 2 (Letter 12/21/07) (Revised 022108)	13 $\mu g/m^3$	Long-term effect - decreased abundance in deer mice.	Table 7-3	Impacts insignificant compared to effect level
NO_x	3-Hour	1.28 $\mu g/m^3$	Table 2 (Letter 12/21/07) (Revised 022108)	1917 $\mu g/m^3$	Respiratory stress in mice.	Table 7-3	Impacts insignificant compared to effect level
	Annual	0.0058 $\mu g/m^3$	Table 2 (Letter 12/21/07) (Revised 022108)	96 $\mu g/m^3$	Long-term effect - respiratory stress in guinea pigs.	Table 7-3	Impacts insignificant compared to effect level
PM	1-Hour	1.15 $\mu g/m^3$	Table 2 (Letter 12/21/07) (Revised 022108)	100 $\mu g/m^3$	2-Hour exposure of 100 $\mu g/m^3$ $NiCl_2$ is reported to cause respiratory stress in rats.	Table 7-3	Impacts insignificant compared to effect level
Impacts on Visibility		Method 2 - all days[c]					
Visibility	24-Hour	10.3 (Oil) % Change	Table FDEP 1-4	10.0 % Change	Visibility impairment possible if >10%.	Section 7.4.5.1	No significant effects on visibility based on overall results.
		6.5 (NG) % Change			<5% - Insignificant to contribute to visibility impairment.	Section 7.4.5.1	Only 1 valid day >5% for oil firing. All days <5% for gas firing.
		Method 2 - excluded days[d]					
		5.79 (Oil) % Change			5 to 10% - May contribute to visibility impairment.		
		<5.0 (NG) % Change					
		Method 6[e]					
		2.17 (Oil)					
		2.25 (NG)					
Impacts from Sulfur and Nitrogen Deposition							
Sulfur	Annual	0.0059 kg/ha/yr	Table FDEP 1-6	0.01 kg/ha/yr	Deposition analysis threshold, below which the deposition is insignificant.	Section 7.4.5.2	Insignificant
Nitrogen	Annual	0.0036 kg/ha/yr	Table FDEP 1-6	0.01 kg/ha/yr	Deposition analysis threshold, below which the deposition is insignificant.	Section 7.4.5.2	Insignificant

[a] No significant adverse effects on vegetation are expected from SAM because of no threat from SO_2 concentration.

[b] Total VOC and NO_x emissions increase of 247 and 1,042 TPY for WCEC Units 1, 2, & 3 is less than 0.5 and 3, respectively, of the projected VOC and NO_x emissions. Therefore, the O_3 monitoring concentrations presented in Section 6.11 of the PSD Permit Application are not expected to significantly change due to the these units.

[c] Maximum visibility impacts calculated using Visibility Method 2.

[d] Maximum visibility impacts calculated using Method 2 and excluding days when natural visibility impairment conditions occurred (e.g., rain, mist, etc.).

[e] 8th highest visibility impacts calculated using visibility Method 6.

TABLE 2 (REVISED)
SUMMARY OF MAXIMUM POLLUTANT CONCENTRATIONS PREDICTED FOR WCEC UNITS 1, 2, AND 3
COMPARED TO THE EPA CLASS I SIGNIFICANT IMPACT LEVELS AT THE PSD CLASS I AREA OF THE EVERGLADES NATIONAL PARK

Pollutant	Averaging Time	Maximum Predicted Concentration ($\mu g/m^3$) [a]								
		Natural Gas [b]			Fuel Oil [c]			Maximum [d]		
		2001	2002	2003	2001	2002	2003	2001	2002	2003
SO_2	Annual	0.0048	0.0058	0.0066	0.0008	0.0009	0.0010	0.0048	0.0058	0.0066
	24-Hour	0.126	0.123	0.130	0.022	0.020	0.023	0.126	0.123	0.130
	8-Hour	0.34	0.31	0.26	0.064	0.035	0.059	0.34	0.31	0.26
	3-Hour	0.479	0.401	0.408	0.089	0.060	0.075	0.479	0.401	0.408
	1-Hour	0.54	0.48	0.61	0.093	0.078	0.093	0.54	0.48	0.61
NO_2	Annual	0.0043	0.0048	0.0055	0.0098	0.0103	0.0105	0.0046	0.0051	0.0058
	24-Hour	0.155	0.151	0.118	0.376	0.290	0.305	0.376	0.290	0.305
	8-Hour	0.37	0.38	0.33	0.877	0.659	0.776	0.88	0.66	0.78
	3-Hour	0.440	0.500	0.484	1.091	1.039	1.284	1.091	1.039	1.284
	1-Hour	0.71	0.65	0.71	1.532	1.478	1.656	1.53	1.48	1.66
PM_{10}	Annual	0.0025	0.0030	0.0035	0.0099	0.0110	0.0123	0.0029	0.0035	0.0040
	24-Hour	0.060	0.059	0.073	0.241	0.259	0.302	0.241	0.259	0.302
	8-Hour	0.16	0.14	0.15	0.714	0.389	0.722	0.71	0.39	0.72
	3-Hour	0.243	0.187	0.210	1.052	0.648	0.881	1.052	0.648	0.881
	1-Hour	0.26	0.22	0.30	1.118	0.833	1.153	1.12	0.83	1.15
CO	Annual	0.0235	0.0268	0.0305	0.0156	0.0172	0.0183	0.0235	0.0268	0.0305
	24-Hour	0.557	0.452	0.565	0.395	0.346	0.392	0.557	0.452	0.565
	8-Hour	1.56	1.08	1.21	1.125	0.534	0.929	1.56	1.08	1.21
	3-Hour	2.114	1.424	1.758	1.481	0.882	1.131	2.114	1.424	1.758
	1-Hour	2.25	1.82	2.32	1.576	1.184	1.483	2.25	1.82	2.32
SAM	Annual	0.0019	0.0022	0.0025	0.0003	0.0003	0.0004	0.0019	0.0022	0.0025
	24-Hour	0.042	0.041	0.048	0.007	0.007	0.008	0.042	0.041	0.048
	8-Hour	0.12	0.08	0.12	0.021	0.016	0.019	0.12	0.08	0.12
	3-Hour	0.176	0.112	0.168	0.029	0.023	0.029	0.176	0.112	0.168
	1-Hour	0.19	0.13	0.20	0.034	0.025	0.037	0.19	0.13	0.20

[a] Based on the CALPUFF model using 2001, 2002, and 2003 surface and upper air meteorological data.

[b] Based on 100 % operating load.with duct firing at 35 °F. Duct firing based on natural gas-fired duct burner with maximum heat input rate of 475 MMBtu/hr (HHV) for the CTs.

[c] Based on 100 % operating load at 35 °F.

[d] Maximum annual average concentration are based on prorating the maximum impacts for each operation by the following maximum number of hours requested for that operation:

Pollutant	Hours for Each Operation		
	Natural Gas	Fuel Oil	Total
SO_2	8,760	0	8,760
PM_{10}	8,260	500	8,760
NO_2	8,260	500	8,760

TABLE FDEP-1-4
MAXIMUM 24-HOUR AVERAGE VISIBILITY IMPAIRMENT PREDICTED FOR WCEC UNITS 1, 2, AND 3 AT THE PSD CLASS I AREA OF THE EVERGLADES NATIONAL PARK

Operating Scenario	Units	Visibility Impairment Impacts 2001	2002	2003	Total Number of Days > Visibility Impairment Criteria 5%	10%
Fuel Oil Firing [a]	Maximum %	4.82	10.3 [b]	6.04 [b]		
	No. Days >					
	5%	0	3	2	5	
	10%	0	1	0		1
Natural Gas Firing	Maximum %	4.19	6.45 [b]	5.15 [b]		
	No. Days >					
	5%	0	1	1	2	
	10%	0	0	0		0

[a] Other values predicted greater than 5%:

2001	2002	2003
None	5.42	5.79
	5.39	

[b] This value was predicted for a day when natural visibility impairment conditions occurred (e.g., rain, mist, etc.) based on hourly observations from the NWS stations at the Miami and Palm Beach International Airports and should not be considered an appropriate comparison for Visibility Impairment Impacts of WCEC.

TABLE FDEP-1-5
MAXIMUM 24-HOUR AVERAGE VISIBILITY IMPAIRMENT PREDICTED FOR WCEC UNITS 1, 2, AND 3 AT THE PSD CLASS I AREA OF THE EVERGLADES NATIONAL PARK - METHOD 6

Operating Scenario	Units	Visibility Impairment Impacts			Total Number of Days > Visibility Impairment Criteria	
		2001	2002	2003	5%	10%
Fuel Oil Firing [a]	Maximum %	3.23	5.58	3.68		
	8th-Highest [a]	2.05	2.16	2.17		
	No. Days >					
	5%	0	1	0	1	
	10%	0	0	0		0
Natural Gas Firing	Maximum %	2.80	3.4	3.71		
	8th-Highest [a]	2.25	2.16	2.17		
	No. Days >					
	5%	0	0	0	0	
	10%	0	0	0		0

[a] The 8th highest concentration is used for Best Available Retrofit Technology (BART) determinations.

TABLE FDEP-1-6
MAXIMUM ANNUAL SULFUR AND NITROGEN DEPOSITION PREDICTED FOR WCEC UNITS 1, 2, AND 3 AT THE PSD CLASS I AREA OF THE EVERGLADES NATIONAL PARK

Species	Total Deposition (Wet & Dry)						Deposition Analysis Threshold [b] (kg/ha/yr)
	2001		2002		2003		
	($g/m^2/s$)	(kg/ha/yr)[a]	($g/m^2/s$)	(kg/ha/yr)[a]	($g/m^2/s$)	(kg/ha/yr)[a]	
Nitrogen (N) Deposition [c]	6.56E-12	0.0021	1.16E-11	0.0036	7.97E-12	0.0025	0.01
Sulfur (S) Deposition [c]	1.31E-11	0.0041	1.88E-11	0.0059	1.30E-11	0.0041	0.01

[a] Conversion factor is used to convert $g/m^2/s$ to kg/hectare (ha)/yr with the following units:

$g/m^2/s$ x 0.001 kg/g
x 10,000 m^2/hectare
x 3,600 sec/hr
x 8,760 hr/yr = kg/ha/yr
or
$g/m^2/s$ x 3.154E+08 = kg/ha/yr

[b] Deposition analysis thresholds (DAT) for nitrogen and sulfur deposition provided by the U.S. Fish and Wildlife Service, January 2002. A DAT is the additional amount of N or S deposition within a Class I area, below which estimated impacts from a proposed new or modified source are considered insignificant.

[c] For N deposition, based on each CT firing natural gas with duct firing for 8,260 hours and firing oil for 500 hours. For S deposition, based on each CT firing natural gas with duct firing for 8,760 hours.

TABLE FDEP-2-1

SUMMARY OF MAXIMUM POTENTIAL ANNUAL EMISSIONS FOR THE WEST COUNTY ENERGY CENTER

	West County Unit 3 Annual Emissions (tons/year)					
Pollutant	**3 CTs/HRSGs with Duct Burners**	**Cooling Tower**	**Emergency Generator (2 for WCEC3)**	**Natural Gas Heater (2 for WCEC3)**	**Auxiliary Boiler (0 for WCEC3)**	**TOTAL**
SO_2	199	NA	0.0163	0.47	--	199
PM	132	116.5	1.41	0.16	--	250
PM_{10}	132	5.1	1.41	0.16	--	139
$PM_{2.5}$[a]	132	0.033	0.58	0.16	--	133
NO_x	327	NA	24.34	8.30	--	359
CO	484	NA	29.98	6.97	--	521
VOC (as methane)	78.4	NA	3.53	0.46	--	82
Sulfuric Acid Mist	40.4	NA	NA	NA	--	40.4
Lead	0.022	NA	NA	NA	--	0.02

	West County Units 1, 2, & 3 Annual Emissions (tons/year)					
Pollutant	**9 CTs/HRSGs with Duct Burners**	**3 Cooling Towers**	**Emergency Generator (6 for WCEC)**	**Natural Gas Heater (4 for WCEC)**	**Auxiliary Boiler (2 for WCEC)**	**TOTAL**
SO_2	597	NA	0.0490	0.95	0.07	598
PM	396	349.6	4.23	0.32	0.04	751
PM_{10}	396	15.3	4.23	0.32	0.04	416
$PM_{2.5}$[a]	396	0.100	1.75	0.32	0.04	399
NO_x	980	NA	73.02	16.61	2.49	1,072
CO	1,451	NA	89.95	13.95	4.60	1,559
VOC (as methane)	235	NA	10.58	0.91	0.13	247
Sulfuric Acid Mist	121	NA	NA	NA	NA	121
Lead	0.067	NA	NA	NA	NA	0.067

Source: Golder, 2007.

[a] No PSD significant emission rate has been established yet for $PM_{2.5}$. PSD significant emission rate for PM_{10} used as a surrogate.

TABLE FDEP-2-2
REGULATED AND HAZARDOUS AIR POLLUTANT EMISSION FACTORS AND EMISSIONS
FOR THE WEST COUNTY ENERGY CENTER UNITS 1, 2, AND 3
WHEN FIRING NATURAL GAS, FRAME G CT

Parameter	Emission Rate (lb/hr) firing Natural Gas for Operating Conditions of Base Load (1)		Natural Gas Maximum Annual Emissions (TPY) (2)		
Ambient Temperature (°F):	59 °F	59 °F w/DB	59 °F	59 °F	59 °F
HIR (MMBtu/hr):	2,590	3,065	1 CT/HRSG	3 CTs/HRSGs	9 CTs/HRSGs
Sulfuric acid mist	2.10	3.68	11.5	34.4	103.2
HAPs (Section 112(b) of Clean Air Act)					
1,3-Butadiene	0.001114	0.001318	0.005	0.016	0.047
Acetaldehyde	0.1036	0.1226	0.481	1.443	4.330
Acrolein	0.0166	0.0196	0.077	0.231	0.693
Benzene	0.0311	0.0368	0.144	0.433	1.299
Ethylbenzene	0.0829	0.0981	0.385	1.155	3.464
Formadehyde	0.608	0.727	2.834	8.501	25.503
Naphthalene	0.00337	0.00398	0.016	0.047	0.141
Polycyclic Aromatic Hydrocarbons (PAH) (3)	0.00570	0.00674	0.026	0.079	0.238
Propylene Oxide	0.0751	0.0889	0.349	1.046	3.139
Toluene	0.0855	0.1011	0.397	1.191	3.572
Xylene	0.166	0.196	0.770	2.309	6.927
Antimony	0.0	0.0	0.0	0.00	0.00
Arsenic	0.0	0.0	0.0	0.00	0.00
Beryllium	0.0	0.0	0.0	0.00	0.00
Cadmium	0.0	0.0	0.0	0.00	0.00
Chromium	0.0	0.0	0.0	0.00	0.00
Lead	0.0	0.0	0.0	0.00	0.00
Manganese	0.0	0.0	0.0	0.00	0.00
Mercury	0.0	0.0	0.0	3.61E-05	1.08E-04
Nickel	0.0	0.0	0.0	0.00	0.00
Selenium	0.0	0.0	0.0	0.00	0.00
HAPs (Total)	1.178	1.402	5.48	16.5	49.4

(1) Emissions based on the following emission factors and conversion factors for firing natural gas:

Emission Factors		Value	Reference
Sulfuric acid mist		10	%; Conversion of SO_2 to SO_3 in gas turbine
1,3-Butadiene	(a)	0.43	lb/10^{12} Btu; AP-42,Table 3.1-3. EPA 2000
Acetaldehyde		40	lb/10^{12} Btu; AP-42,Table 3.1-3. EPA 2000
Acrolein		6.4	lb/10^{12} Btu; AP-42,Table 3.1-3. EPA 2000
Benzene		12	lb/10^{12} Btu; AP-42,Table 3.1-3. EPA 2000
Ethylbenzene		32	lb/10^{12} Btu; AP-42,Table 3.1-3. EPA 2000
Formadehyde		0.091	ppmvd @15% O_2 (see Table 9a)
Naphthalene		1.3	lb/10^{12} Btu; AP-42,Table 3.1-3. EPA 2000
Polycyclic Aromatic Hydrocarbons (PAH)		2.2	lb/10^{12} Btu; AP-42,Table 3.1-3. EPA 2000
Propylene Oxide	(a)	29	lb/10^{12} Btu; AP-42,Table 3.1-3. EPA 2000
Toluene		33	lb/10^{12} Btu; AP-42,Table 3.1-3. EPA 2000. Database
Xylene		64	lb/10^{12} Btu; AP-42,Table 3.1-3. EPA 2000

Antimony	0.00E+00
Arsenic	0.00E+00
Beryllium	0.00E+00
Cadmium	0.00E+00
Chromium	0.00E+00
Lead	0.00E+00
Manganese	0.00E+00
Mercury	1.00E-03
Nickel	0.00E+00
Selenium	0.00E+00

(a) Based on 1/2 the detection limit; expected emissions are lower.

(2) Annual emissions based on ambient temperature of 59 °F firing natural gas for following hours:

5880 CT
2880 CT/DB

(3) Assumed to be representative of Polycyclic Organic Matter (POM) emissions, a regulated HAP.

TABLE FDEP-2-3
REGULATED AND HAZARDOUS AIR POLLUTANT EMISSION FACTORS AND EMISSIONS
FOR THE WEST COUNTY ENERGY CENTER UNITS 1, 2, AND 3
WHEN FIRING DISTILLATE FUEL OIL, FRAME G CT

Parameter	Emission Rate (lb/hr) Firing Distillate Fuel Oil (1)	Maximum Annual Emissions (TPY)				
	Base Load	Distillate Fuel Oil (2)		Natural Gas (4)	Natural Gas and Fuel Oil (5)	
Ambient Temperature (°F):	59 °F					
HIR (MMBtu/hr):	2,244	1 CT/HRSG	3 CTs/HRSGs	3 CTs/HRSGs	3 CTs/HRSGs	9 CTs/HRSGs
Sulfuric acid mist	0.67	0.17	0.5	34.4	32.9	98.8
HAPs (Section 112(b) of Clean Air Act)						
1,3-Butadiene	0.0359	0.0090	0.0269	0.0155	0.042	0.125
Acetaldehyde	0.00	0.00	0.00	1.44	1.4	4.1
Acrolein	0.00	0.00	0.00	0.231	0.22	0.65
Benzene	0.123	0.0309	0.0926	0.433	0.50	1.50
Ethylbenzene	0.00	0.00	0.00	1.155	1.09	3.27
Formadehyde	0.558	0.140	0.419	8.50	8.4	25.3
Naphthalene	0.0785	0.0196	0.0589	0.0469	0.103	0.309
Polycyclic Aromatic Hydrocarbons (PAH) (3)	0.0898	0.0224	0.0673	0.0794	0.14	0.43
Propylene Oxide	0.00	0.00	0.00	1.046	0.99	2.96
Toluene	0.00	0.00	0.00	1.19	1.1	3.4
Xylene	0.00	0.00	0.00	2.31	2.2	6.5
Antimony	0.00	0.00	0.00	0.00	0.0	0.0
Arsenic	0.0247	0.00617	0.0185	0.00	0.019	0.056
Beryllium	0.000696	0.000174	0.000522	0.00	0.00052	0.00157
Cadmium	0.01077	0.00269	0.00808	0.00	0.0081	0.0242
Chromium	0.0247	0.00617	0.0185	0.00	0.019	0.056
Lead	0.0314	0.00785	0.0236	0.00	0.024	0.071
Manganese	1.77	0.443	1.33	0.00	1.3	4.0
Mercury	0.00269	0.000673	0.00202	0.00	0.0021	0.0062
Nickel	0.01032	0.00258	0.00774	0.00	0.0077	0.0232
Selenium	0.0561	0.0140	0.0421	0.00	0.042	0.126
HAPs (Total)	2.82	0.705	2.11	16.5	17.6	52.9

(1) Emissions based on the following emission factors and conversion factors for firing distillate fuel oil:

Emission Factors		Value	Reference
Sulfuric acid mist		5	%; Conversion of SO_2 to SO_3 in gas turbine
1,3-Butadiene	(a)	16	lb/10^{12} Btu; AP-42,Table 3.1-4. EPA 2000
Acetaldehyde		0.0	
Acrolein		0.0	
Benzene		55	lb/10^{12} Btu; AP-42,Table 3.1-4. EPA 2000
Ethylbenzene		0.0	
Formadehyde		0.091	ppmvd @15% O_2 (see Table 10a)
Naphthalene		35	lb/10^{12} Btu; AP-42,Table 3.1-4. EPA 2000
Polycyclic Aromatic Hydrocarbons (PAH)		40	lb/10^{12} Btu; AP-42,Table 3.1-4. EPA 2000
Propylene Oxide		0.0	
Toluene		0.0	
Xylene		0.0	
Antimony		0.0	
Arsenic	(a)	11	lb/10^{12} Btu; AP-42,Table 3.1-5. EPA 2000
Beryllium	(a)	0.31	lb/10^{12} Btu; AP-42,Table 3.1-5. EPA 2000
Cadmium		4.8	lb/10^{12} Btu; AP-42,Table 3.1-5. EPA 2000
Chromium		11	lb/10^{12} Btu; AP-42,Table 3.1-5. EPA 2000
Lead		14	lb/10^{12} Btu; AP-42,Table 3.1-5. EPA 2000
Manganese		790	lb/10^{12} Btu; AP-42,Table 3.1-5. EPA 2000
Mercury		1.2	lb/10^{12} Btu; AP-42,Table 3.1-5. EPA 2000
Nickel	(a)	4.6	lb/10^{12} Btu; AP-42,Table 3.1-5. EPA 2000
Selenium	(a)	25	lb/10^{12} Btu; AP-42,Table 3.1-5. EPA 2000

(a) Based on 1/2 the detection limit; expected emissions are lower.

(2) Annual emissions based on ambient temperature of 59 °F and firing fuel oil at base load for : 500 hours
(3) Assumed to be representative of Polycyclic Organic Matter (POM) emissions, a regulated HAP.
(4) Annual emissions based on maximum emissions presented for natural gas-firing
(5) Maximum total annual emissions based on 500 hours of firing fuel and remaining hours firing natural gas.

TABLE FDEP-7-1
FUGITIVE PM/PM_{10} EMISSIONS CALCULATION FOR ADONEL AND CONTINENTAL CONCRETE

Material Composition of Concrete [1]		
Material	(lbs)	(%)
Aggregate	1,865	46.35%
Sand	1,428	35.49%
Cement	491	12.20%
Cement Supplement	73	1.81%
Water	167	4.15%
Concrete (1 cubic yard)	4,024	

[1] Footnote "a" of Table 11.12-2, AP-42, June 2006.

Operating Hours			
(hrs/day)	(days/wk)	(wks/yr)	(days/yr)
8	5	50	250

Material Throughput										
	Aggregate+Sand	Concrete		Cement	Supplement	Aggregate	Sand	Truck Traffic [2]		
Plant	(tons/month)	(tons/month)	(yd^3/mo)[2]	(tons/month)	(tons/month)	(tons/month)	(tons/month)	truck/mo	trucks/yr	trucks/day
Adonel	5,000.0	6,109.9	3,036.7	745.5	110.8	2,831.8	2,168.2	379.6	4,555.1	18.2
Continental	6,000.0	7,331.9	3,644.1	894.6	133.0	3,398.1	2,601.9	455.5	5,466.1	21.9

[2] 4,024 lbs/yd^3 and 8 yd^3/truck.

Adonel Emissions Calculation

Material	Throughput	Emission Factor[3]		PM Emissions			PM_{10} Emissions			Modeling PM_{10} Emissions	
		PM	PM_{10}								
	(ton/mo)	(lb/ton)	(lb/ton)	(lb/mo)	(lb/yr)	(lb/day)	(lb/mo)	(lb/yr)	(lb/day)	(lb/hr)	(g/s)
Aggregate	2,831.8	0.0069	0.0033	19.539	234.5	0.938	9.345	112.1	0.449	0.0561	0.0071
Sand	2,168.2	0.0021	0.00099	4.553	54.6	0.219	2.147	25.8	0.103	0.0129	0.0016
Cement	745.5	0.00099	0.00034	0.738	8.9	0.035	0.253	3.0	0.012	0.0015	0.0002
Supplement	110.8	0.0089	0.0049	0.986	11.8	0.047	0.543	6.5	0.026	0.0033	0.0004
Hopper (Aggr+Sand)	5,000.0	0.0051	0.0024	25.500	306.0	1.224	12.000	144.0	0.576	0.0720	0.0091
Mixing (Cement+Suppl)	856.4	0.0173	0.0048	14.815	177.8	0.711	4.111	49.3	0.197	0.0247	0.0031
					Total =	3.174		Total =	1.363		0.0215

[3] Table 11.12-2, AP-42, June 2006.

Continental Emissions Calculation

Material	Throughput	Emission Factor[4]		PM Emissions			PM_{10} Emissions			Modeling PM_{10} Emissions	
		PM	PM_{10}								
	(ton/mo)	(lb/ton)	(lb/ton)	(lb/mo)	(lb/yr)	(lb/day)	(lb/mo)	(lb/yr)	(lb/day)	(lb/hr)	(g/s)
Aggregate	3,398.1	0.0069	0.0033	23.447	281.4	1.125	11.214	134.6	0.538	0.0673	0.0085
Sand	2,601.9	0.0021	0.00099	5.464	65.6	0.262	2.576	30.9	0.124	0.0155	0.0019
Cement	894.6	0.00099	0.00034	0.886	10.6	0.043	0.304	3.7	0.015	0.0018	0.0002
Supplement	133.0	0.0089	0.0049	1.184	14.2	0.057	0.652	7.8	0.031	0.0039	0.0005
Hopper (Aggr+Sand)	6,000.0	0.0051	0.0024	30.600	367.2	1.469	14.400	172.8	0.691	0.0864	0.0109
Mixing (Cement+Suppl)	1,027.6	0.0173	0.0048	17.778	213.3	0.853	4.933	59.2	0.237	0.0296	0.0037
					Total =	3.809		Total =	1.636		0.0258

[4] Table 11.12-2, AP-42, June 2006.

TABLE FDEP-7-2
MAXIMUM PREDICTED PM_{10} CONCENTRATIONS WITH UPDATED SOURCE LOCATIONS
COMPARED TO THE PSD CLASS II INCREMENTS AND AAQS

Averaging Time and Rank	Modeled Concentration [a,b] ($\mu g/m^3$)	Background Concentration [c] ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)	Receptor Location UTM- East (m)	Receptor Location UTM- North (m)	Time Period (YYMMDDHH)	PSD Class II Increment ($\mu g/m^3$)	AAQS ($\mu g/m^3$)
PSD Class II Increment Analysis								
Annual, Highest	3.61	NA	3.61	562,528	2,954,930	01123124	17	NA
	3.45	NA	3.45	562,528	2,954,930	02123124		
	3.53	NA	3.53	562,528	2,954,930	03123124		
	3.48	NA	3.48	562,528	2,954,930	04123124		
	3.61	NA	3.61	562,528	2,954,930	05123124		
24-Hour, HSH	22.5	NA	22.47	562,528	2,954,530	01111324	30	NA
	20.4	NA	20.40	562,528	2,954,530	02101324		
	18.9	NA	18.90	562,528	2,954,530	03111324		
	23.7	NA	23.74	562,528	2,954,680	04020224		
	19.9	NA	19.90	562,528	2,954,580	05090224		
AAQS Analysis								
Annual, Highest	6.65	20	26.6	562,750	2,951,400	01123124	NA	50
	7.01	20	27.0	562,750	2,951,400	02123124		
	6.04	20	26.0	562,750	2,951,400	03123124		
	7.05	20	27.1	562,750	2,951,400	04123124		
	6.17	20	26.2	562,750	2,951,400	05123124		
24-Hour, 6th Highest	26.5	42	26.51	562,750	2,951,400	04030324	NA	150

Note: YYMMDDHH = Year, Month, Day, Hour Ending
HSH = Highest, second-highest
NA = not applicable

[a] Concentrations are based on concentrations predicted using 5 years of meteorological data from 2001 to 2005 of surface and upper air data from the National Weather Service stations at Palm Beach and Miami International Airports, respectively.

[b] All sources modeled, with WCEC firing oil, updated locations for Palm Beach Aggregates and Hubbard Construction, and additional sources that included Adonel Concrete Palm Beach Inc. and Continental Florida Material Inc. Receptors not located on FPL property or PBA property.

[c] Background concentration based on monitored data and added to modeled concentrations to estimate total concentrations for AAQS analysis.

TABLE FDEP-7-3
MAXIMUM PREDICTED PM_{10} CONCENTRATIONS WITHOUT WCEC MODELED COMPARED TO THE PSD CLASS II INCREMENTS

Averaging Time and Rank	Modeled Concentration [a,b] ($\mu g/m^3$)	Receptor Location UTM- East (m)	Receptor Location UTM- North (m)	Time Period (YYMMDDHH)	PSD Class II Increment ($\mu g/m^3$)
PSD Class II Increment Analysis					
Annual, Highest	3.48	562,528	2,954,930	01123124	17
	3.30	562,528	2,954,980	02123124	
	3.37	562,528	2,954,930	03123124	
	3.29	562,528	2,954,930	04123124	
	3.48	562,528	2,954,930	05123124	
24-Hour, HSH	22.4	562,528	2,954,530	01111324	30
	20.4	562,528	2,954,530	02101324	
	18.9	562,528	2,954,530	03111324	
	23.3	562,528	2,954,680	04020224	
	19.8	562,528	2,954,580	05090224	

Note: YYMMDDHH = Year, Month, Day, Hour Ending
HSH = Highest, second-highest

[a] Concentrations are based on concentrations predicted using 5 years of meteorological data from 2001 to 2005 of surface and upper air data from the National Weather Service stations at Palm Beach and Miami International Airports, respectively.

[b] All sources modeled, except WCEC, with updated locations for Palm Beach Aggregates and Hubbard Construction, and additional sources that included Adonel Concrete Palm Beach Inc. and Continental Florida Material Inc. Receptors not located on FPL property or PBA property.

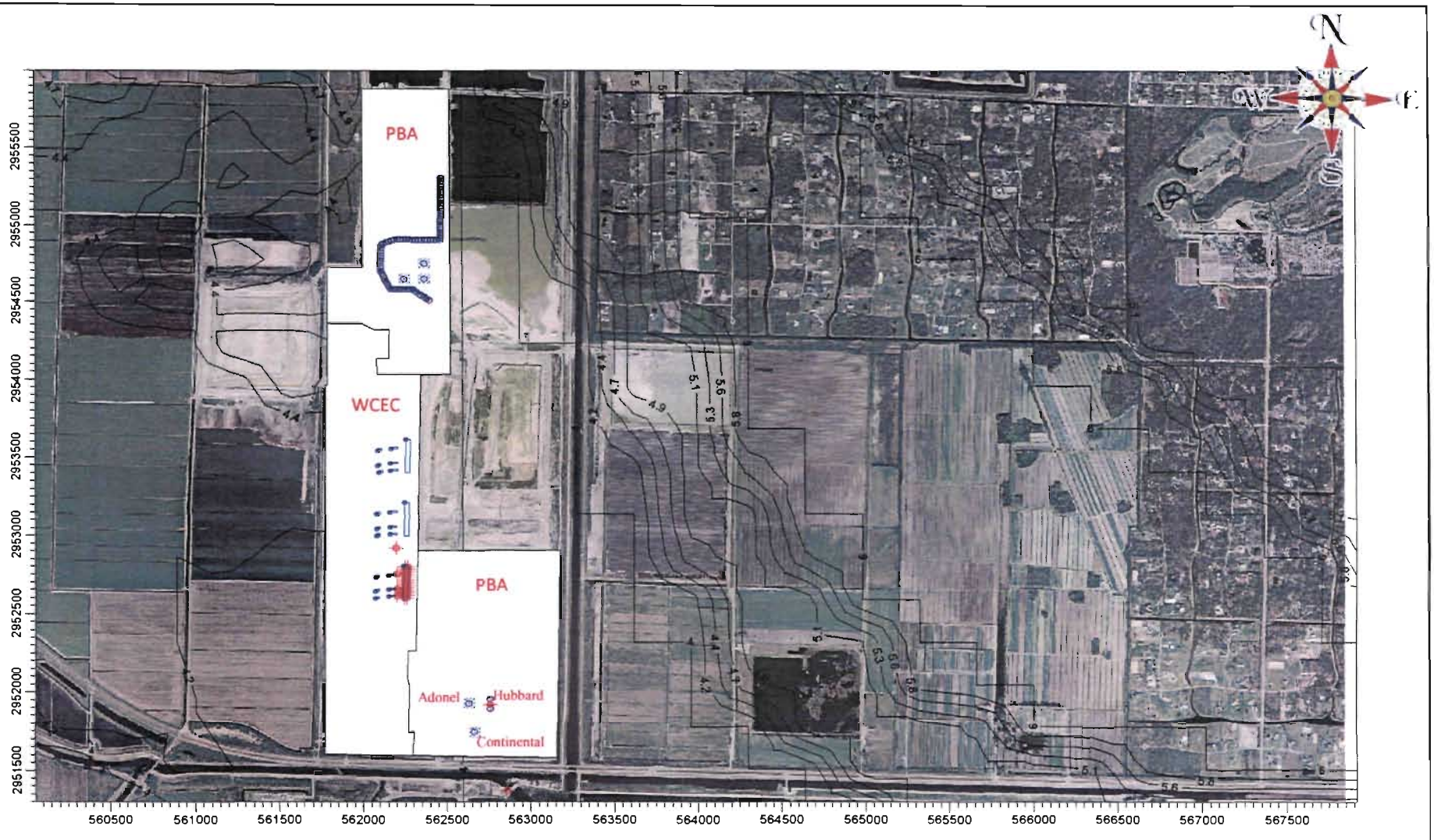

Figure FDEP-7-1.
FPL West County Energy Center Unit 3 Project
WCEC and Surrounding Property

Source: Golder, 2008.

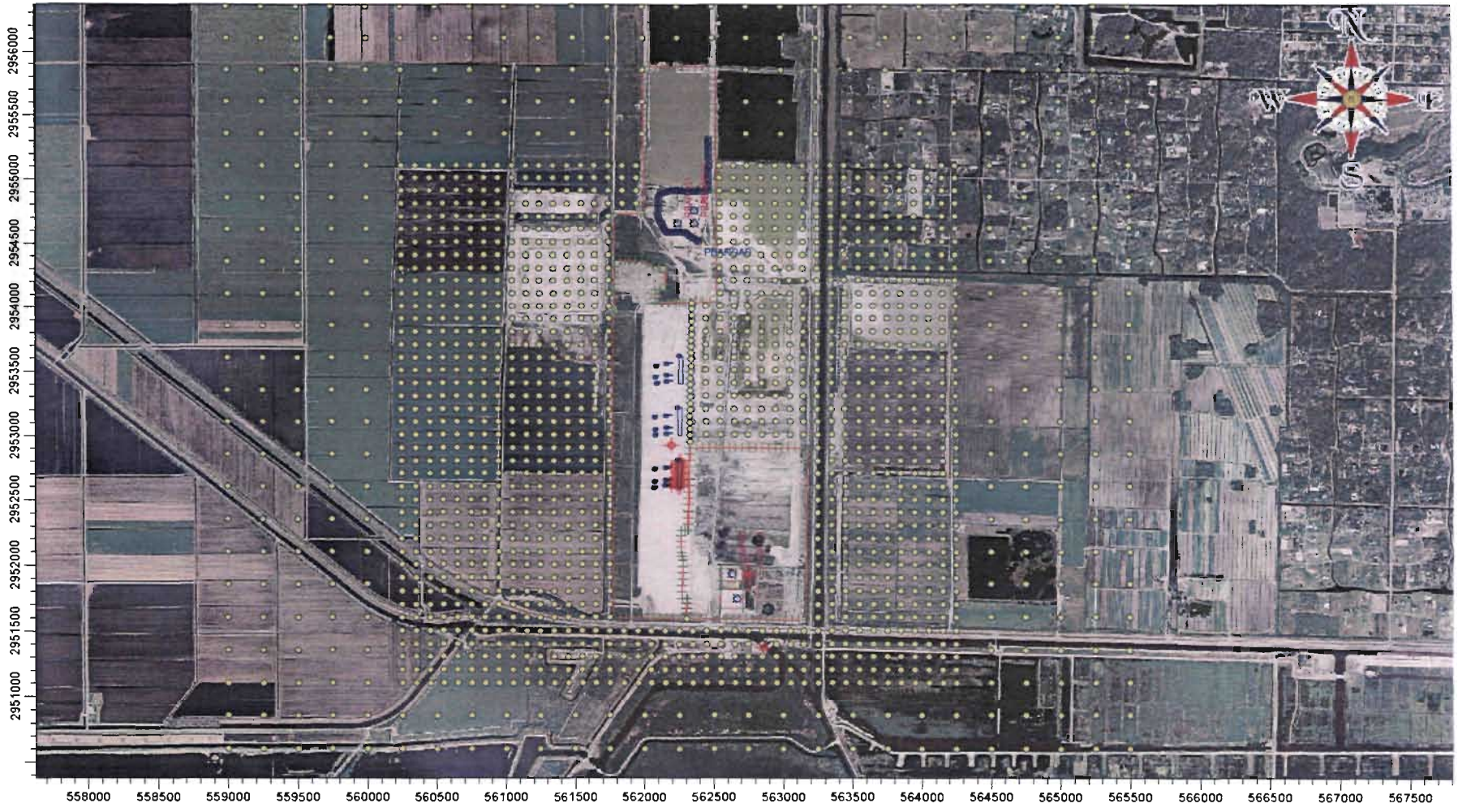

Figure FDEP-7-2.
FPL West County Energy Center Unit 3 Project
Revised PM_{10} PSD Class II and AAQS Modeling

Source: Golder, 2008.

EPA RESPONSES

COMMENTS FROM THE EPA REGION 4

Comment EPA-1. Project Emissions – The WCEC received a permit for two combined–cycle units, with total capacity of 2,500 MW, in January 2007. The permitted facility has not yet operated. The proposed third unit of 1,250 MW at a facility that has not yet operated does not appear to qualify as a modification to an existing facility. This PSD application should be a revision to the initial PSD application as it redefines the West County Energy Center as a three-unit, 3,750 MW facility. From the discussion on page 34 of FL DEP's Technical Evaluation and Preliminary Determination (dated 1 March 2006) for the initial two unit PSD permit application; it appears that FPL planned this facility for an "Ultimate Site Capacity" of 3,300 MW.

[Note: The 21 December 2007 supplemental information regarding the air quality analysis provides PSD Class II area impact modeling with the total WCEC emissions (e.g., all three combined cycle units etc.) as a single entity. Although this is not supplied as part of the permit application for Unit 3, it does provide some of the PSD Class II impact information to address the above concern. It does not provide the complete WCEC facility impacts required to support a PSD permit application. For example, PSD increment and AQRV impacts to the Everglades PSD Class I area were not provided. It also does not provide complete information on the modeling procedures (e.g., the various operating load/fuel configurations used in the analysis and associated emissions and stack exit parameters).]

Response EPA-1: The Florida Department of Environmental Protection (FDEP) previously issued the final air construction permit for WCEC Units 1 and 2 in January 2007. WCEC Units 1 and 2 have commenced construction as defined in Rule 62-210.200, F.A.C. As a result, Units 1 and 2 are not considered part of the Unit 3 Project for prevention of significant deterioration (PSD) purposes and are not subject to the PSD application for WCEC Unit 3. WCEC Unit 3 is a modification for PSD review purposes, and the air modeling analysis contained in the Air Construction/PSD Application addressed the relevant modeling requirements. Nonetheless, air quality impact modeling was performed for the three units as a single project and provided as supplemental information at the request of FDEP. Information related to the air impacts of all three units as related to this comment are provided in responses to other comments by the FDEP, the U.S. Environmental Protection Agency (EPA), and the National Park Service (NPS). Please note that the supplemental air modeling analyses demonstrate that all three units at the WCEC will comply with all applicable air quality standards.

As discussed in Response FDEP-1 and in contrast to the EPA comment, the information submitted to FDEP on December 21, 2007, contained supplemental air analyses addressing the air quality impacts of all three units at WCEC with respect to ambient air quality standards and PSD increments including both PSD Class I [i.e., Everglades National Park (NP)] and Class II areas. The modeling was conducted using the same procedures as presented in the PSD application, as indicated in the supplemental information and demonstrated by the modeling files provided. The information contained in this submittal contains additional information to address the predicted impacts of the three units at WCEC in the vicinity of the plant as they relate to air quality impacts on soils, vegetation, and wildlife, and on the Class I Air Quality Related Values (AQRVs) at the Everglades NP.

Comment EPA-2. $PM_{2.5}$ Standards – Although FL may not have adopted the following standards in their regulations; the following should be included or remove from Table 3-1.

- $PM_{2.5}$ annual (15 $\mu g/m^3$) and 24-hour (35 $\mu g/m^3$) NAAQS
- The 24-hour ozone standard of 0.08 ppm
- Remove the annual NAAQS for PM_{10}

The $PM_{2.5}$ NAAQS should also be included in the other applicable tables (e.g., Tables 2-1 through 2-7) and appropriate sections of the application.

Response EPA-2: A revised Table 3-1 is attached with the noted revisions to the National Ambient Air Quality Standards (AAQS).

The emissions of particulate matter (PM) with aerodynamic diameter less than 2.5 microns ($PM_{2.5}$) for WCEC Units 1, 2, and 3 are provided in Table FDEP-2-1 (see Response FDEP-2). The $PM_{2.5}$ emissions for the combustion turbine/heat recovery steam generator (CT/HRSG) and gas heater were based on using emissions of PM with aerodynamic diameter less than 10 microns (PM_{10}) as a surrogate for these emission units. For the cooling tower, $PM_{2.5}$ emissions were estimated using the same method identified in Appendix A of the PSD application. For the emergency generator, $PM_{2.5}$ emissions were developed from $PM_{2.5}$ emission factors available from EPA AP-42 *Compilation of Air Pollutant Emission Factors*. The $PM_{2.5}$ emissions for these sources are summarized below. Since FDEP has not yet promulgated $PM_{2.5}$ AAQS, and EPA interim guidance indicates that PM_{10} can be used as a surrogate for $PM_{2.5}$ until such time as $PM_{2.5}$ guidance is promulgated, it is not necessary to revise Tables 2-1 through 2-7 of the PSD application.

- Cooling Tower – $PM_{2.5}$: 0.0076 pounds per hour (lb/hr) and 0.033 tons/year (TPY).
- Emergency Generator – $PM_{2.5}$: 0.0566 pounds per million British thermal units (lb/MMBtu); 1.2 lb/hr and 0.29 TPY.

Comment EPA-3. AQRV Modeled Emissions – Section 6.1.2 incorrectly indicated only pollutants with emissions greater than the PSD significant emission rates (SER) are used in the AQRV modeling. All project pollutants affecting the particular AQRV should be included in the modeling even if less than the SER.

Response EPA-3: The comment is acknowledged. The AQRV modeling analysis used all emissions of all pollutants regardless of whether the potential emissions were above the PSD significant emission rates.

Comment EPA-4. Near-field Dispersion Model – AERMOD is proposed for the PSD Class II area air quality impact modeling. The impact modeling performed for Units 1 and 2 in the initial PSD application used the ISCST3 model. Because of the substantial differences in the technical features and input data requirements of the two models, it is recommended that the impacts of the total WCEC facility be performed using the technically superior AERMOD modeling system. Although this recommendation adds support to the above comment that this modification is better treated as a revised PSD permit application, it is also appropriate if this PSD application continues to be considered a major PSD modification to an existing major facility.

[Note: As indicated in Comment EPA-1, the December 21, 2007, supplemental air quality analysis provides PSD Class II area impact modeling for the total WCEC emissions (e.g., all three combined cycle units) as a single entity. Although this is not supplied as part of the permit application for Unit 3, it does provide some of the PSD Class II impact information to address the above concern.]

Response EPA-4: The EPA comment is acknowledged with regard to the use of AERMOD for the supplemental analyses provided to FDEP on December 21, 2007. The air quality impacts were predicted for all three units at WCEC using AERMOD. It should be noted that the air modeling analyses show that the results from either the ISCST3 or AERMOD models are similar and are low compared to AAQS and PSD increments.

Comment EPA-5. Meteorological Data – Although the proposed 2001-2005 Palm Beach/Florida International University (PBI) meteorological data record was representative for the project using the ISCST3 model, these data were further reviewed to assess their representativeness for application using AERMOD. The surface parameters of the meteorological site and project site must be similar.

Direction independent average surface roughness, albedo and Bowen ratio for each site were developed for this comparison. Although a direction dependent evaluation should be performed, the average albedo and Bowen ration were found to be similar. The average roughness parameters, more significant in the assessment of representativeness, reveal significant differences. To assess this difference the meteorological data were processed separately using the PBI and project surface parameters. The two data records were then used in an air quality modeling analysis. Comparison of the modeling results showed the meteorological data processed with the WCEC surface parameters produced lower concentrations. Therefore, as a compensating measure to address the differences in the surface characteristics of the project and meteorological observation site and to ensure the resulting controlling concentrations are not underestimated, the ambient impact modeling used the processed meteorological data producing the larger concentrations (i.e., PBI meteorological data processed with PBI surface parameters).

[Note: Review of Appendix C, which is a one page Table C-1, provides only the maximum concentrations for various modeled scenarios for the two meteorological input data sets. No explanation of the modeling procedures (e.g., receptor grid, operational loads, ambient temperatures, etc.) is provided. This information is needed to evaluate the appropriateness of the data in this table.]

Response EPA-5: The EPA comment is acknowledged that the use of PBI meteorological data with PBI surface parameters do not underestimate impacts. As presented in Appendix C of the PSD application, the use of surface parameters in the vicinity of the WCEC site would result in lower predicted concentrations. Table C-1 in Appendix C shows that the maximum predicted annual impacts were 16 to 29 percent higher using the PBI surface parameters and the maximum predicted 24-hour impacts were 156 to 228 percent higher, depending upon the year. The modeling procedures, receptor grid, source emissions, and stack operating parameter data used with the site-specific land use meteorological data in Appendix C are the same as those used for the PBI-land use meteorological data, presented in Table 6-6 of the PSD application. This was discussed in Section 6.5 of the PSD application and demonstrated by the modeling files provided for review.

Comment EPA-6. Significant Impact Analyses (SIA) – The following comments are associated with the SIA for both PSD Class I and Class II areas.

- **EPA-6.1.** The analyses included 12 scenarios: 2 loads (100 and 75%), 2 fuels (oil and natural gas), and 3 ambient temperatures (35, 59, and 95°F). The permit should limit the facility to these operating conditions.
- **EPA-6.2.** CT operations without HRSG are not included in the modeling. Likewise, duct burners operating with oil fired CT was not included in the modeling. The permit should limit the facility to these operating conditions.
- **EPA-6.3.** The operation scenario producing the maximum impact for each pollutant and averaging period are provided in Table 6-6:

  SO_2 Annual Natural Gas/ 95°F/ 100% Load

  SO_2 24-hour Same as SO_2 Annual

  SO_2 3-hour Natural Gas/ 59°F/ 100% Load

  PM_{10} Annual Oil/ 59°F/ 75% Load

  PM_{10} 24-hour Oil/ 95°F/ 75% Load

  NO_2 Annual Same as SO_2 Annual

  Because the worst-case operating scenario varies with pollutant and averaging period, the appropriate worst-case WCEC operating scenario should be used in the cumulative AAQS and PSD compliance modeling. The WCEC emissions and stack exit parameters used in the compliance modeling should be provided.
- **EPA-6.4.** The Class I SIA should use the same maximum operating scenario as those used in the Class II analyses. Table 6-8 indicates 35°F and 100% load was used for all pollutants for both natural gas and oil burning. The correct worst-case operating scenarios were not used in the PSD Class I area analyses. Because the resultant impacts are much less than the PSD Class I significant impact levels, it appears unlikely this error will change the provided result (i.e., no significant impact in the Class I area).

Response EPA-6.1: The comment describes the operating scenarios used to develop worst-case operating conditions (turbine inlet and load) that were used to produce the maximum predicted impacts. Because of the wide range in operating conditions, the worst-case operating conditions such as 35-degree turbine inlet and 75-percent load produce conservatively high impacts since it is obvious such conditions cannot occur continuously over the 5-year period analyzed. FPL acknowledges that the WCEC Unit 3 emissions will be included in federally enforceable permit limits as is the case for the permit issued for WCEC Units 1 and 2. Inclusion of turbine inlet temperatures as permit conditions is inappropriate since the maximum impacts are enveloped by the possible operating conditions and the conservative nature of the analysis.

Response EPA-6.2: The modeling analyses reflect that each CT/HRSG train has only one exhaust stack (i.e., HRSG stack). Duct firing using natural gas, while the CT fires ultra low-sulfur light oil was not an identified operating condition in the application and is consistent with the FDEP PSD permit issued for Units 1 and 2. It is expected that the operating conditions authorized for WCEC Unit 3 would be the same as authorized for WCEC Units 1 and 2 (i.e., CT operation on gas, CT and duct burners operating on gas, and CT operating on oil).

Response EPA-6.3: The modeling results presented in Table 6-6 of the PSD application for the cumulative AAQS and PSD compliance modeling were based on the worst-case operating scenario for each pollutant and averaging period for which Unit 3's impacts were predicted to be greater than the significant impact levels (SILs). These included:

- SO_2: 24-hour averaging period; and
- PM_{10}: 24-hour averaging period.

For WCEC Units 1, 2, and 3, the impacts were predicted to be greater than the SIL for the following pollutants and averaging periods:

- SO_2: 24-hour and annual averaging periods;
- PM_{10}: 24-hour and annual averaging periods; and
- NO_2: annual averaging period.

For the cumulative AAQS and PSD compliance modeling analyses that were based on the combined impacts of the three units, which were submitted on December 21, 2007, the modeling was performed using the worst-case operating scenario for the units, except as noted:

- PM_{10}: oil-firing for 75-percent load and 95°F for both the 24-hour and annual averaging periods (if the worst-case operating condition for the annual average period was modeled, the difference in the annual impact would be less than 0.02 $\mu g/m^3$ with the total impacts predicted to be below the annual AAQS; and
- NO_2: based on annual operating conditions at 59°F since AAQS and PSD increments are established for the annual averaging period only (i.e., base load with natural gas firing for 5,380 hours, natural gas firing with duct firing for 2,280 hours, and oil firing for 500 hours).

The WCEC Unit 3 emissions and stack exit parameters used in the compliance modeling were provided in the PSD application as well as the computer modeling files.

Response EPA-6.4: The Everglades NP is located more than 100 kilometers (km) from all three units at WCEC. At this distance, the plume from all three units at WCEC will be nearly uniformly dispersed in the vertical (i.e., the estimated concentrations at the ground are similar to those at elevated locations above the ground). As a result, the maximum concentrations predicted for all three units at WCEC at the Everglades NP are primarily due to the magnitude of emission rates from the emission units and less dependent on plume height, which varies based on operating load and ambient temperature. The variation in plume height due to changes in operating load and ambient temperature has more of an effect on maximum concentrations near the plant site (as previously discussed) than at the Everglades NP.

To demonstrate this effect, a comparison of the maximum pollutant impacts predicted using the CT operating load and ambient temperature that produced the maximum emission rate (i.e., base load and 35°F ambient temperature) was made to those operating cases that produced the maximum near-field impacts. Two additional comparison runs were performed with the CALPUFF model for the 2003 meteorological data:

- For SO_2: base load and 95°F ambient temperature (worst-case condition for the near-field annual and 24-hour impacts), and
- For PM_{10}: 75-percent load and 95°F ambient temperature (worst-case condition for the near-field 24-hour impacts).

The analysis was performed for WCEC Unit 3 using the same CALPUFF modeling methodology as was used in the PSD application. Note that the emissions and stack parameters for all three units at WCEC are identical. A summary of the results are presented in Table EPA-6.4-1.

The air modeling results indicate that the Everglades NP impacts presented in the application, based on the CT operating load and ambient temperature that produces the highest emission rate, resulted in the maximum predicted concentrations at the Everglades NP. As shown in Table EPA-6.4-1, using the maximum emissions conditions produces the maximum impacts at the Everglades NP. Indeed, the air quality impacts predicted for WCEC Unit 3 using the worst-case CT configuration from the Class II CT load analysis produced lower impacts at the Everglades NP for all averaging times and pollutants evaluated. The supplemental CALPUFF analyses discussed above are being provided to the FDEP with this response.

Comment EPA-7. Building Downwash – The text indicates the EPA Building Profile Input Program used to provide building downwash information was BPIP. The program that should be used with AERMOD is BPIPPRM. This program includes the consideration of the PRIME algorithm that is included in AERMOD. Review of the program run information reveals the correct BPIPPRM was used.

Response EPA-7: The BPIPPRM program was used in the analysis as stated in the comment. The reference to the BPIP program in the text was an editorial error.

Comment EPA-8. Modeling Palm Beach Aggregates (PBA) and Hubbard Construction Company – The treatment of these two separate sources as one facility within the PBA owned property has not been justified. Three criteria must be satisfied to consider two separate facilities as a single source. The two companies must 1) be under common control, 2) be located on contiguous or adjacent property, and 3) have the same industrial grouping. One company operating on land leased from another is not sufficient to make the two facilities one source. Each company has different ambient air depending on the specifics of land ownership, location of the leased land, and barriers to the public provided by each company. [see Stephen Page Memorandum of 22 June 2007 found at:

(http://www.epa.gov/region07/programs/artd/air/nsr/nsrmemos/leaseair.pdf)]

Eliminating totally the property owned by Palm Beach Aggregates from impact assessment when emissions from both companies are included may not be a correct procedure. More detailed and specific information on each company should be provided as well as a figure showing plant layout for each facility including location of barriers to public access.

Response EPA-8: As noted in Response FDEP-7, the general public does not have access to the PBA property and there is no "ambient air" within the property owned by PBA. The leased properties are entirely within the PBA property with no direct access other than PBA road for which access is controlled and limited by security. Business invitees of the leased companies, and not the general public, are allowed to access the PBA property via PBA road to conduct business. The boundaries for these leased facilities generally consist of drainage ditches and other physical impediments (e.g., berms).

Notwithstanding, to address the question raised by EPA, an analysis was conducted to determine the impacts of all sources including sources on leased property owned by PBA in the vicinity of the

leased sources. This analysis was conducted to determine the maximum impacts compared to the PSD Class II Increments and AAQS. Receptors were placed on the PBA property to the east of WCEC, along the boundary of the leased properties within PBA owned property. This analysis predicts the maximum impacts of each minor source (i.e., Adonel, Continental, and Hubbard) on the respective boundaries of the leased properties as well as on the adjoining PBA property. The receptor grid for this scenario is shown in Figure EPA-8-1. As shown in the figure, the receptor grid consisted of receptors located on the boundaries around each leased property, as well as receptors within the adjoining PBA property.

Table EPA-8-1 presents the maximum PM_{10} impacts for the analysis. As shown in this table, the maximum predicted impacts are less than the PSD Class II Increments and AAQS. The locations of the maximum predicted impacts are along the leased property boundaries. This is an expected result given that the fugitive sources for Adonel, Continental, and Hubbard are closest to the leased boundaries. It is important to emphasize that the general public does not have access to these leased properties or to the PBA property. Only business invitees are allowed within PBA property and there are sufficient impediments to public access (security, fences, canals, and berms) to restrict access.

Comment EPA-9. Additional Impact Assessment – The following comments are associated with the section addressing additional impacts in the PSD Class II site area and Loxahatchee NWR.

- **EPA-9.1.** Class II Area Visibility Impacts: Section 7.3.3 just states no visibility impacts are expected. It is suggested that VISCREEN modeling be performed at identified visibility sensitive receptors to quantify visibility impacts. This visibility assessment should include total emissions from the WCEC and not just those associated with the proposed Unit 3.
- **EPA-9.2.** Vegetation, Soils, and Wildlife: To address impacts to these environmental concerns the text just noted that the modeled cumulative concentrations were less than the FL AAQS and PSD increments. Because the AAQS were established to project the public health and welfare, no significant impact are expected from this modification. Tables 7-1 through 7-3 provide exposure/concentrations where effects on these environmental components have been observed. Because these target exposure/concentration values are applicable to vegetation, soils, and wildlife in both the Class I area, Class II area, and Loxahatchee, it is suggested that a similar comprehensive assessment be performed for these environmental components as was performed for them in the Everglades Class I area.

Response EPA-9.1: As discussed in Section 7.3.3, no visibility impairment in the vicinity of WCEC is expected due to the types and quantities of emissions proposed for the three units. The opacity of

the proposed CT emissions will be 10 percent or less under normal operation, whether firing natural gas or ultra low-sulfur distillate oil. In fact, using the primary fuel, natural gas, the opacity is expected to be near zero because natural gas is the cleanest burning fossil fuel.

VISCREEN is not appropriate for addressing near-field visibility impacts. VISCREEN is intended to be applied for determining potential impacts in PSD Class I areas using screening criteria established for Class I areas. Screening criteria have not been established for the areas around the plant site, which are classified as PSD Class II areas.

Further, VISCREEN is a screening model designed to provide a conservative estimate of plume visual impacts (i.e., impacts that would be larger than those calculated with more realistic input and modeling assumptions). This analysis assumes worst-case meteorological conditions, such as stable stability and a 1-meter-per-second wind speed, persisting for 12 hours toward a PSD Class I area. The general pollutant input required for this analysis is limited to the emission rates of PM_{10}, NO_x, and, if available, NO_2, soot, and primary sulfate.

Information for stack height or exit gas conditions, such as flow rate and temperature, which are important in determining plume height and dispersion, are not included in the evaluation.

Given that the firing of natural gas produces no visible plume from the exhaust gases of the CTs, no visibility impairment in the vicinity of WCEC is expected.

Response EPA-9.2: The potential impacts from all three units at WCEC on soils, vegetation, and wildlife are addressed in Response FDEP-1 for the PSD Class I and Class II areas. For the PSD Class II areas and the Loxahatchee NWR, the potential impacts from the WCEC are expected to be insignificant or no threat to the soils, vegetation, and wildlife in those areas (see Response FDEP-1).

Comment EPA-10. Deposition Impacts to Loxahatchee – The deposition impact in Loxahatchee should be performed using the total emissions from WCEC and not just those associated with the proposed Unit 3. The CALPUFF modeling procedures used for this assessment, including input emission rates, should be provided. The resultant modeled deposition values should be compared to the FLM determined acceptable target values (i.e., 0.01 kg/ha/yr for eastern U.S. sulfur and nitrogen deposition). These target values are associated with an annual average at a receptor not a spatial average over a large area.

Response EPA-10: The maximum sulfur and nitrogen deposition predicted from all three units at WCEC in Loxahatchee NWR are presented in Table EPA-10-1. These impacts were predicted using CALPUFF and modeling procedures based on the same model assumptions used to address sulfate and nitrate deposition at the Everglades NP.

The maximum total sulfur deposition from WCEC Units 1, 2, and 3 in the Loxahatchee NWR was predicted to be 0.25 kilograms per hectare per year (kg/ha/yr), while the average deposition over the entire Loxahatchee NWR is expected to be 8 times lower than the predicted maximum based on previous modeling for WCEC Unit 3 (see Table 5.6.1-5 in the SCA). Sulfur deposition occurs due to sulfur in the atmosphere as a result of both man-made emissions and natural sources. The latter includes sulfur included as sulfate as a natural component of sea salt, which can be a considerable portion of deposition. As previously discussed, background deposition of various major anions and cations are available for south Florida from the Florida Acid Deposition Study (FADS) as wet and dry deposition and the Florida Atmospheric Mercury Study (FAMS) as wet deposition. The total wet and dry sulfur deposition in south Florida for FADS ranges from 4.9 to 5.6 kg/ha/yr, about 20 times higher than the maximum predicted deposition due to all three units at WCEC and over 100 times higher than the average deposition due to all three units at WCEC across the Loxahatchee NWR. The contribution from sea salt to wet sulfur deposition is 0.7 kg/ha/yr, considerably higher than the maximum and average sulfur deposition in the Loxahatchee NWR expected from all three units at WCEC. The predicted total sulfur deposition due to all three units at WCEC in the Loxahatchee NWR, when rainfall is considered, would result in average concentrations of 6 parts per billion (as sulfate), which is 3 orders of magnitude lower than the concentrations of sulfate in surface waters in the vicinity of the Loxahatchee NWR. As a result, the impact from sulfur deposition due to all three units at WCEC to the Loxahatchee NWR is considered insignificant.

The maximum total nitrogen deposition in the Loxahatchee NWR was predicted to be 0.076 kg/ha/yr for 2003, while the average deposition over the entire Loxahatchee NWR is expected to be 5 times lower than the predicted maximum based on previous modeling of WCEC Unit 3 (see Table 5.6.1-5 in the SCA). Nitrogen deposition occurs due to nitrogen compounds in the atmosphere as a result of both man-made emissions and natural sources. The total wet and dry nitrogen deposition in south Florida from data taken during the FADS ranged from 3.4 to 3.8 kg/ha/yr, over 40 times higher than the maximum predicted deposition due to all three units at WCEC and about 200 times higher than the average deposition due to all three units at WCEC across the Loxahatchee NWR. The predicted total nitrogen deposition due to all three units at WCEC in the Loxahatchee NWR, when rainfall is

considered, would result in average concentrations of about 3 parts per billion (as nitrate), which is 150 times lower than the concentrations of nitrate in surface waters in the vicinity of the Loxahatchee NWR. As a result, the impact from nitrate deposition due to WCEC in the Loxahatchee NWR is considered insignificant.

The soils of the Loxahatchee NWR are generally classified as histosols. Histosols (peat soils) are organic and have extremely high buffering capacities based on their cation exchange capacity (CEC), base saturation, and bulk density. Therefore, they would be relatively insensitive to atmospheric inputs. The soils in the Loxahatchee NWR overlay limestone. The direct connection of these soils with subsurface limestone tends to neutralize any acidic inputs. Moreover, the groundwater table is highly buffered due to the interaction with subsurface limestone formations, which results in high alkalinity (as $CaCO_3$). The relatively low sensitivity of the soils to acid inputs, coupled with the extremely low ground-level concentrations of air pollutants projected for the Loxahatchee NWR from the emissions from all units at WCEC, precludes any significant impact on soils.

Comment EPA-11. Impacts to Everglades PSD Class I Area AQRV – Unlike the PSD Class I significant impact levels and increment, the acceptable target values for the AQRV are based on ambient concentrations, visibility, etc. identified to be of concern for a source. The target values are not designed for comparison with individual emission component/unit at a source. Therefore, the total emission from the WCEC, not just the proposed Unit 3 emissions, should be included in the modeling. The emissions include all pollutant affecting the AQRV of concern. The following are comments on the Everglades AQRV impact assess.

- **EPA-11.1.** The comparison of the impacts from the proposed Unit 3 emissions provided in Table 7-4 to the known sensitive ambient concentrations in Tables 7-1 through 7-3 is not appropriate.
- **EPA-11.2.** The emissions to be used in this visibility assessment should be the total emissions from WCEC not just those from the proposed Unit 3.
- **EPA-11.3.** The deposition analyses should include the total emissions from WCEC.
- **EPA-11.4.** The National Park Service federal land manager should be provided an opportunity to review and comment on this PSD permit application. Their comments on the AQRV analyses at Everglades should prevail.

Response EPA-11: Regarding Comments EPA-11.1 to EPA-11.3, a comparison of the impacts from the three units at WCEC to the known sensitive ambient concentrations is addressed in Response

FDEP-1. A visibility assessment and sulfate and nitrate deposition analyses of the impacts from the three units at WCEC are also addressed in Response FDEP-1.

Regarding Comment EPA-11.4, the National Park Service was provided a copy of the PSD permit application and modeling files and has submitted comments.

ATTACHMENTS TO EPA RESPONSES

TABLE 3-1 (REVISED)
NATIONAL AND STATE AAQS, ALLOWABLE PSD INCREMENTS, AND SIGNIFICANT IMPACT LEVELS

Pollutant	Averaging Time	AAQS ($\mu g/m^3$) [a]			PSD Increments ($\mu g/m^3$) [a]		PSD Class II Significant Impact Levels ($\mu g/m^3$) [b]
		National Primary Standard	National Secondary Standard	Florida	Class I	Class II	
Particulate Matter (PM_{10}) [c]	Annual Arithmetic Mean	NA	NA	50	4	17	1
	24-Hour Maximum	150	150	150	8	30	5
Particulate Matter ($PM_{2.5}$) [c]	Annual Arithmetic Mean	15	15	NA	NA	NA	NA
	24-Hour Maximum	35	35	NA	NA	NA	NA
Sulfur Dioxide	Annual Arithmetic Mean	80	NA	60	2	20	1
	24-Hour Maximum	365	NA	260	5	91	5
	3-Hour Maximum	NA	1,300	1,300	25	512	25
Carbon Monoxide	8-Hour Maximum	10,000	10,000	10,000	NA	NA	500
	1-Hour Maximum	40,000	40,000	40,000	NA	NA	2,000
Nitrogen Dioxide	Annual Arithmetic Mean	100	100	100	2.5	25	1
Ozone	1-Hour Maximum	NA	NA	235	NA	NA	NA
	8-Hour Maximum [c]	157	157	NA	NA	NA	NA
Lead	Calendar Quarter Arithmetic Mean	1.5	1.5	1.5	NA	NA	NA

Note: Particulate matter (PM_{10}) = particulate matter with aerodynamic diameter less than or equal to 10 micrometers.
Particulate matter ($PM_{2.5}$) = particulate matter with aerodynamic diameter less than or equal to 2.5 micrometers.
NA = Not applicable, i.e., no standard exists.

[a] Short-term maximum concentrations are not to be exceeded more than once per year except where noted. For PM_{10}, the Florida 24-hour AAQS is attained when the expected number of days per year with a 24-hour concentration above 150 $\mu g/m^3$ is equal to or less than 1. For modeling purposes, compliance is based on the sixth highest 24-hour concentration over a 5-year period. For ozone, the Florida AAQS is based on a daily maximum 1-hour concentration that cannot be exceeded an average of more than one per year.

[b] Maximum concentrations used as trigger levels to determine level of review.

[c] On July 18, 1997, EPA promulgated revised AAQS for particulate matter and ozone. The ozone standard was modified to be 0.08 ppm (157 $\mu g/m^3$); achieved when 3-year average of 4th highest value is 0.08 ppm or less. On October 17, 2006, the $PM_{2.5}$ standards were finalized: 24-hour standard of 35 $\mu g/m^3$ (3-year average of 98th percentile) and annual standard of 15 $\mu g/m^3$ (3-year average at community monitors). The annual PM_{10} AAQS was revoked. FDEP has not yet adopted these standards.

Sources: Federal Register, Vol. 43, No. 118, June 19, 1978; 40 CFR 50; 40 CFR 52.21. Chapter 62-204, F.A.C.

TABLE EPA-6.4-1
COMPARISON OF CONCENTRATIONS PREDICTED FOR WCEC UNIT 3
AT THE EVERGLADES NATIONAL PARK PSD CLASS I AREA

		Maximum Concentrations ($\mu g/m^3$) [a]	
Pollutant	**Averaging Time**	**Application CT Configuation [b]**	**Worst-Case CT Operating Scenario from PSD Class II Significant Impact Analysis [c]**
SO_2	Annual	0.0022	0.0020
	24-Hour	0.043	0.038
	8-Hour	0.085	0.088
	3-Hour	0.136	0.122
	1-Hour	0.203	0.186
PM_{10}	Annual	0.0041	0.0037
	24-Hour	0.101	0.090
	8-Hour	0.241	0.208
	3-Hour	0.294	0.247
	1-Hour	0.384	0.322

[a] Based on the CALPUFF model using 2003 Florida domain.

[b] Based on base load and 35°F ambient temperature, which produced the highest emissions.

[c] For SO_2, maximum Class II impacts were obtained for base load, 95°F, and gas firing.
For PM_{10}, maximum Class II impacts were obtained for 75% load, 95°F, and oil firing.

TABLE EPA-8-1
MAXIMUM PREDICTED PM_{10} CONCENTRATIONS ON PBA PROPERTY
COMPARED TO THE PSD CLASS II INCREMENTS AND AAQS

Averaging Time and Rank	Modeled Concentration [a,b] ($\mu g/m^3$)	Background Concentration [c] ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)	Receptor Location UTM- East (m)	Receptor Location UTM- North (m)	Time Period (YYMMDDHH)	PSD Class II Increment ($\mu g/m^3$)	AAQS ($\mu g/m^3$)
PSD Class II Increment Analysis								
Annual, Highest	9.70	NA	9.70	562,710	2,951,941	01123124	17	NA
	9.80	NA	9.80	562,710	2,951,941	02123124		
	8.98	NA	8.98	562,710	2,951,941	03123124		
	9.13	NA	9.13	562,710	2,951,941	04123124		
	8.50	NA	8.50	562,710	2,951,912	05123124		
24-Hour, HSH	28.1	NA	28.09	562,710	2,951,941	01022624	30	NA
	28.2	NA	28.22	562,805	2,951,896	02121124		
	28.1	NA	28.07	562,710	2,951,941	03090324		
	25.0	NA	25.02	562,710	2,951,950	04081824		
	27.0	NA	26.96	562,710	2,951,941	05031524		
AAQS Analysis								
Annual, Highest	10.49	20	30.5	562,710	2,951,912	01123124	NA	50
	10.52	20	30.5	562,710	2,951,941	02123124		
	9.89	20	29.9	562,710	2,951,941	03123124		
	9.86	20	29.9	562,710	2,951,941	04123124		
	9.42	20	29.4	562,710	2,951,912	05123124		
24-Hour, 6th Highest	30.7	42	72.7	562,805	2,951,896	04012424	NA	150

Note: YYMMDDHH = Year, Month, Day, Hour Ending
HSH = Highest, second-highest
NA = not applicable

[a] Concentrations are based on concentrations predicted using 5 years of meteorological data from 2001 to 2005 of surface and upper air data from the National Weather Service stations at Palm Beach and Miami International Airports, respectively.

[b] All sources modeled, with WCEC firing oil, updated locations for Palm Beach Aggregates and Hubbard Construction, and additional sources that included Adonel Concrete Palm Beach Inc. and Continental Florida Material Inc.
Additional receptors placed on PBA property but not on land PBA leases to other sources. Receptors also located on boundaries between these sources.

[c] Background concentration based on monitored data and added to modeled concentrations to estimate total concentrations for AAQS analysis.

TABLE EPA-10-1
MAXIMUM ANNUAL SULFUR AND NITROGEN DEPOSITION PREDICTED FOR WCEC UNITS 1, 2, AND 3 AT THE LOXAHATCHEE NWR

Species	Total Deposition (Wet & Dry)					
	2001		2002		2003	
	($g/m^2/s$)	(kg/ha/yr)[a]	($g/m^2/s$)	(kg/ha/yr)[a]	($g/m^2/s$)	(kg/ha/yr)[a]
Nitrogen (N) Deposition [b]	2.34E-10	0.0737	1.90E-10	0.0599	2.41E-10	0.0761
Sulfur (S) Deposition [b]	7.84E-10	0.247	5.45E-10	0.172	7.32E-10	0.231

[a] Conversion factor is used to convert $g/m^2/s$ to kg/hectare (ha)/yr with the following units:

$g/m^2/s$ x 0.001 kg/g
x 10,000 m^2/hectare
x 3,600 sec/hr
x 8,760 hr/yr = kg/ha/yr
or
$g/m^2/s$ x 3.154E+08 = kg/ha/yr

[b] For N deposition, based on each CT firing natural gas with duct firing for 8,260 hours and firing oil for 500 hours. For S deposition, based on each CT firing natural gas with duct firing for 8,760 hours.

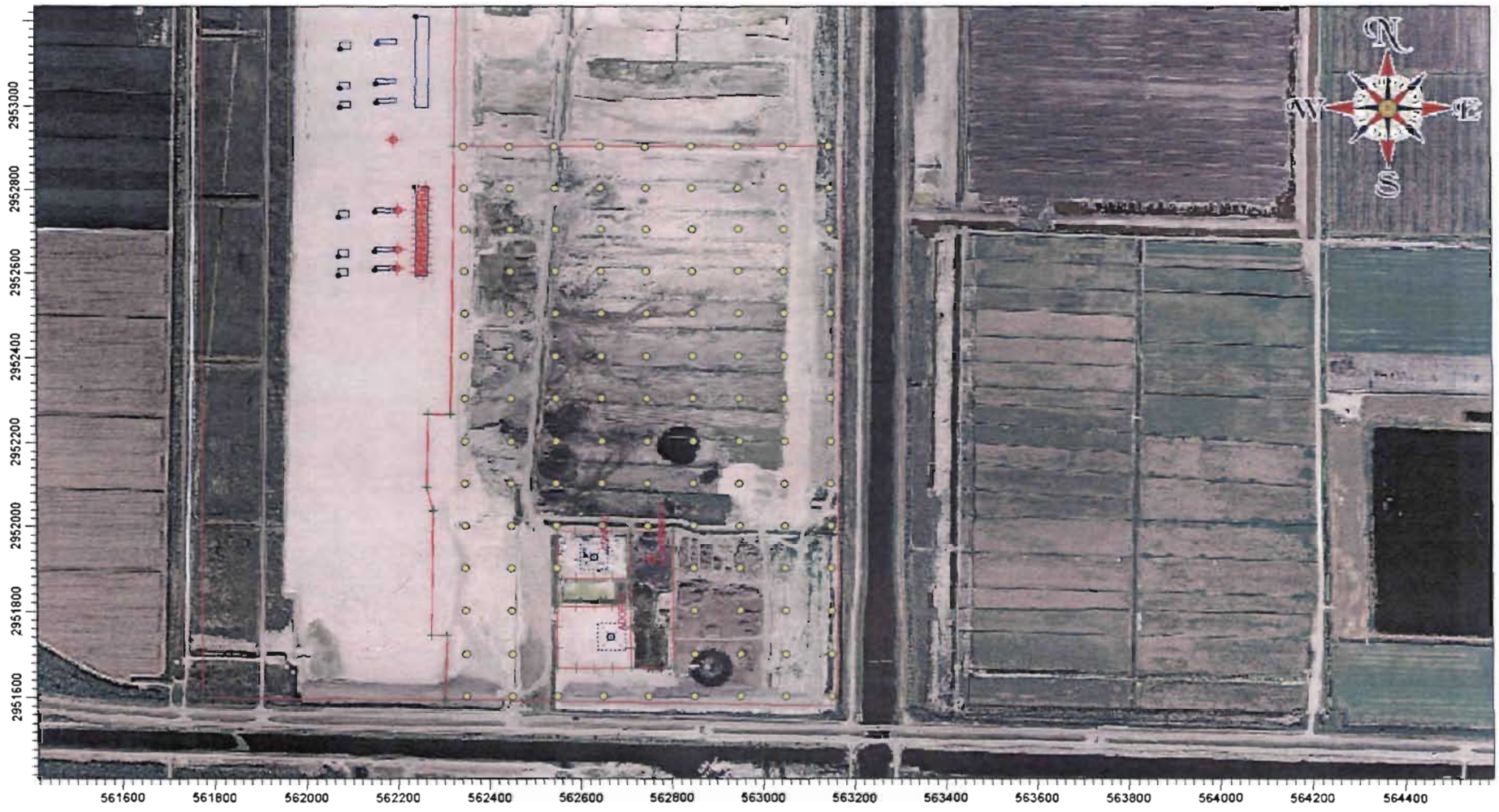

Figure EPA-8-1.
FPL West County Energy Center Unit 3 Project
Revised PM_{10} PSD Class II and AAQS Modeling - Refined Receptor Grid

Source: Golder, 2008.

FPL.

NPS RESPONSES

COMMENTS FROM THE NATIONAL PARK SERVICE

Comment NPS-1. We reviewed the West County Energy Center (WCEC) Unit 3 PSD application. According to the WCEC PSD application, Florida Power & Light (FPL) will construct a 1,250 MW combined cycle unit (Unit 3) which will be in operation in 2011. It is our understanding that FPL is also constructing two (Units 1 and 2) 1,250 MW combined cycle units at WCEC. Unit 1 is expected to be in operation by mid 2008 and Unit 2 in operation a year later. Supplemental modeling files show that FPL conducted an air quality increment analysis with emissions from all three units which showed no significant impact on Class I Increments at Everglades National Park. However, FPL conducted an AQRV analysis which only included emission from Unit 3. We ask that FPL conduct an AQRV modeling analysis and include emissions from Units 1, 2, and 3 in order for us to properly assess impacts at Everglades National Park, Big Cypress National Preserve and Biscayne National Park. We also ask that the AQRV modeling analysis follow the WCEC modeling protocol we reviewed in November 2007.

I will alert the USFWS Air Quality Branch about potential air quality concerns at Loxahatchee National Wildlife Refuge since the WCEC site is located adjacent to the refuge.

Response NPS-1: It should be noted that Units 1 and 2 are scheduled to begin operation by mid-2009 and mid-2010, respectively. As discussed in Response FDEP-1, the information submitted to the Florida Department of Environmental Protection (FDEP) on December 21, 2007, contained supplemental air analyses addressing the air quality impacts of all three units at WCEC. This information demonstrated compliance with ambient air quality standards (AAQS) and Prevention of Significant Deterioration (PSD) Increments including both PSD Class I [i.e., Everglades National Park (NP)] and Class II areas for all three units at WCEC. To address the predicted impacts of all three units at WCEC, additional analyses were conducted for regional haze; sulfate and nitrate deposition; ozone impacts; and impacts on soils, vegetation, and wildlife at the PSD Class I area of the Everglades NP. This information is presented in Response FDEP-1.

This response contains additional information on the air quality impacts in the Big Cypress National Preserve and Biscayne National Park. Pollutant concentrations, regional haze impacts, and sulfate and nitrate deposition were predicted for the three units at Big Cypress National Preserve and Biscayne National Park.

Maximum pollutant concentrations predicted at the Big Cypress National Preserve due to WCEC Units 1, 2, and 3 are summarized in Tables NPS-1-1 and NPS-1-2. Concentrations are presented for both natural gas- and oil-firing. Maximum regional haze and annual sulfur and nitrogen deposition predicted at the Big Cypress National Preserve due to these units are summarized in Tables NPS-1-3 and NPS-1-4, respectively.

Maximum pollutant concentrations predicted at the Biscayne National Park due to WCEC Units 1, 2, and 3 are summarized in Tables NPS-1-5 and NPS-1-6. Concentrations are presented for both natural gas- and oil-firing. Maximum regional haze and annual sulfur and nitrogen sulfur deposition predicted for these units are summarized in Tables NPS-1-7 and NPS 1-8, respectively.

The AQRV modeling analysis followed the WCEC modeling protocol that the National Park Service (NPS) reviewed and commented on in November 2007. These procedures are detailed in the PSD application and this response.

The potential impacts from the proposed Unit 3 at WCEC on soils, vegetation, and wildlife; visibility; and ozone concentrations were addressed in Section 7 of the PSD Permit Application. In this section, the effect levels related to the potential impacts to vegetation and wildlife were included. The information provided in that section has been supplemented in tabular format in Tables NPS-1-9 and NPS-1-10 to address the potential impacts from the three units at WCEC in the Big Cypress National Preserve and the Biscayne National Park. As shown in Tables NPS-1-9 and NPS 1-10, the maximum potential impacts from all three units at WCEC are orders of magnitude less than the potential effect levels and are expected to have an insignificant impact on soils vegetation and wildlife. In addition, the maximum potential impacts were determined using worst-case operating conditions and meteorological conditions, and therefore represent conservative impacts. As a result, no threat to the soils, vegetation, and wildlife in the Big Cypress National Preserve and Biscayne National Park are expected to occur as a result of WCEC.

ATTACHMENTS TO NPS RESPONSES

TABLE NPS-1-1
MAXIMUM POLLUTANT CONCENTRATIONS PREDICTED FOR WCEC UNITS 1, 2, AND 3
AT BIG CYPRESS NATIONAL PRESERVE
NATURAL GAS- FIRING

Pollutant	Averaging Time	Gas-Firing Maximum Concentrations ($\mu g/m^3$) [a, b] 2001	2002	2003
SO_2	Annual	0.0112	0.0106	0.0127
	24-Hour	0.246	0.171	0.259
	8-Hour	0.445	0.393	0.487
	3-Hour	0.554	0.672	0.816
	1-Hour	0.784	0.823	1.000
NO_2	Annual	0.0118	0.0108	0.0130
	24-Hour	0.315	0.230	0.326
	8-Hour	0.609	0.529	0.561
	3-Hour	0.767	0.843	0.860
	1-Hour	1.059	0.963	1.143
PM_{10}	Annual	0.0053	0.0052	0.0062
	24-Hour	0.109	0.080	0.121
	8-Hour	0.202	0.179	0.240
	3-Hour	0.250	0.316	0.400
	1-Hour	0.352	0.390	0.475
CO	Annual	0.047	0.046	0.052
	24-Hour	0.877	0.655	0.915
	8-Hour	1.535	1.390	1.827
	3-Hour	1.901	2.690	3.043
	1-Hour	2.836	3.311	3.610
SAM	Annual	0.0033	0.0035	0.0039
	24-Hour	0.0582	0.0512	0.0661
	8-Hour	0.1075	0.1224	0.1432
	3-Hour	0.1378	0.2474	0.2355
	1-Hour	0.2106	0.3076	0.2870

[a] Based on the CALPUFF model using 2001, 2002, and 2003 surface and upper air meteorological data.

[b] Based on 100 % operating load with duct firing at 35 °F. Duct firing based on natural gas-fired duct burner with maximum heat input rate of 475 mmBtu/hr (HHV).

TABLE NPS-1-2
MAXIMUM POLLUTANT CONCENTRATIONS PREDICTED FOR WCEC UNITS 1, 2, AND 3
AT BIG CYPRESS NATIONAL PRESERVE
NATURAL GAS- AND DISTILLATE OIL- FIRING

Pollutant	Averaging Time	Distillate Oil-Firing Maximum Concentrations ($\mu g/m^3$) [a]			Gas-Firing/Distillate Oil-Firing Maximum Concentrations ($\mu g/m^3$) [b]		
		2001	2002	2003	2001	2002	2003
SO_2	Annual	0.0016	0.0014	0.0018	0.0112	0.0106	0.0127
	24-Hour	0.036	0.033	0.040	0.246	0.171	0.259
	8-Hour	0.061	0.059	0.083	0.445	0.393	0.487
	3-Hour	0.090	0.118	0.151	0.554	0.672	0.816
	1-Hour	0.193	0.141	0.198	0.784	0.823	1.000
NO_2	Annual	0.0231	0.0189	0.0250	0.0124	0.0113	0.0137
	24-Hour	0.676	0.554	0.731	0.676	0.554	0.731
	8-Hour	1.136	1.171	1.212	1.136	1.171	1.212
	3-Hour	1.539	1.606	2.339	1.539	1.606	2.339
	1-Hour	2.831	2.615	3.367	2.831	2.615	3.367
PM_{10}	Annual	0.0177	0.0164	0.0204	0.0060	0.0058	0.0070
	24-Hour	0.389	0.379	0.436	0.389	0.379	0.436
	8-Hour	0.676	0.653	0.949	0.676	0.653	0.949
	3-Hour	1.013	1.303	1.715	1.013	1.303	1.715
	1-Hour	2.216	1.561	2.175	2.216	1.561	2.175
CO	Annual	0.027	0.026	0.029	0.047	0.046	0.052
	24-Hour	0.522	0.495	0.558	0.877	0.655	0.915
	8-Hour	1.083	0.934	1.218	1.535	1.390	1.827
	3-Hour	1.366	1.871	2.201	1.901	2.690	3.043
	1-Hour	2.842	2.239	2.786	2.842	3.311	3.610
SAM	Annual	0.0005	0.0005	0.0005	0.00330	0.00350	0.00390
	24-Hour	0.0089	0.0091	0.0095	0.058	0.051	0.066
	8-Hour	0.0203	0.0208	0.0220	0.108	0.122	0.143
	3-Hour	0.0267	0.0409	0.0393	0.138	0.247	0.236
	1-Hour	0.0510	0.0491	0.0482	0.211	0.308	0.287

[a] Based on the CALPUFF model using 2001, 2002, and 2003 surface and upper air meteorological data.

[b] Maximum annual average concentration are based on prorating the maximum impacts for each operation by the following maximum number of hours requested for that operation:

Pollutant	Natural Gas	Fuel Oil	Total
SO_2	8,760	0	8,760
PM_{10}	8,260	500	8,760
NO_2	8,260	500	8,760
CO	8,760	0	8,760
SAM	8,760	0	8,760

TABLE NPS-1-3
MAXIMUM 24-HOUR AVERAGE VISIBILITY IMPAIRMENT PREDICTED FOR THE PROJECT AT THE BIG CYPRESS NATIONAL PRESERVE

Operating Scenario	Units	Visibility Impairment Impacts 2001	2002	2003
Visibility Method 2				
Fuel Oil- Firing	Maximum %	5.96	8.38	11.36
Natural Gas- Firing	Maximum %	6.77	7.51	8.44
Visibility Method 6				
Fuel Oil- Firing	Maximum %	3.94	4.72	5.27
	8th-highest % [a]	2.76	2.69	2.89
Natural Gas- Firing	Maximum %	4.23	3.84	5.07
	8th-highest % [a]	3.16	3.01	3.29

[a] The 8th-highest concentration is used for Best Available Retrofit Technology (BART) determinations.

TABLE NPS-1-4
MAXIMUM ANNUAL SULFUR AND NITROGEN DEPOSITION PREDICTED FOR THE PROJECT AT THE BIG CYPRESS NATIONAL PRESERVE

Species	Total Deposition (Wet & Dry)						Deposition Analysis Threshold [b] (kg/ha/yr)
	2001		2002		2003		
	($g/m^2/s$)	(kg/ha/yr)[a]	($g/m^2/s$)	(kg/ha/yr)[a]	($g/m^2/s$)	(kg/ha/yr)[a]	
Nitrogen (N) Deposition [c]	1.77E-11	0.0056	1.88E-11	0.0059	1.89E-11	0.0060	0.01
Sulfur (S) Deposition [c]	3.03E-11	0.0096	3.09E-11	0.0097	2.98E-11	0.0094	0.01

[a] Conversion factor is used to convert $g/m^2/s$ to kg/hectare (ha)/yr with the following units:

$g/m^2/s$	x	0.001 kg/g
	x	10,000 m^2/hectare
	x	3,600 sec/hr
	x	8,760 hr/yr = kg/ha/yr
	or	
$g/m^2/s$	x	3.154E+08 = kg/ha/yr

[b] Deposition analysis thresholds (DAT) for nitrogen and sulfur deposition provided by the U.S. Fish and Wildlife Service, January 2002. A DAT is the additional amount of N or S deposition within a Class I area, below which estimated impacts from a proposed new or modified source are considered insignificant.

[c] For N deposition, based on each CT firing natural gas with duct firing for 8,260 hours and firing oil for 500 hours. For S deposition, based on each CT firing natural gas with duct firing for 8,760 hours.

TABLE NPS-1-5
MAXIMUM POLLUTANT CONCENTRATIONS PREDICTED FOR WCEC UNITS 1, 2, AND 3
AT BISCAYNE NATIONAL PARK
NATURAL GAS- FIRING

Pollutant	Averaging Time	Gas-Firing Maximum Concentrations ($\mu g/m^3$) [a, b] 2001	2002	2003
SO_2	Annual	0.0025	0.0034	0.0041
	24-Hour	0.082	0.110	0.091
	8-Hour	0.187	0.245	0.175
	3-Hour	0.298	0.382	0.245
	1-Hour	0.409	0.478	0.346
NO_2	Annual	0.0025	0.0030	0.0036
	24-Hour	0.088	0.113	0.109
	8-Hour	0.253	0.325	0.232
	3-Hour	0.426	0.496	0.360
	1-Hour	0.480	0.620	0.479
PM_{10}	Annual	0.0013	0.0019	0.0023
	24-Hour	0.046	0.066	0.049
	8-Hour	0.094	0.120	0.090
	3-Hour	0.173	0.206	0.134
	1-Hour	0.239	0.247	0.188
CO	Annual	0.012	0.017	0.020
	24-Hour	0.352	0.617	0.486
	8-Hour	0.719	0.922	0.693
	3-Hour	1.330	1.763	1.219
	1-Hour	1.832	2.144	1.597
SAM	Annual	0.0009	0.0014	0.0016
	24-Hour	0.0333	0.0572	0.0310
	8-Hour	0.0651	0.0783	0.0601
	3-Hour	0.1229	0.1370	0.1048
	1-Hour	0.1682	0.1653	0.1430

[a] Based on the CALPUFF model using 2001, 2002, and 2003 surface and upper air meteorological data.

[b] Based on 100 % operating load with duct firing at 35 °F. Duct firing based on natural gas-fired duct burner with maximum heat input rate of 475 mmBtu/hr (HHV).

TABLE NPS-1-6
MAXIMUM POLLUTANT CONCENTRATIONS PREDICTED FOR WCEC UNITS 1, 2, AND 3
AT BISCAYNE NATIONAL PARK
NATURAL GAS- AND DISTILLATE OIL- FIRING

Pollutant	Averaging Time	Distillate Oil-Firing Maximum Concentrations (µg/m^3) [a] 2001	2002	2003	Gas-Firing/Distillate Oil-Firing Maximum Concentrations (µg/m^3) [b] 2001	2002	2003
SO_2	Annual	0.0004	0.0005	0.0008	0.0025	0.0034	0.0041
	24-Hour	0.016	0.020	0.018	0.082	0.110	0.091
	8-Hour	0.036	0.034	0.034	0.187	0.245	0.175
	3-Hour	0.067	0.065	0.050	0.298	0.382	0.245
	1-Hour	0.094	0.081	0.071	0.409	0.478	0.346
NO_2	Annual	0.0060	0.0064	0.0098	0.0027	0.0032	0.0040
	24-Hour	0.252	0.229	0.282	0.252	0.229	0.282
	8-Hour	0.740	0.589	0.741	0.740	0.589	0.741
	3-Hour	0.949	1.258	0.953	0.949	1.258	0.953
	1-Hour	1.277	1.600	1.320	1.277	1.600	1.320
PM_{10}	Annual	0.0051	0.0065	0.0097	0.0015	0.0022	0.0027
	24-Hour	0.209	0.286	0.228	0.209	0.286	0.228
	8-Hour	0.440	0.435	0.397	0.440	0.435	0.397
	3-Hour	0.849	0.792	0.638	0.849	0.792	0.638
	1-Hour	1.138	0.992	0.897	1.138	0.992	0.897
CO	Annual	0.008	0.010	0.014	0.012	0.017	0.020
	24-Hour	0.272	0.443	0.295	0.352	0.617	0.486
	8-Hour	0.567	0.611	0.512	0.719	0.922	0.693
	3-Hour	1.096	1.125	0.827	1.330	1.763	1.219
	1-Hour	1.472	1.377	1.169	1.832	2.144	1.597
SAM	Annual	0.0001	0.0002	0.0003	0.00090	0.00140	0.00160
	24-Hour	0.0059	0.0104	0.0057	0.033	0.057	0.031
	8-Hour	0.0117	0.0153	0.0100	0.065	0.078	0.060
	3-Hour	0.0236	0.0208	0.0173	0.123	0.137	0.105
	1-Hour	0.0317	0.0275	0.0244	0.168	0.165	0.143

[a] Based on the CALPUFF model using 2001, 2002, and 2003 surface and upper air meteorological data.

[b] Maximum annual average concentration are based on prorating the maximum impacts for each operation by the following maximum number of hours requested for that operation:

Pollutant	Natural Gas	Fuel Oil	Total
SO_2	8,760	0	8,760
PM_{10}	8,260	500	8,760
NO_2	8,260	500	8,760
CO	8,760	0	8,760
SAM	8,760	0	8,760

TABLE NPS-1-7
MAXIMUM 24-HOUR AVERAGE VISIBILITY IMPAIRMENT PREDICTED FOR THE PROJECT AT BISCAYNE NATIONAL PARK

Operating Scenario	Units	Visibility Impairment Impacts 2001	2002	2003
Visibility Method 2				
Fuel Oil- Firing	Maximum %	3.55	6.12	5.41
Natural Gas- Firing	Maximum %	3.90	6.13	4.42
Visibility Method 6				
Fuel Oil- Firing	Maximum %	2.71	4.16	2.88
	8th-highest % [a]	1.10	1.11	1.99
Natural Gas- Firing	Maximum %	2.51	4.01	2.56
	8th-highest % [a]	0.98	1.18	1.60

[a] The 8th-highest concentration is used for Best Available Retrofit Technology (BART) determinations.

TABLE NPS-1-8
MAXIMUM ANNUAL SULFUR AND NITROGEN DEPOSITION PREDICTED FOR THE PROJECT AT BISCAYNE NATIONAL PARK

Species	Total Deposition (Wet & Dry) 2001 ($g/m^2/s$)	2001 ($kg/ha/yr$)[a]	2002 ($g/m^2/s$)	2002 ($kg/ha/yr$)[a]	2003 ($g/m^2/s$)	2003 ($kg/ha/yr$)[a]	Deposition Analysis Threshold[b] (kg/ha/yr)
Nitrogen (N) Deposition[c]	4.06E-12	0.0013	5.41E-12	0.0017	4.06E-12	0.0013	0.01
Sulfur (S) Deposition[c]	1.19E-11	0.0037	1.02E-11	0.0032	1.19E-11	0.0037	0.01

[a] Conversion factor is used to convert $g/m^2/s$ to kg/hectare (ha)/yr with the following units:

$g/m^2/s$ x 0.001 kg/g
x 10,000 m^2/hectare
x 3,600 sec/hr
x 8,760 hr/yr = kg/ha/yr
or
$g/m^2/s$ x 3.154E+08 = kg/ha/yr

[b] Deposition analysis thresholds (DAT) for nitrogen and sulfur deposition provided by the U.S. Fish and Wildlife Service, January 2002. A DAT is the additional amount of N or S deposition within a Class I area, below which estimated impacts from a proposed new or modified source are considered insignificant.

[c] For N deposition, based on each CT firing natural gas with duct firing for 8,260 hours and firing oil for 500 hours.
For S deposition, based on each CT firing natural gas with duct firing for 8,760 hours.

TABLE NPS-1-9
PREDICTED IMPACTS ON AQRVs IN BISCAYNE NATIONAL PARK
WCEC UNITS 1, 2, AND 3

AQRV/ Pollutant	Averaging Time	Maximum Impact from WCEC	Maximum Impact Reference	Potential Effect Levels	Effect	Effect Level Reference	Conclusion
Impacts on Soil							
Sulfur Deposition	Annual	0.0037 kg/ha/yr	Table NPS-1-8	None	Maximum deposition small compared to background of 4.9 to 5.6 kg/ha/yr. Natural sea-salt background is 0.7 kg/ha/yr. Average deposition over 1,500 times lower than natural background.	Section 7.4.5.2	No threat
Nitrogen Deposition	Annual	0.0017 kg/ha/yr	Table NPS-1-8	None	Maximum deposition small compared to background of 3.4 to 4.8 kg/ha/yr. Average deposition over 2,000 times lower than natural background.	Section 7.4.5.2	No threat
Impacts on Vegetation							
SO_2	Annual	0.0041 $\mu g/m^3$	Table NPS-1-6	8 $\mu g/m^3$	Damage to sensitive species such as lichens.	Section 7.2.2.1	No threat
	3-Hour	0.38 $\mu g/m^3$	Table NPS-1-6	790 $\mu g/m^3$	Injury to sensitive plants such as ragweed, legumens, blackberry, southern pine, and red and black oak.	Section 7.2.2.1	No threat
NO_x	1-Hour	1.6 $\mu g/m^3$	Table NPS-1-6	3800 $\mu g/m^3$	Acute exposure (1-, 4-, and 8-hour), foliar injury to sensitive plants.	Section 7.2.2.2	No threat
	3-Hour	1.26 $\mu g/m^3$	Table NPS-1-6	3800 $\mu g/m^3$	Acute exposure (1-, 4-, and 8-hour), foliar injury to sensitive plants.	Section 7.2.2.2	No threat
	8-Hour	0.74 $\mu g/m^3$	Table NPS-1-6	3800 $\mu g/m^3$	Acute exposure (1-, 4-, and 8-hour), foliar injury to sensitive plants.	Section 7.2.2.2	No threat
	Annual	0.004 $\mu g/m^3$	Table NPS-1-6	2000 $\mu g/m^3$	Chronic exposure, yield loss and chlorosis in plant tissue.	Section 7.2.2.2	No threat
PM	8-Hour	0.44 $\mu g/m^3$	Table NPS-1-6	210 $\mu g/m^3$	Damage to plant foliage in the form of higher leaf area/dry weight ratio.	Section 7.2.2.3	No threat
CO	1-Hour	2.14 $\mu g/m^3$	Table NPS-1-6	6.85E+06 $\mu g/m^3$	Cytochrome c Oxidase inhibition in corn, sorghum, millet, and Guinea grass.	Section 7.2.2.4	No threat
SAM [b]	Annual	0.0016 $\mu g/m^3$	Table NPS-1-6	-- --	--	--	No threat
Ozone [c]	--	-- --	--	-- --	--	--	

TABLE NPS-1-9
PREDICTED IMPACTS ON AQRVs IN BISCAYNE NATIONAL PARK
WCEC UNITS 1, 2, AND 3

AQRV/ Pollutant	Averaging Time	Maximum Impact from WCEC	Maximum Impact Reference	Potential Effect Levels	Effect	Effect Level Reference	Conclusion
Impacts on Wildlife							
SO_2	1-Hour	0.48 $\mu g/m^3$	Table NPS-1-6	427 $\mu g/m^3$	Respiratory stress in guinea pigs.	Table 7-3	Impacts insignificant compared to effect level
	Annual	0.0041 $\mu g/m^3$	Table NPS-1-6	13 $\mu g/m^3$	Long-term effect - decreased abundance in deer mice.	Table 7-3	Impacts insignificant compared to effect level
NO_x	3-Hour	1.26 $\mu g/m^3$	Table NPS-1-6	1917 $\mu g/m^3$	Respiratory stress in mice.	Table 7-3	Impacts insignificant compared to effect level
	Annual	0.004 $\mu g/m^3$	Table NPS-1-6	96 $\mu g/m^3$	Long-term effect - respiratory stress in guinea pigs.	Table 7-3	Impacts insignificant compared to effect level
PM	1-Hour	1.14 $\mu g/m^3$	Table NPS-1-6	100 $\mu g/m^3$	2-Hour exposure of 100 $\mu g/m^3$ $NiCl_2$ is reported to cause respiratory stress in rats.	Table 7-3	Impacts insignificant compared to effect level
Impacts on Visibility		Method 6[c]					
Visibility	24-Hour	1.99 (Oil)	Table NPS-1-7	NA	None established for PSD Class II areas.	Section 7.4.5.1	No significant effects on visibility based on overall results.
		1.6 (NG)				Section 7.4.5.1	
Impacts from Sulfur and Nitrogen Deposition							
Sulfur	Annual	0.0037 kg/ha/yr	Table NPS-1-8	0.01 kg/ha/yr	Deposition analysis threshold, below which the deposition is insignificant.	Section 7.4.5.2	Insignificant
Nitrogen	Annual	0.0017 kg/ha/yr	Table NPS-1-8	0.01 kg/ha/yr	Deposition analysis threshold, below which the deposition is insignificant.	Section 7.4.5.2	Insignificant

[a] No significant adverse effects on vegetation are expected from SAM because of no threat from SO_2 concentration.

[b] Total VOC and NO_x emissions increase of 247 and 1,042 TPY for WCEC Units 1, 2, & 3 is less than 0.5 and 3, respectively, of the projected VOC and NO_x emissions. Therefore, the O_3 monitoring concentrations presented in Section 6.11 of the PSD Permit Application are not expected to significantly change due to the these units.

[c] 8th highest visibility impacts calculated using Visibility Method 6.

TABLE NPS-1-10
PREDICTED IMPACTS ON AQRVs IN BIG CYPRESS NATIONAL PRESERVE
WCEC UNITS 1, 2, AND 3

AQRV/ Pollutant	Averaging Time	Maximum Impact from WCEC	Maximum Impact Reference	Potential Effect Levels	Effect	Effect Level Reference	Conclusion
Impacts on Soil							
Sulfur Deposition	Annual	0.0097 kg/ha/yr	Table NPS-1-4	None	Maximum deposition small compared to background of 4.9 to 5.6 kg/ha/yr. Natural sea-salt background is 0.7 kg/ha/yr. Average deposition over 500 times lower than natural background.	Section 7.4.5.2	No threat
Nitrogen Deposition	Annual	0.0060 kg/ha/yr	Table NPS-1-4	None	Maximum deposition small compared to background of 3.4 to 4.8 kg/ha/yr. Average deposition over 500 times lower than natural background.	Section 7.4.5.2	No threat
Impacts on Vegetation							
SO_2	Annual	0.013 $\mu g/m^3$	Table NPS-1-2	8 $\mu g/m^3$	Damage to sensitive species such as lichens.	Section 7.2.2.1	No threat
	3-Hour	0.82 $\mu g/m^3$	Table NPS-1-2	790 $\mu g/m^3$	Injury to sensitive plants such as ragweed, legumens, blackberry, southern pine, and red and black oak.	Section 7.2.2.1	No threat
NO_x	1-Hour	3.37 $\mu g/m^3$	Table NPS-1-2	3800 $\mu g/m^3$	Acute exposure (1-, 4-, and 8-hour), foliar injury to sensitive plants.	Section 7.2.2.2	No threat
	3-Hour	2.34 $\mu g/m^3$	Table NPS-1-2	3800 $\mu g/m^3$	Acute exposure (1-, 4-, and 8-hour), foliar injury to sensitive plants.	Section 7.2.2.2	No threat
	8-Hour	1.21 $\mu g/m^3$	Table NPS-1-2	3800 $\mu g/m^3$	Acute exposure (1-, 4-, and 8-hour), foliar injury to sensitive plants.	Section 7.2.2.2	No threat
	Annual	0.014 $\mu g/m^3$	Table NPS-1-2	2000 $\mu g/m^3$	Chronic exposure, yield loss and chlorosis in plant tissue.	Section 7.2.2.2	No threat
PM	8-Hour	0.95 $\mu g/m^3$	Table NPS-1-2	210 $\mu g/m^3$	Damage to plant foliage in the form of higher leaf area/dry weight ratio.	Section 7.2.2.3	No threat
CO	1-Hour	3.61 $\mu g/m^3$	Table NPS-1-2	6.85E+06 $\mu g/m^3$	Cytochrome c Oxidase inhibition in corn, sorghum, millet, and Guinea grass.	Section 7.2.2.4	No threat
SAM [b]	Annual	0.0039 $\mu g/m^3$	Table NPS-1-2	-- --	--	--	No threat
Ozone [c]	--	-- --	--	-- --	--	--	

TABLE NPS-1-10
PREDICTED IMPACTS ON AQRVs IN BIG CYPRESS NATIONAL PRESERVE
WCEC UNITS 1, 2, AND 3

AQRV/ Pollutant	Averaging Time	Maximum Impact from WCEC	Maximum Impact Reference	Potential Effect Levels	Effect	Effect Level Reference	Conclusion
Impacts on Wildlife							
SO_2	1-Hour	1.00 $\mu g/m^3$	Table NPS-1-2	427 $\mu g/m^3$	Respiratory stress in guinea pigs.	Table 7-3	Impacts insignificant compared to effect level
	Annual	0.013 $\mu g/m^3$	Table NPS-1-2	13 $\mu g/m^3$	Long-term effect - decreased abundance in deer mice.	Table 7-3	Impacts insignificant compared to effect level
NO_x	3-Hour	2.34 $\mu g/m^3$	Table NPS-1-2	1917 $\mu g/m^3$	Respiratory stress in mice.	Table 7-3	Impacts insignificant compared to effect level
	Annual	0.014 $\mu g/m^3$	Table NPS-1-2	96 $\mu g/m^3$	Long-term effect - respiratory stress in guinea pigs.	Table 7-3	Impacts insignificant compared to effect level
PM	1-Hour	2.22 $\mu g/m^3$	Table NPS-1-2	100 $\mu g/m^3$	2-Hour exposure of 100 $\mu g/m^3$ $NiCl_2$ is reported to cause respiratory stress in rats.	Table 7-3	Impacts insignificant compared to effect level
Impacts on Visibility							
Visibility	24-Hour	Method 6[c] 2.9 (Oil) % Change 3.3 (NG) % Change	Table NPS-1-3	NA	None established for PSD Class II areas.	Section 7.4.5.1 Section 7.4.5.1	No significant effects on visibility based on overall results.
Impacts from Sulfur and Nitrogen Deposition							
Sulfur	Annual	0.0097 kg/ha/yr	Table NPS-1-4	0.01 kg/ha/yr	Deposition analysis threshold, below which the deposition is insignificant.	Section 7.4.5.2	Insignificant
Nitrogen	Annual	0.006 kg/ha/yr	Table NPS-1-4	0.01 kg/ha/yr	Deposition analysis threshold, below which the deposition is insignificant.	Section 7.4.5.2	Insignificant

[a] No significant adverse effects on vegetation are expected from SAM because of no threat from SO_2 concentration.

[b] Total VOC and NO_x emissions increase of 247 and 1,042 TPY for WCEC Units 1, 2, & 3 is less than 0.5 and 3, respectively, of the projected VOC and NO_x emissions. Therefore, the O_3 monitoring concentrations presented in Section 6.11 of the PSD Permit Application are not expected to significantly change due to the these units.

[c] 8th highest visibility impacts calculated using Visibility Method 6.