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BUREAU OF AIR REGULATION

December 18, 2009 FPLNNP-09-0725

Mr. Jeffrey F. Koerner, Administrator, New Source Review Section
Florida Department of Environmental Protection
Bureau of Air Regulation
111 South Magnolia St.
Tallahassee, FL 32399

Re: FPL Turkey Point Units 6 & 7 Project
Request for Additional Information
Air Permit Application and Prevention of Significant Deterioration Analysis
Project No. 0250003-013-AC (PSD-FL-409)

Dear Mr. Koerner:

Florida Power & Light Company (FPL) is pleased to submit six (6) copies of its responses to the Air Permit Application and Prevention of Significant Deterioration Analysis Request for Additional Information issued by the Department on November 13, 2009. The additional information is presented in the same order as requested from the Department. In addition, a Professional Engineer Certification is attached because additional information of an engineering nature is provided. A new certification statement by the authorized representative is not needed as no material changes are being made to the application by this submittal.

If you have any comments or questions regarding the attached, please feel free to contact me at (561) 691-7518 or Matt Raffenberg at (561) 691-2808.

Sincerely,
FLORIDA POWER & LIGHT COMPANY

for

Barbara P. Linkiewicz
Director of Environmental Licensing

Attachment

cc: Timothy Gray, FDEP Southeast District Office
Michael Halpin, FDEP Siting Office
Trina Vielhauer, FDEP Bureau of Air Regulation
Peter Cunningham, Esq., Hopping Green & Sams P.A.
Kennard Kosky, Golder Associates Inc.
Lennon Anderson, FDEP Southeast District
Patrick Wong, Miami-Dade DERM
Mallika Muthias, Miami-Dade DERM
Dee Morris, National Park Service, Air Resources Division
Kathleen Forney, EPA Region 4
Heather Abrams, EPA Region 4
Ana M. Oquendo, EPA Region 4
Vickie Gibson, FDEP BAR Reading File
Matthew J. Raffenberg, FPL
Michael S. Tammaro, Esq., FPL

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: **6026 NW 1st Place** City: **Gainesville** State: **FL** Zip Code: **32607**
3.	Professional Engineer Telephone Numbers... Telephone: **(352) 336-5600** ext. **21156** Fax: **(352) 336-6603**
4.	Professional Engineer E-mail 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: Kennard F. Kosky — Date: 12/17/09 (seal)

* Attach any exception to certification statement.

**Board of Professional Engineers Certificate of Authorization #00001670.

FDEP-2PSD-1-a Based on the response and information provided in the application, the Department understands that each proposed nuclear unit will have three cooling towers for a total of six cooling towers. Each cooling tower will have the following specifications:

Air Flow Specifications	Circulating Water Flow Specifications
Number of Cells: 12 cells **per tower**	Total Circulating Water Flow: 210,366.7 gpm **per tower**
Discharge Height: 67 feet	PM Drift Rate: 0.0005%
Diameter: 33.67 feet	PM Emissions: 157.2 tons/year/**per tower** at 65,000 ppmw TDS
Exit Temperature: 104.7° F	PM_{10} Emissions: 3.5 tons/year/**per tower** based on 4000 ppmw TDS
Volumetric Flow Rate: 1,764,500 acfm **per cell**	("TDS" means total dissolved solids in proposed cooling water.)

"PM" means particulate matter. "PM_{10}" means particulate matter with a mean particle diameter of 10 microns or less.

a. The above information was updated based on your initial response. Please confirm the above specifications.

Response: The information contained in the Department's Request for Additional Information (RAI) for the circulating water cooling tower specifications is accurate as reflected in Table 2-1 of the PSD Report; however, please note that "discharge height", as represented above, is the height of the circulating water cooling tower stack that was identified as 66.5 feet in the PSD Report.

FDEP-2PSD-1-b In your response, you state that the treatment criterion is 336 to 580 mg/L of TDS, which is approximately 336 to 580 ppmw of TDS. Does this mean that the reclaimed water will be treated from 4000 ppmw to 580 ppmw before being used in the cooling towers?

Response: No, the reclaimed water will not be treated for total dissolved solids (TDS) from a TDS concentration of 4,000 parts per million by weight (ppmw) to a TDS concentration of 580 ppmw. The reclaimed water treatment plant is designed primarily to treat nutrients (phosphorous and ammonia nitrogen) to less than 1 milligrams per liter (mg/L). Treatment for TDS is unnecessary for purposes of cooling tower operation. An explanation of the basis for the estimated maximum TDS concentration in treated reclaimed water follows.

The TDS concentration leaving the FPL reclaimed water treatment plant is expected to range from 336 to 580 mg/L. However, over the life of the plant, the TDS concentration in the reclaimed water could vary, depending on the Miami Dade Water and Sewer Department (MDWASD) reclaimed water source and could be as high as 1,000 ppmw.

To determine the maximum potential particulate matter less than 10 micrometers in diameter (PM_{10}) emissions, a maximum TDS concentration for reclaimed water was assumed to be 1,000 ppmw. A TDS concentration of 1,000 ppmw for the reclaimed water supply would produce a TDS concentration in the circulating water of 4,000 ppmw when operating at 4 cycles of concentration. A TDS concentration of 4,000 ppmw in the circulating water results in a conservative estimate of PM_{10} emissions.

As shown in Table A-1 of the Prevention of Significant Deterioration (PSD) Report and explained in the response FDEP-PSD-1-c-6 of the first RAI, the maximum potential PM_{10} emissions were estimated using a TDS concentration in the circulating water of 4,000 ppmw. The actual PM_{10} emissions are expected to be lower.

FDEP-2PSD-1-c The second source of water will be from radial collector wells, for which you estimate a maximum TDS concentration of 65,000 ppmw. In your response, you provided a representative analysis of the actual TDS for this source of water as 33,800 to 35,800 mg/L, which is approximately 33,800 to 35,800 ppmw. At this concentration, would the maximum total PM emissions from the cooling towers be reduced to approximately 518 tons/year?

Response: No, the total PM emissions would not be approximately 518 tons/year, since the TDS in the makeup water would be concentrated by 1.5 times to account for evaporation in the circulating water system cooling towers. At TDS concentrations of 33,800 and 35,800 ppmw (for saltwater used as makeup water to the cooling towers) the TDS concentrations in the circulating water would be 50,700 and 53,700 ppmw, respectively, when concentrated 1.5 times. The calculated annual PM emissions with this range of TDS concentrations are approximately 727 and 769 tons/year. The analyses provided in the response to FDEP-PSD-1-d for the first RAI show TDS concentrations of 33,800 and 35,800 ppmw for specific samples taken on the Turkey Point peninsula during aquifer pump tests.

The maximum estimated TDS concentration of 65,000 ppmw in the circulating water is based on the variability of TDS concentrations in Biscayne Bay and operation of the cooling towers. Although the water is withdrawn from 40 feet (ft) below Biscayne Bay via radial collector wells, the saltwater is expected to have TDS concentrations similar to those found in Biscayne Bay. The maximum TDS concentration of 65,000 ppmw for the circulating water is based on an upper bound of TDS concentration for saltwater of 43,333 ppmw from the radial collector wells, with 1.5 cycles of concentration.

Figure 2PSD-1-c shows the salinity in Biscayne Bay at a station near Turkey Point. Salinity is measured in parts per thousand (ppt) that approximates TDS concentrations in ppmw when multiplied by 1,000. The average salinity in Biscayne Bay near the Turkey Point peninsula is approximately 34 ppt or approximately 34,000 ppmw TDS. During wet periods, the salinity in the Bay is typically below average; during dry periods, the salinity in the Bay is typically above average. As shown in Figure 2PSD-1-c, the salinity can exceed 40,000 ppmw.

FDEP-2PSD-1-d In your response, you state that the cooling water will made up from a combination of these water sources. Is there sufficient supply to operate the cooling towers solely on treated effluent? Will this be the preferred source? If the sources are blended, what is the expected blend ratio?

Response: Yes, it is expected that is a sufficient supply of reclaimed water will be available to provide makeup water to the circulating water cooling towers, after treatment in the FPL reclaimed water treatment facility. Reclaimed water from the MDWASD South District Waste Water Treatment Plant has been identified as the primary source of cooling water makeup for the circulating water cooling towers. The secondary makeup water source will come from radial collector wells. When reclaimed water is not available in sufficient quantity or quality, saltwater will be added to provide the necessary cooling water.

The design and operation of the cooling towers will maximize use of reclaimed water. The ratio of water supplied by the two makeup water sources will vary based on the availability of reclaimed water from MDWASD. As described in the response to FDEP-PSD-1-e of the first RAI, the cycles of concentration would be based on the ultimate TDS concentration of the reclaimed water and saltwater blend. However, because conservative estimates for the range of TDS concentrations were assumed, the particulate matter (PM) and PM_{10} emissions would not exceed the maximum potential emissions provided by the range of TDS concentrations being considered: i.e., 4,000 ppmw when using reclaimed water to calculate the maximum PM_{10} emissions, and 65,000 ppmw when using saltwater to calculate maximum PM emissions.

FDEP-2PSD-1-e For the six cooling towers for proposed Units 6 and 7, the application estimates potential PM emissions of 943 tons/year and PM_{10} emissions of 21 tons/year. Based on the expected actual TDS concentrations and the blend of cooling waters, estimate the expected actual PM and PM_{10} emissions.

Response: The expected annual PM_{10} emissions would be 20.4 tons/year using reclaimed water, and the expected annual PM emissions would be 731.5 tons/year using saltwater. The basis for these estimated expected emissions are presented below.

For reclaimed water, the expected TDS concentration is 580 ppmw (see response to FDEP-2PSD-1-b). At 4 cycles of concentration, the expected TDS concentration in the circulating water cooling towers would be 2,320 ppmw. At a TDS concentration of 2,320 ppmw in the circulating water, the expected annual PM_{10} emissions would be 20.4 tons/year.

For saltwater, the expected TDS would be approximately 34,000 ppmw, which approximates the average TDS concentration of Biscayne Bay near Turkey Point (see response to FDEP-2PSD-1-c). At 1.5 cycles of concentration, the TDS concentration in the circulating water cooling towers would be 51,000 ppmw. Since higher concentrations of TDS produce higher PM emissions, as demonstrated by the calculations presented in Appendix A of the air permit application, the expected annual PM emissions would be 731.5 tons/year. To account for the variability of TDS concentrations in Biscayne Bay, a conservatively high TDS concentration of 65,000 ppmw in the circulating water cooling towers at 1.5 cycles of concentration was used.

For a blend of reclaimed water and saltwater, the expected TDS concentrations in the circulating water will fall within the ranges discussed above (2,320 ppmw for reclaimed water and 51,000 ppmw for saltwater). The maximum potential PM_{10} emissions, could result from a TDS concentration in the circulating water of 4,000 ppmw (using a blend of reclaimed water and saltwater), producing PM_{10} emissions of 21 tons/year.

The maximum expected PM emissions, using a blend of reclaimed water and saltwater in the ranges discussed above, would be no greater than 731.5 tons/year.

FDEP-2PSD-2-a The project also proposes to construct two service water cooling towers - one per nuclear unit with the following specifications per tower.

Air Flow Specifications	Circulating Water Flow Specifications
Number of Cells: 2 cells per tower	Total Circulating Water Flow: 21,000 gpm **per tower**
Discharge Height: 63 feet	PM Drift Rate: 0.0005%
Diameter: 35 feet	PM Emissions: **0.92** tons/year/**per tower**
Exit Temperature: 96.9° F	PM_{10} Emissions: 0.35 tons/year/**per tower**
Volumetric Flow Rate: 1,358,000 acfm **per cell**	Emission based on high range of TDS in proposed cooling water.

a. The above information was updated based on your initial response. Please confirm the above specifications.

Response: The information contained in the Department's Request for Additional Information (RAI) for the service water cooling tower specifications is accurate, as reflected in Table 2-2 of the PSD Report; however, please note that "discharge height", as represented above, is the height of the service water cooling tower stack, identified as 63 ft in the PSD Report.

FDEP-2PSD-2-b Your response indicates that the service water cooling towers will use potable water from Miami-Dade County, which has a TDS concentration of 318 ppmw that would be 1272 ppmw at 4 cycles of concentration. Please explain this statement.

Response: The TDS concentration of potable water that would be used for makeup to the service water cooling towers was based on a sample provided by MDWASD at 318 ppmw. Based on 4 cycles of concentration, the TDS concentration in the circulating water would be 1,272 ppmw. However, since the TDS could vary in potable water, a maximum TDS concentration of 4,000 ppmw in the circulating water (based on a maximum TDS concentration of 1,000 ppmw in the potable water) was used to conservatively estimate the maximum potential PM and PM_{10} emissions from the service water cooling towers.

FDEP-2PSD-3 As shown in Table 2-1, the cooling tower PM emission rate for a TDS concentration of 65,000 ppmw is 107.7 lb/hr per unit or about 45 times higher than the maximum modeled PM_{10} emission rate of 2.42 lb/hr per unit. The modeling results show a maximum predicted 24-hour average PM_{10} project impact of 4.934 $\mu g/m^3$. Based on the ratio of maximum PM to PM_{10} emissions, the predicted modeling impacts are around 220 $\mu g/m^3$, 24-hour average, for PM emissions. Please address the potential air quality impacts of PM emissions on soils, vegetation and wildlife.

Response: For clarification, while the maximum PM mass emissions are 44.5 times higher than the PM_{10} mass emissions, it is not appropriate to linearly scale the difference in mass emissions to the predicted modeling results for PM_{10} concentrations to PM concentrations. The differences in locations and stack parameters for all the sources modeled, including the circulating water and service water cooling towers, standby and ancillary generators, and diesel fire pump engines, result in non-linear relationships between emissions and predicted concentrations. Modeling of PM is no longer required, because there are no ambient air quality standards or PSD increments.

To address the Department's question concerning PM impacts on soils, vegetation and wildlife, an analysis of the year producing the maximum 24-hour PM_{10} concentration of 4.934 micrograms per cubic meter of air (ug/m^3) was modeled (i.e., 2005). The modeling analysis was performed to determine the maximum 24-hour PM concentration, using meteorological data for the year 2005 and using the same methodology discussed in Section 6 of the PSD Report. The only difference in the modeling was that PM emissions (rather than PM_{10} emissions) for each tower were used in the analysis. The maximum PM emissions for each tower are 35.9 pounds per hour (lb/hr), which yields the rate of 107.7 lb/hr for the three circulating water cooling towers associated with each unit. The maximum 24-hour PM concentration, based on the year 2005, is predicted to be 36.7 ug/m^3, as compared to the 4.934 ug/m^3 for PM_{10}, as presented in the PSD Report.

There are no longer ambient air quality standards for PM [or Total Suspended Particulate (TSP) matter]. In 1971, EPA promulgated primary and secondary National Ambient Air Quality Standards (NAAQS) for TSP. The primary standards (measured by the indicator TSP) were 260 ug/m^3, 24-hour average, not to be exceeded more than once per year, and a 75 ug/m^3 annual geometric mean. The secondary standard (measured as TSP) was 150 ug/m^3, 24-hour average, not to be exceeded more than once per year. The "secondary" NAAQS protect against welfare effects (e.g., effects on vegetation, ecosystems, visibility, climate, manmade materials, etc.).

EPA promulgated significant revisions of the 1971 standards in 1987 (52 FR 24854, July 1, 1987) and dropped the TSP NAAQS in favor of the PM_{10} NAAQS. While TSP NAAQS are no longer applicable, the levels established as the secondary NAAQS provide information relevant to the protection of vegetation, soils and wildlife. As shown above, the secondary NAAQS was 150 ug/m^3 on a 24-hour average, not to be exceeded more than once per year (i.e., defined as the "highest, second highest" concentration at any receptor). The maximum predicted PM (TSP) concentration for the Turkey Point Units 6 & 7 Project is estimated to be 36.7 ug/m^3, which is one-fourth the previously adopted TSP secondary NAAQS established to protect vegetation, ecosystems and wildlife. This maximum predicted PM concentration is also the "highest" and not the "highest, second highest".

The appropriate comparison to the secondary NAAQS was the "highest, second highest" concentration, which would be lower than 36.7 ug/m^3. These results, together with the information presented in the response to FDEP-PSD-7 of the first RAI and Section 7.3.1 of the PSD Report, demonstrate that there will be no adverse impacts to soils, vegetation and wildlife as a result of the PM emissions from the Project.

FDEP-2PSD-4-a With regard to off-site nonmetallic mineral processing operations that may be performed in association with the construction project, FPL will be required to obtain a Miami-Dade County Air Emissions Annual Operating Permit prior to conducting rock mining/crushing operations, as well as registering with FDEP for a Nonmetallic Mineral Processing Plant Air General Permit. Please acknowledge.

Response: As described in the response to FDEP-PSD-10-a in the first RAI, the review of the off-site fill source is being performed as part of the certification process under the Power Plant Siting Act (PPSA), Chapter 403, Part II, Florida Statutes (F.S.). Upon approval of the Project under the PPSA, separate permits from state and local agencies are not required, except in the case of permits issued under federally approved or delegated program [403.511(1), F.S.]. FPL will comply with applicable non-procedural requirements of the nonmetallic mineral processing air general permit requirement and the New Source Performance Standard (NSPS) [40 Code of Federal Regulations (CFR) Part 60, Subpart OOO), and would not object to a condition confirming such compliance in the PPSA conditions of certification.

FDEP-2PSD-4-b-1 Provide a technical discussion and analysis of the heat transfer process on the constituents identified in the circulating cooling waters - both reclaim and radial well/subsurface waters.

Response: The overall heat transfer process in the circulating water cooling towers is a low temperature process. The heat transfer process is a function of the exchange of heat between warm water returning from each generating unit and the evaporation of water resulting from air passing through the cooling towers. As shown in Table 2-1 of the PSD Report, the design hot water temperature is 115.4 degrees Fahrenheit (°F) (cooling tower inlet temperature) and the design cold water temperature is 91°F (cooling tower outlet temperature). The design temperatures are based on ambient conditions at Turkey Point that occur during the summertime that represent the highest temperatures that occur in the heat transfer process. The remaining portions of the year, the water temperatures would be lower. These low operating temperatures of the circulating water cooling towers will not result in chemical changes in the constituents. Rather, the primary influence of the heat transfer process on the constituents in the circulating water is their concentration, based on the cycles of concentration. Evaporation in the circulating water cooling towers concentrates the constituents in the makeup water (i.e., reclaimed water, saltwater, or a blend).

To maintain proper water chemistry in the circulating water cooling towers and to prevent scaling and corrosion, the cycles of concentration are adjusted, based on the quality of the makeup water source. Cooling water blowdown is utilized to adjust the cycles of concentration. Makeup water for the circulating water cooling towers compensates for evaporation, drift, and blowdown. For the circulating water cooling towers proposed for Turkey Point Units 6 & 7, the cycles of concentration will range from 4 (for reclaimed water with low TDS concentrations) to 1.5 (for saltwater with higher TDS concentrations). Please also refer to responses FDEP-2PSD-1-b through e.

FDEP-2PSD-4-b-2 Provide the anticipated mix of cooling waters. In other words, what are the expected percentage of reclaim water and the expected percentage of radial well/subsurface water that will be utilized in the cooling towers?

Response: Please refer to the response to FDEP-2PSD-1-d.

FDEP-2PSD-4-b-3 FPL plans to install a treatment facility for the partially treated wastewater effluent. As noted in the response, the radial well/subsurface water contains high concentrations of chlorides (20,700 mg/l) and sulfates (2,540mg/l) from the "saltwater". Identify available pre-treatment processes that could be used on this source of cooling water to reduce TDS. Evaluate the energy, environmental and economic impacts as well as other associated costs of such treatment.

Response: FPL objects to this RAI comment, based on Rule 62-4.055(3), Florida Administrative Code (F.A.C.), on grounds that the information is not needed to clarify information previously provided in the PSD permit process or to answer new questions arising from or related to additional information previously provided in the PSD permit process. Without waiving this objection, FPL responds as follows.

The Best Available Control Technology (BACT) evaluation identified reclaimed water from the MDWASD as the primary water source for the cooling water towers for Units 6 & 7. The evaluation of an applicant's BACT analysis should recognize how the applicant defines the proposed source, including its fundamental purpose or basic design. FPL has proposed that reclaimed water will be the primary source of cooling water — not saltwater — and has, therefore proposed an appropriate water treatment facility to treat nutrients and assure the proper operation of the circulating water cooling towers. Moreover, evaluation of pre-treatment for TDS has not been required in previous PSD reviews for projects using water with higher TDS concentrations. The information provided below demonstrates that the use of a RO treatment facility for a *secondary* source of cooling water is inappropriate for the Project.

The FPL reclaimed water treatment facility will be designed to treat reclaimed water for removal of nutrients for the proper operation of the circulating water cooling towers. The secondary or backup source of water is saltwater withdrawn from radial collector wells that recharge from below Biscayne Bay. Since the water from the radial collector wells contains high TDS, any removal of chlorides, sulfates and other dissolved solids would require the installation of a fundamentally different treatment system that that planned for the FPL reclaimed water treatment facility. To remove chlorides, sulfates, and other dissolved solids, a reverse osmosis (RO) treatment facility would be required.

Assuming that the TDS in saltwater from the radial collector wells is reduced by RO to approximately the same levels as reclaimed water, approximately 59 million gallons per day (mgd) of cooling tower makeup water would be required for the circulating water cooling towers. The quality of RO treated water would have maximum TDS of 1,000 ppmw for use as makeup to the circulating water cooling towers with 4 cycles of concentrations. Using 1,000 ppmw as the design concentration of RO treated water, there would be a decrease in PM emissions, but not PM_{10}, since the maximum potential PM_{10} emissions occur with a TDS concentration in the circulating water of 4,000 ppmw. The volume of saltwater required to yield 59 million gallons per day (mgd) of treated RO treated water is 138 mgd. This saltwater flow from the radial collector wells would be 10 percent greater than the amount required by the circulating water cooling towers when only saltwater is used. The difference between the saltwater withdrawal and the treated saltwater, 138 mgd and 59 mgd respectively, will be 79 mgd of RO concentrate that will have to be disposed of using the deep injection wells or other methods. The volume of concentrate from an RO treatment facility and blowdown from the circulating water cooling towers using treated saltwater is 15 percent greater than the anticipated blowdown from the cooling towers when using saltwater without RO treatment.

Energy and Economic Impacts

The estimated capital and operating costs for an RO facility are as follows:

- Capital cost for the RO treatment facility – $399,989,000.
- Annual energy use for operating the treatment facility - 285,921,000 kWh.
- Other operating and maintenance costs per year - $15,823,000.

The annual energy cost of 285,921,000 kilowatt hours (kWh) is $8,577,630, using a rate of $30 per megawatt hours (MWh) based on EPA's Technical Development Document for comparing cooling towers (see previous response to FDEP-2PSD-1-f). The total annual operating costs would be $24,400,630, including the operating and maintenance costs. Using the EPA recommended capital recovery factor of 7 percent over 20 years (i.e., 0.0944) the annualized capital cost is $37,758,962 (0.0944 times $399,898,000). The total annualized cost is estimated to be $62,159,592.

The PM emission rate, assuming 4,000 ppmw TDS, is 6.315 lb/hr for three circulating water cooling towers or 55.3 tons/year for the Project (see previous response to FDEP-PSD-1-c-1 in the first RAI). The PM reduction using RO treatment for saltwater would be 888 tons/yr, assuming the continuous use of saltwater. The cost effectiveness is estimated to be approximately $70,000 per ton of PM removed ($62,159,592 divided by 888 tons/yr). This cost effectiveness is clearly unreasonable for PM, a pollutant for which there are no AAQS or PSD Increments.

A cost effectiveness of approximately $70,000 per ton of PM removed is clearly inappropriate when considering other BACT determinations. In the Technical Evaluation and Preliminary Determination for the Highland Ethanol Facility dated October 23, 2009, the Department determined that a cost effectiveness that ranged from $4,000 to $27,000 per ton of nitrogen oxide (NO_x) removed (very likely to be less than $10,000 per ton of NO_x removed) was not appropriate given the marginal decrease in NO_x at a relatively high additional costs (Air Permit No. 0550061-001-AC). NO_x is a pollutant with AAQS and PSD Increments and is a precursor of ozone. In contrast, PM has no AAQS or PSD Increments and the use of RO will not reduce PM_{10} emissions. Moreover, the use of saltwater is a secondary source of cooling water makeup, making the cost effectiveness for RO even greater than $70,000 per ton of PM removed.

The cost effectiveness estimate above is based on the continuous use of saltwater, but saltwater is proposed as a secondary water supply. When reclaimed water is used, there is an even higher cost per ton associated with PM removal, because an RO treatment plant would have to be constructed as if FPL were going to use saltwater 100 percent of the time, with attendant capital costs, which would be inefficient and costly.

In addition, the above costs do not include increasing the size of the radial collection wells and additional deep injection wells or other wastewater disposal facilities to accommodate the need for additional saltwater and subsequent concentrate disposal, using deep well injection or other methods. Therefore, the estimated costs are lower than what would be actually expected.

Environmental Impacts
While there would be a reduction in PM emissions with an RO treatment plant, there would be no corresponding reduction in PM_{10} emissions, a pollutant for which there are AAQS and PSD Increments. In addition, the energy penalty associated with RO treatment would result in additional emissions from other generating units in FPL's system of at least 99,000 tons/year of carbon dioxide (CO_2), 8 tons/year of NO_x, and 5 tons/year of sulfur dioxide (SO_2). Moreover, there would be an increase in amount of wastewater (i.e., RO concentrate) for disposal.

The above information clearly demonstrates that use of pre-treatment processes on saltwater is not cost effective and would not result in substantive environmental benefits. Indeed, the energy penalty would result in increased air emissions and additional wastewater discharge of RO concentrate.

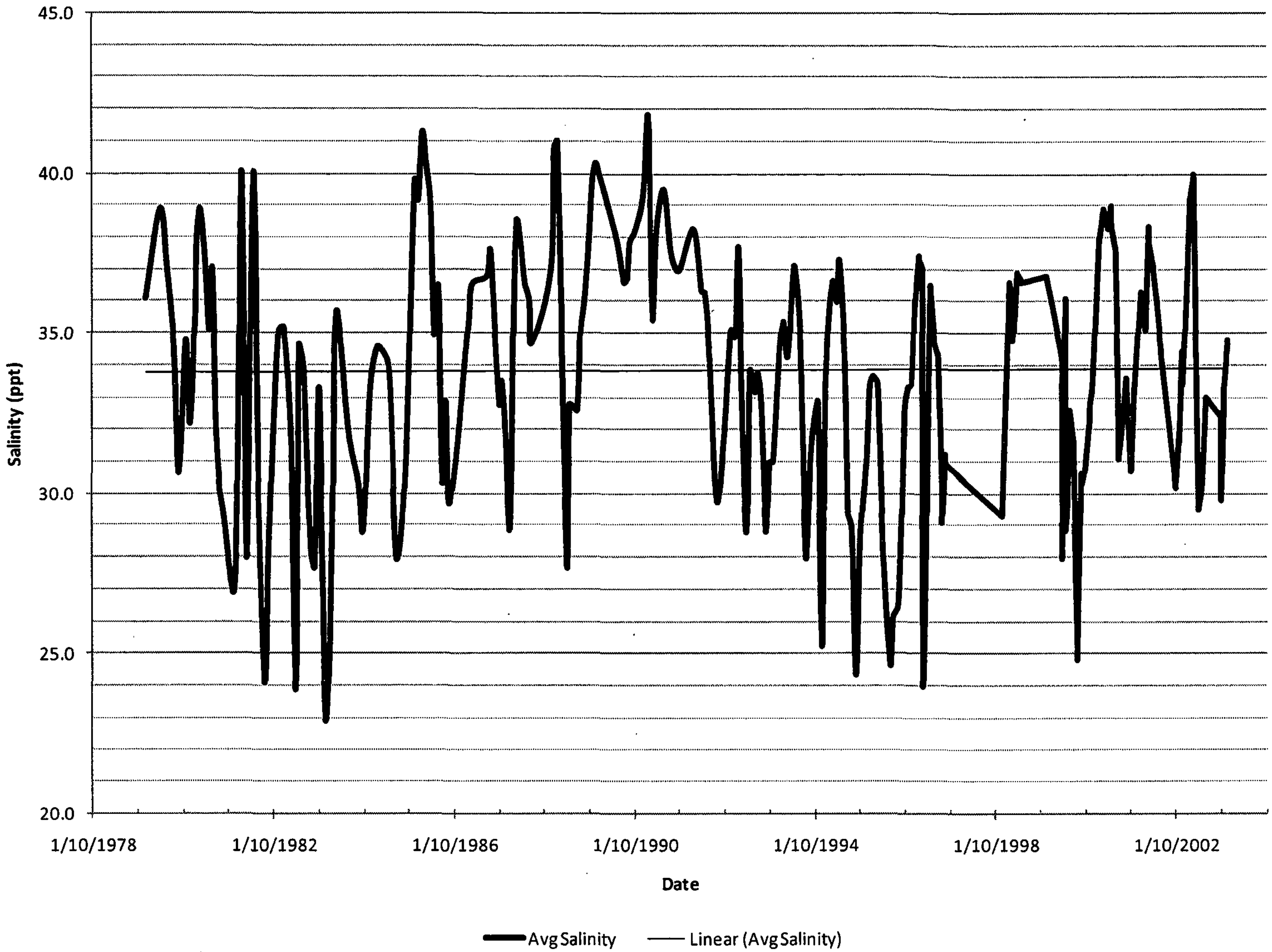

Figure 2PSD-1-c
Time History of Salinity in Biscayne Bay near Turkey Point
Source: South Florida Water Management District, 2009.

Rev. 2PSD

FPL.