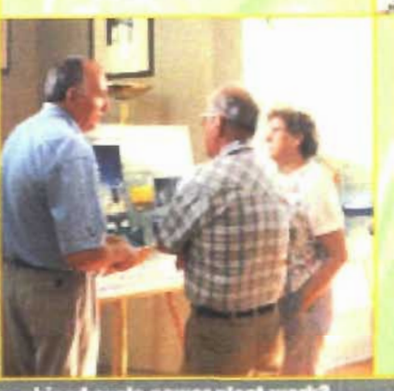
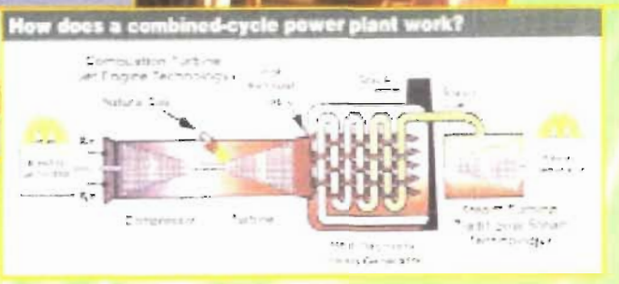
Turkey Point

expansion project





Sufficiency Responses

FPL

Golder Associates Inc.

6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

Golder Associates

TRANSMITTAL LETTER

To: Mr. Al Linero
FDEP

Date: February 27, 2004
Project No.: 0337600-0105

Sent by: nav

- ☐ Mail
- ☐ Air Freight
- ☐ Hand Carried
- ☐ UPS
- ☒ Federal Express

Per: Ken Kosky

Quantity	Item	Description
2	Final Bound Copies	FPL Turkey Point Expansion Project SCA Sufficiency Responses

Remarks:

Please find enclosed 2 copies of the Sufficiency Responses for FPL Turkey Point Expansion Project (Unit 5). The Sufficiency Responses address questions and comments from several offices within the Florida Department of Environmental protection, the Florida fish and Wildlife Conservation Commissions, the South Florida Regional Planning Council, and the South Florida Water Management District. Contact Mr. Steven Palmer of the FDEP Siting Office [(850) 245-8002] for further information or questions.

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Figure 2.3-8, Existing Plant Water Balance

Page 3-12

Application Page 21, Pollutant Detail Information Page 3 of 7, Sulfur Dioxide

Appendix 10.7

Comment Letters

Palmer, Steven

From: Gray, Tim
Sent: Monday, January 05, 2004 3:22 PM
To: Palmer, Steven
Subject: FW: Site Certification Application, Turkey Point Expansion Project, Miami-Dade County

Comments from our Waste/Waste Cleanup section...

-----Original Message-----
From: Wierzbicki, Paul
Sent: Wednesday, December 31, 2003 9:51 AM
To: Gray, Tim
Cc: Moulton, John; Troisi, Kenneth; Powell, Tim; Horne, Linda; Tittle, Thomas; Rach, Timothy; Rahrig, Teresa; Jagnarine, Indarjit
Subject: Site Certification Application, Turkey Point Expansion Project, Miami-Dade County

I have reviewed the Advance Notification document entitled "Site Certification Application, Turkey Point Expansion Project, Submitted by Florida Power & Light Company, dated November, 2003 (received November 17, 2003), and have the following comments within the scope of the Waste Cleanup Section:

1. The Project involves the expansion of the existing power facilities to include a Unit 5. 1FDEP-1

2. Page 2-16 -- Solid Waste Disposal, Fourth Sentence. Our records show that the active Miami-Dade South Dade Landfill is not permitted by the Department to dispose of yard trash, unprocessed tires, nor septic tank pump out wastes. This paragraph needs to be revised after consultation with the landfill facility operator. 1FDEP-2

3. Page 2-23, Section 2.3.3.2 Area Users, First Paragraph. Please list the users of the Biscayne aquifer within one mile of the facility boundary with their name, permit number, well information, etc. and depict such users on a map. 1FDEP-3

4 Page 2-23, Section 2.3.3.2 Area Users, Last Sentence on Page. Please provide documentation (site specific laboratory testing, etc.) that the groundwater at the site is "Class G-III". Reference needs to be made to Chapter 62-520, F.A.C. 1FDEP-4

5. Page 2-88, Figure 2.3-11. Please explain the "Deep Well" identified on the south portion of the map, south of the "Collector Canal". 1FDEP-4

6. Page 3-3 -- Fourth Paragraph, Fourth Sentence. "All wastewaters will be treated as appropriate and recycled to the existing cooling canal system." Please be advised that hazardous waste determinations are required for most wastewaters generated (including "washdowns") in accordance with Title 40 Code of Federal Regulations (C.F.R.) Part 261, as referenced in Chapter 62-730, Florida Administrative Code (F.A.C.). 1FDEP-6

7. Page 3-5, Section 3.3 Fuel, Third Paragraph. Will the new 4.3 million-gallon "ultra low sulfur light oil" tank and associated piping and appurtenances be constructed, operated and managed in accordance with Chapter 62-761, F.A.C.? 1FDEP-7

8. Page 3-9 -- Section 3.4.3.1 Nitrogen Oxides, Second Paragraph, Last Sentence. Reference is made to one 20,000-gallon Ammonia storage tank. Will this tank and associated piping and appurtenances, be constructed, operated and managed in accordance with Chapter 62-761, F.A.C.? 1FDEP-8

9. Page 3-13, Section 3.5.4 Process Water Systems and Section 3.6 Chemical and Biocide Waste and Page 3-15 and 3-16, Section 3.6.5. Chemical Cleaning and Section 3.6.6., Miscellaneous Chemical Drains and Section 3.7 Solid and Hazardous Waste. 1FDEP-9

In addition to any industrial waste requirements, all waste streams must be characterized for proper hazardous waste management in accordance with 40 C.F.R. Part 261, including wastes collected in sumps, laboratory wastes and material from solids settling basins . A chart and description of each waste stream needs to be included that indicates which waste stream would be hazardous, whether it is based on process knowledge or will be based on analytical testing, and if hazardous, additional information regarding the storage and treatment of such wastes would be required.

10. Page 3-18, Section 3.9.2 Fill Material. What contaminant considerations, if any, are being applied to the stockpiled material generated as a result of the maintenance of the existing cooling canal system? Has any analytical testing (soil, groundwater, sediment) been conducted or planned, including metals? What contaminant criteria is proposed to be used to evaluate the stockpiled material? 1FDEP-10

11. Page 4-2, Third Paragraph (and Page 4-7, Third Paragraph). What reasonable assurances can be provided to show that dewatering will not affect any soil / groundwater contaminated areas, if any, at the Turkey Point facility? Detailed information needs to be provided, including a map(s), showing these contaminated areas. In the past, the facility was subject to the Hazardous Waste permitting requirements of Chapter 62-730, F.A.C. What is the status of the hazardous waste closure with the Department and with the EPA? What groundwater monitoring requirements were conducted for the closure? If required as part of the hazardous waste closure, are the monitoring wells still available for sampling of groundwater? If so, does the facility sample and monitor groundwater from these wells? Please provide a list of the monitored parameters and the results from the sampling and enclose a map depicting these groundwater monitoring wells. 1FDEP-11

12. Page 4-7, Fourth Paragraph and Page 4-8, Section 4.3.1., Third Paragraph. This is an important inclusion that needs to be emphasized to all facility personnel and construction contractors and sub-contractors and site workers. 1FDEP-12

13. Page 5-10, Section 5.3.2, Groundwater, Third Paragraph. Does the second sentence indicate that there may be a Class G-II (per 62-520, F.A.C.) groundwater lens above 40 feet? What site specific testing has been conducted to confirm this? Why are the primary, secondary and minimum criteria not included in the sampling? How does the facility implement the provisions of 62-520.520(8), F.A.C.? If the groundwater at the facility is Class G-III, how has the facility demonstrated reasonable assurances of compliance with the secondary standards referenced in Rule 62-520.430, F.A.C. "Standards for Class G-III Groundwater"? 1FDEP-13

14. Page 5-13, Section 5.4., Hazardous Waste. In order to determine facility hazardous waste generation status, all hazardous waste streams from all sources at the facility must be counted, including hazardous wastes generated during construction such as waste hazardous paints, solvents, adhesives, oils, etc. This is outlined in 40 C.F.R. Parts 260 - 280 and Chapter 62-730, F.A.C. 1FDEP-14

15. Volume 3 of 3 inside cover page has a typo: "Manatee Expansion Project". 1FDEP-15

16. Any land clearing or construction debris must be characterized for proper disposal. Potentially hazardous materials must be properly managed in accordance with Chapter 62-730, F.A.C. In addition, any solid wastes or other non-hazardous debris must be managed in accordance with Chapter 62-701, F.A.C. 1FDEP-16

Is a meeting being planned to discuss the application with the applicant? If so, please include me in the meeting so that these concerns can be addressed.

Thank you for the chance to comment.

#031070

Florida Department of

Memorandum **Environmental Protection**

To: Steve Palmer, P.E.
Siting Coordinating Office
DEP/Tallahassee

Through: Tim Powell, P.E.
Wastewater Program Manager
DEP/Southeast District

From: Paul Sze
Industrial Wastewater Section
Southeast District

Date: December 29, 2003

RE: Florida Power & Light Company/Turkey Point Unit 5 Expansion Project
Site Certification Application; DEP File No. PA 03-45

Below are the SED/staff's review comments on the application documents received on November 17, 2003:

1. Please submit a full-size copy of Figure 2.1-2. All the legends and other notations should be clearly legible and not overlapped. To facilitate Wastewater Permitting Section's review, the drawing should call out the locations for Lake Warren, its outfall structure, D-001, and the several oil/water separators, and wastewater treatment (neutralization) basin B-1, and solids settling basins B-2 and B-3, and their outfall structure, D-002. 2FDEP-1

2. Please expand and revise the flow schematics as presented in Figures 3.5-1 and 3.5-2, to distinct the process "waste water sump" into its existing individual components of neutralization basin B-1, and solids settling basins B-2 and B-3, and any other new treatment components being proposed under the expansion. (Attached here for sample is a file copy of the flow diagram from March 1, 1993, showing more details for the flow schemes.) 2FDEP-2

3. The projected water quality for upper Floridan aquifer and the discussion thereof, should have included radionuclides, and more specifically gross alpha particles activity and radium-226 and radium-228, and also hydrogen sulfide and un-ionized ammonia. From experience, radionuclides frequently are presented in Floridan aquifer, in levels posing compliance concern relative to both groundwater and surface water standards. 2FDEP-3

4. Please reconcile the discrepancies in flow figures for the expansion among those presented in Figure 3.5-2 in Volume 1, and Figure 15 included in Appendix 10.7 "Cooling Pond Modeling Report" in Volume 3. It appears the latter might not have accounted for the R.O. concentrate and other process wastewater discharges involved. 2FDEP-4

5. Follow-up to item no. 4 above, please include in the revised "Cooling Pond Modeling Report", a discussion on how the increased discharge volume from the expansion project, could affect the operating water level in the cooling canal system, and its conformance with the current "No Discharge" prohibition in the NPDES permit. Also, please review the frequency and circumstances for any recent emergency discharge events. 2FDEP-5

6. The report should provide further detailed discussion on the potential adverse impact from outward migration of pollutants in the proposed discharges, to the water quality in both the groundwater outside the permitted zone of discharge, and the Biscayne Bay. For groundwater movement, the existing interceptor ditch may have certain benefits as a salinity barrier, but its effectiveness in prevention of general pollutants migrating in the deeper zone (beneath the trench bottom) needs to be further demonstrated. (Please include in the discussion a typical lateral cross section profile for the cooling canals and the interceptor ditch.) 2FDEP-6

7. The following are several minor review comments grouped together as a single comment:

   (a) A remark on page 2-7 states "only a small portion of the 5-mile study area contains a portion of the aquatic preserve." Using Figure 2.2-1 as a reference, it would appear the entire ocean side of the study area falls within the Biscayne Bay Aquatic Preserve Area, and also within the Biscayne Bay SWIM Planning Area. 2FDEP-7(a)

   (b) Please show the specific sampling locations where the two surface water samples, as referenced on page 2-27, for the cooling canal and L 31E Canal were taken, and confirm their representativeness. (Please also check other sections of the report to assure the sampling locations are shown on proper drawings.) 2FDEP-7(b)

   (c) Please provide the depths and screened intervals for the six groundwater monitoring wells west of L 31E: L-3, L-5, G-6, G-21, G-27, G-28 and G-35, as referenced in SFWMD Agreement in Appendix 10.4. 2FDEP-7(c)

   (d) Please show for all the water quality results shown in Table 3.5-1 and 3.5-2 that are listed as "ND" or non-detectable, list the laboratory's detection limits for the pollutants. 2FDEP-7(d)

   (e) Table 3.5-3 "cooling tower design" information as referenced on page 3-12 may be missing. 2FDEP-7(e)

8. The recirculated water in the cooling canal system is already considered "hypersaline" - salinity twice that of the Biscayne Bay. Please discuss if certain canal freshening possibilities, for example, freshening the canal water with clean stormwater runoff captured onsite, or even ocean water from Biscayne Bay, have been given due consideration. Another more costly possibility is the eventual segregation of the waste streams into the cooling canal system into high-strength waste (high mineral salts) and low-strength waste (thermal pollutant only) streams. The high-strength waste can be consumed in heat evaporation or other combustion process, with the salts recovered or removed. This should result in more effective reuse of the low-strength waste for general cooling purposes, and also lessen the increasing salinity loading on the cooling canal system. 2FDEP-8

Florida Department of
Memorandum Environmental Protection

FPL – Turkey Point Expansion

Environmental Resources and Permitting Section Comments

Reduction and Elimination of Impacts

Discuss why the elimination of impacts to wetlands is impossible and the steps that were taken in the project design that reduced these impacts. 3FDEP-1

Mitigation

Is a conservation easement being proposed for the on site mitigation areas? If not, how will they be protected from future impacts? 3FDEP-2

Provide cross sections of all on-site mitigation areas. 3FDEP-3

The online mitigation summary on p. 16 of appendix A shows a 0.86 post mitigation WATER score for Area D-mid, but the WATER evaluation matrix shows 0.78. This should be verified, and the mitigation summary should be updated, and the required mitigation should be adjusted. 3FDEP-4

The online mitigation summary on p. 16 of appendix shows a 0.83 pre mitigation WATER score for Area H-east, but the WATER evaluation matrix shows 0.89, and 0.83 for the post-secondary impact. The value of 0.89 should be used to determine the actual lift on this area (which is 0.01, and not 0.07 as indicated). This will reduce the amount of mitigation credit generated at this Area. 3FDEP-5

In light of the fact that they are proposing 36.94 acres of impact, and mitigating 35.33 acres, the optional mitigation that is proposed should be mandatory. 3FDEP-6

Success of the mitigation could be measured by having them submit subsequent WATER scores that show that the proposed mitigation does offset the impact as proposed. If the WATER scores show that the mitigation is not meeting the expectations of the Department after 2 years, additional mitigation shall be proposed through a permit modification request. 3FDEP-7

For the off-site mitigation, please provide information from the Everglades Mitigation bank that 18.09 credits are available. Also, provide details on what type of mitigation will be performed by the Everglades Mitigation Bank through the purchasing of these credits (i.e., demonstrate how the purchase of 18.09 credits in the mitigation bank will off set the impacts of this project). 3FDEP-8

Recommended Specific Conditions: 3FDEP-9

( ) Initial mitigation of planting wetland plant species and hydrologic improvements shall occur within 30 days of completion of construction; at this time the permittee shall submit to the Department a baseline ("*time zero*") report. The report shall include details on the progress of the hydrologic improvements, a list of species planted, the number of individuals planted, and the date of the plantings. The report shall contain photographs, taken from referenced locations, to represent the entire site. Additionally, a drawing shall be included to show the location and direction of the camera. Subsequent monitoring reports shall be submitted quarterly, the first report being due 90 days after the baseline report. The quarterly reports shall include the number of plants surviving from the initial planting, additional seedlings planted, and explanations if survivorship is trending toward failure. The reports shall include photographs from the locations referenced in the baseline report. **3FDEP-9 (con't.)**

( ) The mitigation site shall be successful when all of the following criteria have been continuously met for a period of at least two growing seasons (but no earlier than two years after the initial planting), without intervention in the form of irrigation, dewatering, removal of undesirable vegetation, or replanting of desirable vegetation:

(a) The percent cover of the mitigation wetland area exceeds 80% of native wetland plants

(b) Nuisance and exotic species are limited to 5% or less of the total cover.

(c) The desirable plants are reproducing naturally, either by normal, healthy vegetative spread, or through seedling establishment, growth and survival.

(d) The size distribution of the desirable species increases with time.

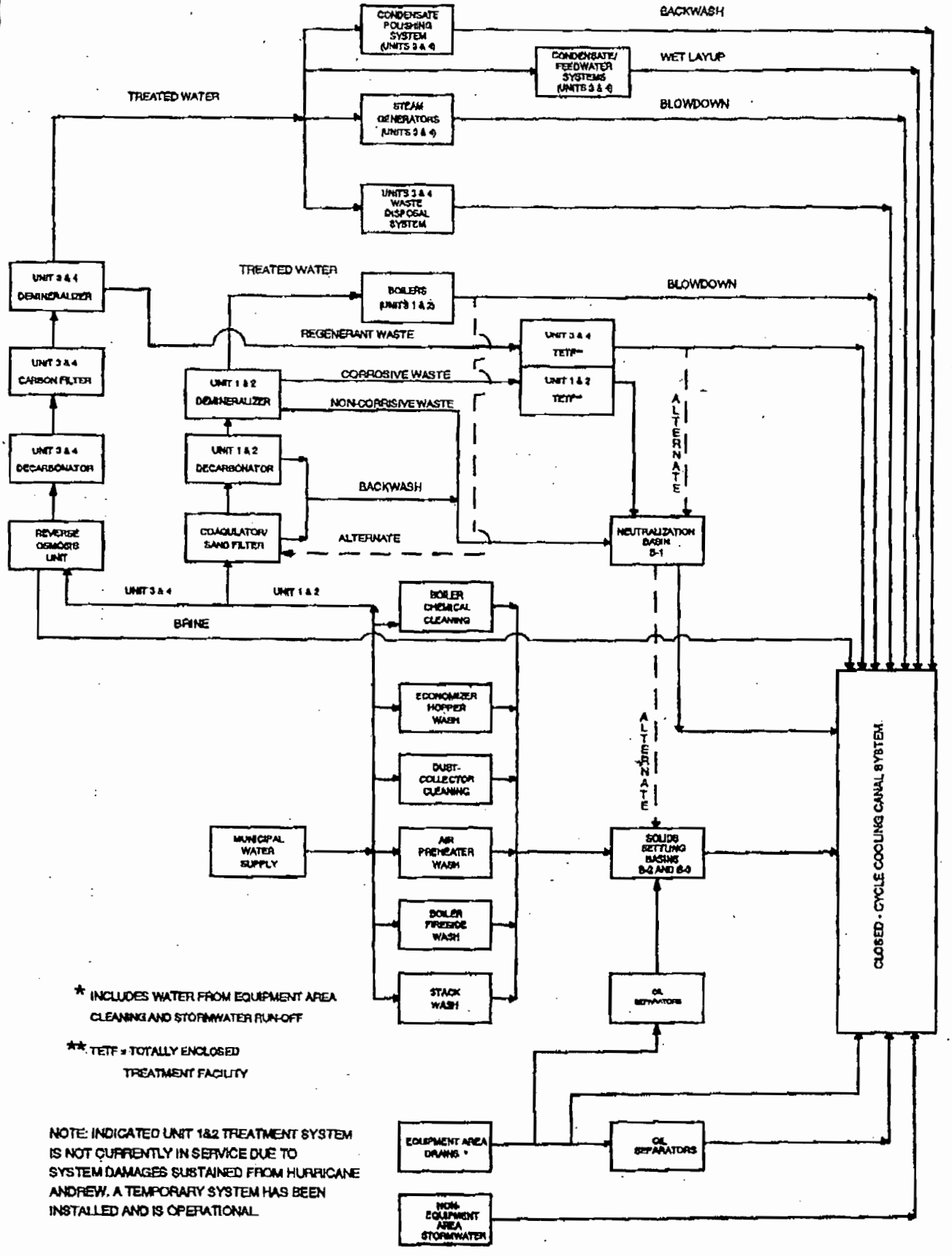
( ) The mitigation shall be determined successful when the above requirements of the permit have been met. The procedures for requesting a success determination and guidelines for the Department's response are provided herein.

(a) The permittee may notify the Department whenever the permittee believes the mitigation is successful, but in no event earlier than two years after the mitigation is implemented.

(b) The notice shall include a copy of the most recent Annual Progress and Mitigation Success Report and a narrative describing how the reported data support the contention that each of the mitigation criteria have been met. The permittee shall afford the Department personnel the opportunity to schedule and conduct an on-site inspection of the mitigation site to determine whether the criteria are met.

TURKEY POINT PLANT - WASTE FLOW DIAGRAM

PTP MW
3/1/93



* INCLUDES WATER FROM EQUIPMENT AREA CLEANING AND STORMWATER RUN-OFF

** TETF = TOTALLY ENCLOSED TREATMENT FACILITY

NOTE: INDICATED UNIT 1&2 TREATMENT SYSTEM IS NOT CURRENTLY IN SERVICE DUE TO SYSTEM DAMAGES SUSTAINED FROM HURRICANE ANDREW. A TEMPORARY SYSTEM HAS BEEN INSTALLED AND IS OPERATIONAL.

(c) Within 60 days of receipt of this notice, the Department shall notify the permittee by certified mail that the Department determined that one of the following: 3FDEP-9 (con't.)

(1) That the mitigation has been successfully completed, or
(2) That the mitigation is not successful, identifying specifically those elements of the mitigation that do not meet the success criteria; or
(3) That the mitigation cannot be determined to be successful at this time, identifying specifically those elements of the mitigation that prevent it from determining whether the mitigation is successful.

(d) When the Department notifies the permittee that the mitigation is successful, or, if the Department fails to notify the permittee within the time period prescribed by this condition, then the permittee's mitigation obligation under the terms of the permit shall be deemed satisfied.

() The responsibility to determine if the mitigation is meeting the permit-specified success criteria shall not fall solely on the Department. An alternative mitigation plan must be submitted if 3 years after completion of planting, the mitigation site is not "clearly tending" towards attaining the success criteria. The plan shall be submitted within 60 days of a request from the Department or may be submitted at any time by the permittee. The permittee shall submit an alternative mitigation plan to the Department for review and approval according to the following:

(a) Contents of the alternative mitigation plan - The plan shall analyze why a particular mitigation site is not clearly trending towards success and propose actions which will ensure success. The permittee is on notice that the failure to meet a single success criterion will prevent the mitigation site from meeting the success criteria of this permit.

(b) Implementation schedule - As part of the alternative mitigation plan, the permittee shall propose a schedule for implementation and completion of all of the provisions of the alternative mitigation plan. Upon approval, the permittee shall implement the contingency plan pursuant to the approved schedule.

The permittee shall implement the approved plan within 60 days of Department approval of the alternative mitigation plan. The approved plan shall be made a part of this permit.

Narrative Progress Reports 3FDEP-9 (con't.)

Suggested Specific Conditions

(Rules Adopted for DEP by Reference)
Effective 10/3/95

( ) Narrative progress reports should be submitted every 6 months indicating the status of the project. The cover page shall indicate the permit number, project name and the permittee name. The first semi-annual progress report shall be submitted six months from the date of permit issuance, and reports shall continue to be submitted until all work authorized by the permit, including mitigation, has been completed. The report shall include the following information: 3FDEP-9 (con't.)

a. Date permitted activity was begun; if work has not begun on-site, please so indicate.

b. Brief description of extent of work (i.e., dredge, fill, monitoring, mitigation, management, maintenance) completed since the previous report or since the permit was issued. Show on copies of the permit drawings those areas where work has been completed.

c. Brief description and extent of work (i.e. dredge, fill, monitoring, mitigation, management, maintenance) anticipated in the next six months. Indicate on copies of the permit drawings those areas where it is anticipated that work will be done.

d. The progress of the permitted mitigation program. The reports shall include; photographs taken from the permanent stations, some of which must be in the vegetation sampling areas, a description of problems encountered and solutions undertaken, and anticipated work for the next six months.

e. This report shall include on the first page, just below the title, the certification of the following statement by the individual who supervised preparation of the report: "This report represents a true and accurate description of the activities conducted during the six month period covered by this report."

Dewatering

Any dewatering will require a permit from the South Florida Water Management District. 3FDEP-10

Erosion Controls

It would be helpful to have figures depicting the location of the erosion control devices mentioned in Section E. 3FDEP-11

(Rules Adopted for DEP by Reference)
Effective 10/3/95

Florida Department of Environmental Protection

Memorandum

TO: Steve Palmer, Power Plant Siting Office

FROM: Al Linero, Program Administrator

DATE: January 2, 2004

SUBJECT: FPL Turkey Point Fossil Plant
1150 MW Combined Cycle Unit No. 5

We have conducted our initial sufficiency review for the proposed FPL Turkey Point Unit 5 project. Following are our sufficiency items:

4FDEP-1 Please confirm whether the exhaust from the combined cycle units will actually be approximately 300 degrees F when firing fuel oil compared with 200 F when firing natural gas. This can affect the ambient modeling performed. With the low sulfur values for the fuel oil (and less sulfuric acid mist condensation), it would not seem necessary to waste the heat with the higher exhaust temperature. If the exhaust temperatures will indeed be lower, please submit updated modeling analyses.

4FDEP-2 Please clarify that there will not be operation in simple cycle. For reference one citation is Section 1 of 2, F2, Page 21, showing SC - 42 ppm NO_X for oil. Please double check whether the 15 ppm references are for simple cycle peaking and steam augmentation or for oil firing under combined cycle.

4FDEP-3 Please double-check the estimated emissions in TPY. It looks like they were estimated assuming 4,880 hours at full load natural gas, 2,880 hrs with duct burners, and 500 hours of oil firing. Are there 500 hours unaccounted for? Are the estimated emissions not affected by this?

4FDEP-4 General Electric (GE) advised in publication GER-4213 (discussed by DEP with FPL when permitting Martin and Manatee Projects) that they will provide a guarantee of 5 ppm for CO emissions on a case-by-case basis to avoid installation of oxidation catalyst. Our own data from numerous new installations confirm low emissions on the order or 0.5 to 2.0 ppm. The ten year old Martin Power Plant GE combustion turbines also exhibit very low CO emissions. Please justify the higher values requested in light of GE's claims and the actual performance of the new GE 7FA units throughout the state. We will also need more information to justify the higher values requested for other modes. Perhaps GE now has more information on NO_X emissions for those modes.

4FDEP-5 The most stringent nitrogen oxides limits nationwide for combined cycle power plant permits are now approximately 1.5 to 2.0 ppm averaged over a period of one hour. Please submit an analysis of the costs to achieve such lower limits and averaging times. A few of these are at projects in which FPL Energy LLC is the owner or a partner so the data should be relatively easy to obtain.

4FDEP-6 Comment on the ability of present monitors to measure very low NO_X emissions. For example, the Thermo Environmental 42CLS was specifically designed for turbines and has two default ranges: 0-2 ppm and 0-200 ppm, presumably to capture both startup and continuous NO_X emissions. According to their web site, the lower detectable limit for this analyzer is about 0.01 ppm with a one-minute average.

Submit copies of the accepted (or subsequently negotiated) bids to supply the SCR systems for Manatee Unit 3 and Martin Unit 8. Because they are current actual accepted bids for projects virtually identical to Turkey Point Unit 5, they might comprise the most accurate capital costs for such systems. 4FDEP-7

Review the actual vendor analyses for the NO_X removal to show whether the oil case (from 42 ppm to 10 ppm) governs the size of the reactor or if it is the gas case (9 to 2.5 ppm) that governs the reactor size. 4FDEP-8

Please provide the annual projected fuel throughputs for Turkey Point Fossil Units 1 and 2 for each of the years 2004 through 2012. This projection should be based upon FPL's published 2003 RFP evaluation of its next planned generating unit (the 2007 capacity need of four combined cycle units on one steam generator at Turkey Point) as well as the "most likely" FPL Fossil Fuel Price and Natural Gas Availability Forecast issued in September 2003. The same forecasted annual load which was used to justify this capacity addition should also be used. 4FDEP-9

Please discuss how natural gas use at Turkey Point Unit 5 is likely to impact natural gas availability for Turkey Point Units 1 and 2 as well as the Port Everglades and Riviera Plants. For example, the new plant will use nearly twice as much natural gas compared with the amounts used by all of the existing units at the three plants combined in 2002. Please describe any planned or necessary upgrades to existing pipelines to convey additional natural gas supplies to Turkey Point. 4FDEP-10

The project is located 21 kilometers from the Everglades National Park Class I Area and is adjacent to the Biscayne National Park (not a Class I area). Per the application some visibility impacts are projected from Unit 5 in the Class I Area even though the projected emissions from Unit 5 are only 191 tons per year (TPY) of SO_2 and 387 TPY of NO_X (assuming no change in fuel use by Unit 1 and 2). Provide a description of the process by which the combination of meteorological and operational parameters can cause the visibility impacts projected. 4FDEP-11

Discuss measures to mitigate the potentially greater actual impacts on visibility from potential decreased natural gas availability for Units 1 and 2. These units already emitted about 9,000 tons of SO_2 and 6,000 tons of NO_X in 2002 (per the EPA Acid Rain Website). For reference, the two existing units emit roughly two orders of magnitude more emissions (per unit of electricity produced) than the proposed new unit. The impact is greatest when the existing units use more residual fuel oil. 4FDEP-12

Has FPL evaluated the environmental benefit of utilizing two independent and reliable sources of natural gas rather than fuel oil as a backup? If so please include the analysis and conclusions thereof and any impacts on natural gas availability for Units 1 and 2 and other plants in Southeast Florida. 4FDEP-13

Ammonia ultimately binds with nitrates and sulfates in the stack or in the environment to produce species that affect visibility. Please cite any references in the application to a proposed ammonia standard for the purposes of PM control, proper operation of the SCR unit, visibility impact considerations, etc.? 4FDEP-14

Based upon Table 2-6 of the application, the annual emission increase of NO_X associated with this project is 387 TPY. The Department notes that the average annual emissions of NO_X for the existing fossil units (as reported by FPL) during the past 2 years are over 4600 TPY (~6,000 TPY per EPA Reports). This suggests that a reduction of approximately 8% in Units 1 and 2 compared to past actual emissions would allow the Unit 5 project to net out of a PSD review for NO_X (yielding no net NO_X increase). Additional cost-effective reductions could help ameliorate visibility in the Class I area. The Department is interested and supportive of efforts in this regard, should FPL have an interest in pursuing such a goal. 4FDEP-15

For CALMET processing, what meteorological stations were used for the surface and upper air data? Hourly Precipitation data? 4FDEP-16

Within 50 km of the Everglades National Park, project impacts are expected to be above the 2.0 Screening Criteria Threshold for a VISCREEN model Level 2 case. Although, these impacts were addressed in the application submitted, please provide further comment. Does the meteorology or stability class associated with impacts above 2.0 represent typical meteorology in the area? Are there any project specifications that can be altered to lower the predicted impacts? 4FDEP-17

Beyond 50 km of the Everglades National Park, project impacts are expected to be above the Visibility Impairment % threshold of 5% on 4 days in the years modeled. Please provide further comment. What were the specific meteorology parameters seen on these days. Are there any project specifications that can be altered to lower the predicted impacts? 4FDEP-18

Project impacts are above the Sulfur and Nitrogen Deposition Analysis Thresholds as well. Are there any project specifications that can be altered to lower the predicted impacts? 4FDEP-19

In Section 7.3.3, Impacts to Vegetation, all PSD pollutants for this project are addressed except for VOC. Does VOC effect vegetation and if so, how will the predicted VOC emissions from the proposed project effect the vegetation in the area? 4FDEP-20

We did not receive any comments from the National Park Service or EPA Region 4. We will pass these on if and when received. FPL was already interacting with the NPS with respect to modeling protocols and visibility issues. Either agency might submit comments during the sufficiency review or during the normal comment period. 4FDEP-21

The DEP contacts for the PSD Permit application are Debbie Nelson (850/921-9537) for modeling issues and Al Linero (850/921-9523) on all other matters.

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

JAN 15 2004

GOLDER ASSOCIATES INC.

FEB - 5 2004

GAINESVILLE

RECEIVED

JAN 20 2004

BUREAU OF AIR REGULATION

4APT-APB

Mr. A. A. Linero, P.E.
Florida Department of Environmental Protection
Mail Station 5500
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Dear Mr. Linero:

Thank you for sending the prevention of significant deterioration (PSD) permit application for Florida Power & Light (FPL) Turkey Point, dated November 19, 2003. The PSD permit application is for the proposed construction and operation of four combined cycle combustion turbines (CTs) with a total nominal generating capacity of 1,150 MW to be located near Homstead, FL. The combustion turbines proposed for the facility are General Electric (GE), frame 7FA units. The CTs will primarily combust pipeline quality natural gas with ultra low sulfur fuel oil (0.0015% S) combusted as backup fuel. As proposed, the CTs will be allowed to fire natural gas up to 8,760 hours per year and fire fuel oil a maximum of 500 hours per year. The CTs will be allowed to operate natural gas-fired duct burners for a maximum of 2,880 hours/year. Total emissions from the proposed project are above the thresholds requiring PSD review for nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter (PM/PM_{10}), and volatile organic compounds (VOC).

Based on our review of the PSD permit application we have the following comments:

1. The applicant proposed the use of good combustion practices as best available control technology (BACT) for CO and requested the following CO limits (page 4-2): 9 ppmvd while burning natural gas, 17 ppmvd while burning natural gas and duct firing, 22.6 ppmvd while burning natural gas and in high power mode with duct firing, and 20 ppmvd when burning fuel oil. However, Table 4-1 (page 4-16) of the application references the following CO limits: 7.3 ppmvd while burning natural gas, 10.2 ppmvd while burning natural gas and duct firing, 14.7 ppmvd while burning natural gas and in high power mode with duct firing, and 20 ppmvd when burning fuel oil. According to the vendor test data in Appendix B, the latter set of emission limits seem to be the correct ones. 4FDEP-21-1

   Regardless of which set of emission limits are the correct ones, these CO limits are much higher than those recently seen as a result of BACT analyses throughout the country, including here in Region 4. For instance, we are seeing CO limits for both natural gas and fuel oil combustion in the low single digits (i.e., 2.0 ppmvd) in several recent permits in Georgia. According to the application, the CO emissions test data range from 0.0 ppmvd to 1.01 ppmvd when firing natural gas during load ranges from 50 to 100

percent. Irrespective of the exact control technology used, we would expect to see BACT CO limits near 2 ppmvd in the draft PSD permit for FPL Turkey Point.

2. Table 2-4 is a summary of the maximum potential annual emissions. In several of the scenarios, including the scenario generating maximum CO emissions, it is assumed that there will be a maximum of 400 hours/year of operation with power augmentation. In order for the BACT analysis to remain valid, this limit on power augmentation should be included as an enforceable requirement of the draft PSD permit. Additionally, any other underlying assumptions used in the BACT or air quality analyses, such as the 2,880 hours/year limit on duct burning, should also be included in the draft PSD permit. Finally, any operating limits (including the ones mentioned above) which were used in the analyses on a per CT basis should be included in the draft PSD permit on a per CT basis. 4FDEP-21-2

3. The applicant rejected catalytic oxidation as an economically infeasible control technology for reducing CO emissions from the CTs. According to the application, the resulting cost effectiveness was found to be $4,240/ton of CO removed. The annual operating costs included $214,193 for a heat rate penalty (0.2 percent of the megawatt (MW) output.) It is unclear if this value is based on a set dollar per kW of lost sales or based on the cost of additional natural gas to make up for the 0.2 percent loss in MW output. The applicant should provide a better explanation of how this number was calculated. Please note that we do not consider it appropriate to calculate a heat rate penalty based on lost sales. It should be calculated based on the cost of enough natural gas to make up for any loss in MW output. The annual heat rate penalty contributes $1,462/ton of CO removed to the total cost effectiveness. Consequently, any reduction in the heat rate penalty will make a significant difference in the cost effectiveness of catalytic oxidation. Finally, it should be noted that catalytic oxidation has the added advantage of controlling VOC emissions, including volatile organic hazardous air pollutants. 4FDEP-21-3

If you have any questions regarding these comments or need additional information, please contact Katy Forney at 404-562-9130.

Sincerely,

Gregg M. Worley

Gregg M. Worley,
Chief
Air Permits Section

cc: O. Nelson
J. Tittle, SED
P. Hong, DERM
B. Orion, DEP
G. Bennyak, NPS
K. Kerley, Golder

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

R. KIPP FROHLICH, CHIEF
BUREAU OF PROTECTED SPECIES MANAGEMENT
(850)922-4330
FAX (850)922-4334

January 08, 2004

DEPARTMENT OF
ENVIRONMENTAL PROTECTION

JAN 09 2004

SITING COORDINATION

Steve Palmer
Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Re: Comments and Questions Regarding Florida Power & Light's Turkey Point Power Plant Siting Application.

Dear Mr. Palmer:

The Florida Fish and Wildlife Conservation Commission, Bureau of Protected Species Management has reviewed this application, and provides the following questions and comments.

The proposed construction of additional power generating units adjacent to the existing Turkey Point power plant does not appear to pose significant threats to the Florida manatee or its habitat. However, several aspects of the proposed mitigation will require additional information for review. . Culverts proposed to improve the hydrologic connectivity between Biscayne Bay and areas A, C, D and H may have the potential to entrap manatees. The risk is greatest with those culverts that are proposed to connect Biscayne Bay or tidal creeks directly to one of the mitigation areas (A, D H and the optional mitigation area within Biscayne National Park). Additionally, area C appears to be indirectly linked to Biscayne Bay by culverts through area H.

The CERP Interagency Manatee Task Force is currently developing a Manatee Conservation Plan for the protection of manatees during Everglades restoration work. These guidelines will include criteria for the installation of culverts and the appropriate manatee protection techniques to avoid entrapment. We recommend that Florida Power & Light use these guidelines where appropriate in the Optional Mitigation area. The draft guidelines and future final guidelines can be obtained from the U.S. Fish & Wildlife Service's South Florida Ecological Services Office (Dave Ferrell – 772-562-3090).

In order to complete our review of this concern we will require the following;

- Site plans for areas A, C, D, H and the optional mitigation area with the locations of proposed culverts. FFWCC-1(a)
- The location of tidal creeks within these same areas and their bathymetry at MHW. FFWCC-1(b)

- The location of any existing canals that may intersect these creeks or culverts. FFWCC-1(c)
- The number and dimensions of proposed culverts in these areas. FFWCC-1(d)

Please do not hesitate to call me at (850) 922-4330, if you have any questions.

Sincerely,

Ronald R. Mezich
Biological Scientist

C:\...\mrapermit.003.FPL-Turkey Point-comments.108
ENV7-2-12-4

cc: D. Ferrell, USFWS
W. Perkins, FPL
B. Linkiewicz, FPL

South
Florida
Regional
Planning
Council

January 12, 2004

Golder Associates Inc.
6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500

RE: SFRPC 03-1208, Site Certification Application for the FPL Turkey Point Power Plant Expansion Project. The expansion project would include building a new combined cycle generating unit fueled by natural gas including a cooling tower. The new power generation unit would add an additional 1,150 MW to the Turkey Point power generation system. The proposed expansion project would occupy approximately 65 acres within a 90-acre project area immediately north of the existing power generation facilities, Florida Power and Light, Miami-Dade County.

Dear Sir or Madam:

We have reviewed the above-referenced Site Certification Application and have the following comments:

- The project must be consistent with the goals and policies of the Miami-Dade County comprehensive development master plan and its corresponding land development regulations. SFRPC-1

- Staff recommends that impacts to the natural systems be minimized to the greatest extent feasible and that sensitive wildlife and vegetative communities in the vicinity of the project be protected and disturbed habitat be appropriately mitigated. This will assist in reducing the cumulative impacts to native plants and animals, wetlands and deep-water habitat and fisheries that the goals and policies of the *Strategic Regional Policy Plan for South Florida* (SRPP) seek to protect. SFRPC-2

- The project is located over the Biscayne Aquifer, contiguous to wetlands and mangrove communities, adjacent to Biscayne National Park and within the Biscayne Bay SWIM area, all natural resources of regional significance designated in the SRPP. The goals and policies of the SRPP, in particular those indicated below, should be observed when making decisions regarding this project: SFRPC-3

Strategic Regional Goal

3.2 Develop a more efficient and sustainable allocation of the water resources of the region.

Regional Policies

3.2.5 Ensure that the recharge potential of the property is not reduced as a result of a proposed modification in the existing uses by incorporation of open space, pervious areas, and impervious areas in ratios which are based upon analysis of on-site recharge needs.

3.2.6 When reviewing proposed projects and through the implementation of the SRPP, discourage water management and proposed development projects that alter the natural wet and dry cycles of Natural Resources of Regional Significance or suitable adjacent buffer areas or cause functional disruption of wetlands or aquifer recharge areas.

3440 Hollywood Boulevard, Suite 140, Hollywood, Florida 33021
Broward (954) 985-4416, State (800) 985-4416
SunCom 473-4416, FAX (954) 985-4417, Sun Com FAX 473-4417
email: sfadmin@sfrpc.com, website: www.sfrpc.com

Require all inappropriate inputs into Natural Resources of Regional Significance to be eliminated through such means as; redirection of offending outfalls, suitable treatment improvements or retrofitting options.

3.2.10 The discharge of freshwater to Natural Resources of Regional Significance and suitable adjacent natural buffer areas shall be designed to imitate the natural discharges in quality and quantity as well as in spatial and temporal distribution.

3.2.11 Existing stormwater outfalls that do not meet or improve upon existing water quality or quantity criteria or standard, or cause negative impacts to Natural Resources of Regional Significance or suitable adjacent natural buffer areas shall be modified to meet or exceed the existing water quality or quantity criteria or standard. The modification shall be the responsibility of the outfall operator, permittee or applicant.

Strategic Regional Goal

3.4 Improve the protection of upland habitat areas and maximize the interrelationships between the wetland and upland components of the natural system.

Regional Policies

Remove invasive exotics from all Natural Resources of Regional Significance and associated buffer areas. Require the continued regular and periodic maintenance of areas that have had invasive exotics removed.

Required maintenance shall insure that re-establishment of the invasive exotic does not occur.

In addition Council staff agrees that:

The consideration of natural gas as an alternative to the greater use of oil fuel is a positive step. SFRPC-4

- With regard to the policies of the utility which impact the resources and economy of the region, Florida Power and Light has balanced conservation measures through its Demand Side Management programs with expansion of energy-generating facilities to simultaneously meet the energy needs of our expanding population while reducing the potential of that need for energy. SFRPC-5

- The proposed energy facility expansion is generally consistent with the goals and policies of the *Strategic Regional Policy Plan for South Florida*, specifically the following: SFRPC-6

Strategic Regional Goal

2.3 Enhance the economic competitiveness of the region and ensure the adequacy of its public facilities and services by eliminating the existing backlog, meeting the need for growth in a timely manner, improving the quality of services provided and pursuing cost-effectiveness and equitability in their production, delivery and financing.

Regional Policies

Encourage the application of resource recovery, recycling, cogeneration, district cooling, water re-use systems, and other appropriate mechanisms where they are cost-effective and environmentally sound, as means of reducing the impacts of new development on existing public facilities and services, and the costs of providing new public facilities and services.

2.3.35 Allow flexibility in state, local, and private sector participation in funding public services and facilities.

Encourage the use of user fees which discourage excessive use of infrastructure and services in the region while considering social and economic equity standards.

Thank you for the opportunity to comment. Please call us should you have any questions or comments.

Sincerely,

Carlos Andres Gonzalez
Senior Planner

CAG/kal

cc: Susan Markley, DERM
Diane O'Quinn Williams, MDPZ
Lynn Griffin, Coastal Program Administrator, FCMP
Stephan Palmer, FDEP
Barbara Linkiewicz, FPL

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

3301 Gun Club Road, West Palm Beach, Florida 33406 • (561) 686-8800 • FL WATS 1-800-432-2045 • TDD (561) 697-2574
Mailing Address: P.O. Box 24680, West Palm Beach, FL 33416-4680 • www.sfwmd.gov

LAN 04-06

January 5, 2004

Mr. Hamilton S. Oven, Jr., P.E.
Administrator, Siting Coordination Office
Florida Department of Environmental Protection, MS 48
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Dear Mr. Oven:

Subject: Turkey Point Unit #5, PA 89-27A
Site Certification Application
First Sufficiency Review

South Florida Water Management District (SFWMD) staff has reviewed the application submitted by Florida Power & Light Company (FPL) for the above subject project, as required by Sections 403.501-539, F.S., and Chapter 62-17, F.A.C. As a result of that review, we have identified the following outstanding issues/sufficiency questions which must be addressed in order for the SFWMD to complete its review of this project. Please include the following questions/comments in your sufficiency letter on this project:

(1) The Water Supply Alternative Analysis presented in Appendix 10.10 concludes that groundwater from the Upper Floridan aquifer is the best source of makeup water for the cooling tower and continued use of city water provided by the Miami-Dade County Water and Sewer Division (WASD) is the best source of service water. SFWMD staff concurs with this conclusion. SFWMD-1

However, Appendix 10.10, Section 4.2 – Service Water, proposes the use of surface water from the L-31E canal delivered through a pump and pipeline as a secondary source of service water, when available. This section proposes that *withdrawals from the L-31E canal will only take place during high flow events and the intake structure will be designed to minimize the impacts of entrainment or impingement.* SFWMD staff has concerns that the withdrawal of any volume of water from the L-31E canal would interfere with the gradient criteria stated in the Interceptor Ditch Operation Program and contained in the original agreement dated February 2, 1972, and subsequent supplemental agreements. The applicant should provide a feasibility analysis of the proposed L-31E withdrawals that should include, but not be limited to, an evaluation of the past hydrologic conditions in the L-31E canal and the cooling canal system as they relate to the gradient criteria and application of the Interceptor Ditch Operation Program. Otherwise, this alternative should be removed from consideration.

(2) The aquifer parameters for the Upper Floridan Aquifer (UFA) from the 1975 report by Dames & Moore used in the impact analysis are similar to those obtained from aquifer performance testing of the aquifer storage and recovery (ASR) test well at the Florida Keys Aqueduct Authority (FKAA) Florida City facility. The sensitivity analysis included with the MODFLOW results predicted that a lower storage coefficient for the UFA would result in greater drawdown in the vicinity of the FKAA ASR well. The applicant should conduct an aquifer performance test (APT) of the two zones identified in the UFA. Should the aquifer parameters derived from the APT be outside the range of parameters that were used in the modeling as presented in the submittal, additional modeling will be required and a proposed mitigation plan will also be required. SFWMD-2

If any of the above requires additional clarification, please do not hesitate to contact me at (561) 682-6862.

Sincerely,

James J. Golden, AICP
Senior Planner
Environmental Resource Regulation

/jig

c: See Attached Distribution List

Palmer, Steven

From: Oven, Hamilton
Sent: Wednesday, January 07, 2004 7:53 AM
To: Palmer, Steven; Goorland, Scott
Cc: Moulton, John; Gray, Tim
Subject: FW: Turkey Point Unit #5

Card for James Golden

-----Original Message-----
From: James Golden [mailto:jgolden@sfwmd.gov]
Sent: Tuesday, January 06, 2004 3:11 PM
To: john_gnecco@fpl.com
Cc: Barbara Linkiewicz; Scott Burns; Tom Colios; Keith Smith; Steve Bell; Oven, Hamilton; Douglas MacLaughlin; Susan Martin; Cecile Ross; Terrie Bates; Elizabeth Abbott
Subject: Turkey Point Unit #5

In follow up to our discussion earlier today, I talked to our water use staff to gain a better understanding of the recent changes to our water use criteria concerning the "mitigation" issue and how it relates to the Florida Keys Aqueduct Authority (FKAA) ASR wells. It appears to me that, in order for FPL to demonstrate that they will be able to meet the District's water use criteria, FPL is going to have to drill a Floridan aquifer test well and do an APT test prior to the District issuing its final agency report and Recommended Conditions of Certification to DEP. This will be necessary in order to determine if sufficient water will be available from the Floridan aquifer to meet FPL's needs for Unit #5 without adversely impacting the FKAA wellfield. Otherwise, when it comes time to issue our final agency report to DEP, we will not be able to state that the proposed withdrawals meet District criteria and we will not be in a position to authorize the proposed withdrawals through our Recommended Conditions of Certification.

SFWMD-3

District water use staff has also advised me that drilling a Floridan Aquifer well may take up to half a year or possibly even longer. Obviously, this would have an impact on the project's current review schedule.

If you would like to schedule a meeting with District staff to further discuss this issue, please let me know.

1FDEP: Florida Department of Environmental Protection, Waste / Waste Cleanup Section, Southeast District, Paul Wierzbicki

1FDEP Comment 1: The project involves the expansion of the existing power facilities to include a Unit 5.

Response: Comment acknowledged.

1FDEP Comment 2: Page 2-16 – Solid Waste Disposal, Fourth Sentence. Our records show that the active Miami-Dade South Dade Landfill is not permitted by the Department to dispose of yard trash, unprocessed tires, nor septic tank pump out wastes. This paragraph needs to be revised after consultation with the landfill facility operator.

Response 2: The Project will not generate yard waste or unprocessed tires during construction or operation.

Septic tank waste generated during construction by construction employees will be treated by portable chemical toilets and/or permitted holding tanks. Pump out and disposal of septic waste will be conducted by one or more of several dozen licensed septic tank cleaning and pumping contractors located in Miami-Dade County. Septic tank waste will be disposed of at one of the permitted Miami-Dade Water and Sewer Department's regional wastewater facilities. Any sanitary waste generated from the operation of the new Unit 5 will be treated by the existing permitted treatment facility at the Turkey Point Plant.

1FDEP Comment 3: Page 2-23, Section 2.3.3.2, Area Users, First Paragraph. Please list the users of the Biscayne aquifer within one mile of the facility boundary with their name, permit number, well information, etc. and depict such users on a map.

Response 3: There are no permitted users of the Biscayne Aquifer within 1 mile of the Project Area (see Figure 2.3-7 of the SCA). The nearest permitted user of the Biscayne aquifer is Alger Farms, Permit Number 13-00300-W, located about 3.7 miles northwest of the Project Area.

1FDEP Comment 4: Page 2-23, Section 2.3.3.2, Area Users, Last Sentence on Page. Please provide documentation (site specific laboratory testing, etc.) that the groundwater at the site is "Class G-III". Reference needs to be made to Chapter 62-520, F.A.C.

Response 4: In correspondence dated September 6, 1983, from Roy Duke, District Manager of the Southeast District of the Florida Department of Environmental Regulation (FDER) [now Department of Environmental Protection (FDEP)] to FPL, the FDER designated a certain portion of the Turkey Point Site as Class – III groundwater (see letter as Attachment 1FDEP-4). This designation was

based on information supplied to the FDER at an August 5, 1983 meeting as well as related documentation of salinity gradients supplied by FPL (based on reports generated by Dames & Moore and submitted to the South Florida Water Management District, and the Nuclear Regulatory Commission). These data indicated that the total dissolved solids (TDS) concentration in the groundwater below the Turkey Point cooling canals was greater than 10,000 milligrams per liter (mg/L) as specified in 62-520.410 Florida Administrative Code (F.A.C.). The prevailing regional groundwater flow is northwest to southeast so that any discharges from the cooling canal system would not affect the quality of fresh water north and west of the system. FDER amended Specific Condition 2 of permit IO 13-57079 to read:

> "2. The Zone of Discharge shall be in accordance with 17-4.245 (now 62-4.245) F.A.C. and is described as follows:
>
> The area bounded by a line along the west bank of the interceptor ditch and extending northeasterly to the Turkey Point Plant entry road; then due eastward from this junction to Biscayne Bay; and a line along the west bank of the interceptor ditch extending southward to the Sea Dade Canal, to Card Sound, then north along the coastline to intersect with the north boundary.
>
> The groundwaters contained in this area are classified as G-III Groundwaters."

This classification has not changed in subsequent renewals of the facility's FDEP Industrial Wastewater Facility Permit (IWWFP; see current IWWFP FL0001562 contained in Appendix 10.4 of the SCA).

1FDEP Comment 5: Page 2-88, Figure 2.3-11. Please explain the "Deep Well" identified on the south portion of the map, south of the "Collector Canal".

Response 5: The "Deep Well" shown on Figure 2.3-11 was known as the Research Test Well, and was constructed as part of studies performed by FPL to evaluate the potential to use Floridan aquifer water within the cooling canal system. It was drilled by the Alsay Drilling Company of Lake Worth, Florida, and was completed on September 15, 1972. The lithologic log of this well is presented in Appendix A-8 of the SCA Appendix 10.9.2. It was completed to a depth of 2,000 feet below land surface with elevation 9.7 feet above mean sea level. A profile is shown on Figure 8-1 of SCA Appendix 10.9.2, as Well 38. The well location is shown as well number 38 on Figure 8-2 of SCA

Appendix 10.9.2, and as well number 20 on Figure 8-4 of SCA Appendix 10.9.2. This well was properly abandoned in 1997.

1FDEP Comment 6: Page 3-3 – Fourth Paragraph, Fourth Sentence. "All wastewaters will be treated as appropriate and recycled to the existing cooling canal system." Please be advised that hazardous waste determinations are required for most wastewaters generated (including "washdowns") in accordance with Title 40 Code of Federal Regulations (CFR) Part 261, as referenced in Chapter 62-730, F.A.C..

Response 6: This comment is acknowledged.

1FDEP Comment 7: Page 3-5, Section 3.3 Fuel, Third Paragraph. Will the new 4.3 million-gallon "ultra low sulfur light oil" tank and associated piping and appurtenances be constructed, operated and managed in accordance with Chapter 62-761, F.A.C.?

Response 7: Yes. The new 4.3-million-gallon tank and associated connections will be constructed, operated, and maintained according to the applicable requirements of Chapter 62-761, F.A.C.

1FDEP Comment 8: Page 3-9 – Section 3.4.3.1 Nitrogen Oxides, Second Paragraph, Last Sentence. Reference is made to one 20,000-gallon Ammonia storage tank. Will this tank and associated piping and appurtenances, be constructed, operated and managed in accordance with Chapter 62-761, F.A.C.?

Response 8: Yes. The new 20,000-gallon ammonia tank and associated connections will be constructed, operated, and maintained according to the applicable requirements of Chapter 62-761, F.A.C.

1FDEP Comment 9: Page 3-13, Section 3.5.4 Process Water Systems and Section 3.6 Chemical and Biocide Waste and Page 3-15 and 3-16, Section 3.6.5 Chemical Cleaning and Section 3.6.6 Miscellaneous Chemical Drains and Section 3.7 Solid and Hazardous Waste.

In addition to any industrial waste requirements, all waste streams must be characterized for proper hazardous waste management in accordance with 40 C.F.R. Part 261, including wastes collected in sumps, laboratory wastes and material from solids settling basins. A chart and description of each waste stream needs to be included that indicates which waste stream would be hazardous, whether it is based on process knowledge or will be based on analytical testing, and if hazardous, additional information regarding the storage and treatment of such wastes would be required.

Response 9: The comment is acknowledged. Proper waste management is a standard FPL practice. This Project will become part of the existing fossil power plant and, in general, will follow FPL's "Waste Guidelines" procedure (included as pages FDEP-5 and FDEP-6 of this response). This procedure was developed by FPL to comply with applicable rules and regulations. Table 1FDEP-9

presents a chart that describes the handling of waste streams for Turkey Point Unit 5. As discussed in Section 3.7.2 of the SCA, the Project may generate hazardous waste periodically as part of boiler chemical cleaning [less than 100 kilograms (kg)/month], including spent solvents, boiler chemical cleaning wastes, and other chemicals. These wastes will be collected and managed as hazardous waste until tested to determine their characteristics. Boiler chemical cleaning waste is typically determined to be non-hazardous and, if so, can be evaporated in the conventional boiler units. Occasionally, chromium concentrations will exceed hazardous waste characteristic limits, in which case, hazardous waste rules will be followed.

The same types of wastes mentioned above are expected to be generated during Project construction and will be managed as stated above. Solvent rags will be collected and laundered. Residual waste from punctured aerosol cans will be collected and managed as hazardous waste. Paint waste, PVC cleaner, and PVC cement wastes will be minimized by implementation of programs requiring use of all material prior to issuance of additional material. All hazardous wastes will be stored onsite and disposed of by a licensed hazardous waste contractor. All non-hazardous waste will be managed according to FPL's "Waste Guidelines" with appropriate modifications to accommodate the Project construction.

No laboratory wastes are expected to be generated on the Turkey Point Expansion Project site. No solids settling basins are planned as part of the Project.

The Turkey Point site has one EPA Identification Number for both the fossil and the nuclear plants. Together, these plants typically generate less than 1,000 kg of hazardous waste per month. The facility holds a Small Quantity Generator (SQG) status. The Turkey Point Expansion Project will not contribute significantly to the hazardous waste generation at the site; hence, the SQG status is not expected to change.

FPL WASTE GUIDELINES – TURKEY POINT FOSSIL PLANT

GENERAL WASTE HANDLING GUIDELINES

1. All effort should be taken to reduce and/or eliminate waste generation.
2. All effort should be taken to reuse and/or recycle wastes.
3. Label all containers so that contents can easily be determined and products used.
4. If waste is hazardous due to a hazardous constituent in the original product, try to substitute with a non-hazardous product, if feasible.
5. If waste is generated, see attached list for disposal options and instructions.
6. If waste is hazardous and is required to be placed into locked satellite drums, contact Environmental Plant Leader at extension 3826.
7. If waste cannot be identified, contact Environmental Plant Leader at extension 3826.

WASTE HANDLING INSTRUCTIONS

Recycling

1. Cardboard, flatten and place in small wire cage next to unloading dock.
2. Pallets (poor condition) and scrap wood, place in large wire cage next to unloading dock.
3. White paper and file stock, place in blue bin north side of Administrative Building.
4. Aluminum cans, place in blue bin marked "Aluminum Cans" on north side of Administrative Building.
5. Metal scrap, place in metal dumpster located in Laydown Area.
6. Empty drums (poor condition), empty, crush and place in metal dumpster.
7. Fluorescent bulbs (intact), place into original box and store in Hazardous Waste Building.
8. Lead acid batteries, place on pallet in Hazardous Waste Building.
9. Dry alkaline cell batteries, place in appropriate bin in Stores.
10. Ni Cad batteries (includes all communication type batteries, i.e., cell phone/pager batteries), place in appropriate bin in Stores.
11. Empty aerosol cans, puncture with can puncturing device and place into scrap metal drum located in Machine Shop.
12. Used oil filters, place drained oil filters into gray drums located in Non-Regulated Drum Storage Area. Do not put plastic bags into drum.
13. Metal shavings, place in scrap metal drum located in Machine Shop.
14. Mercury liquid, place in glass jar under water and notify Environmental Plant Leader.

FPL WASTE GUIDELINES –TURKEY POINT FOSSIL PLANT

(Page 2 of 2)

Non-Regulated Waste Disposal

1. Normal trash, minimize and dispose, place into plant dumpster.
2. Asbestos, double bag with label and place into asbestos dumpster in Laydown Area.
3. Used oil, place into "On Spec" Satellite Accumulation Area located in Oil House.
4. Solid oily waste, place into Solid Oily Waste Dumpster located in Oil House.
5. Parts cleaning solution, use parts cleaner in Maintenance Apron for all parts cleaning. For special parts cleaning applications, see Environmental Plant Leader for instructions. Also contact Environmental Plant Leader when parts cleaning fluid is spent.
6. V-Bottom ash, collect in dumpsters as needed during outages.

Hazardous Waste Disposal *

1. Solvent contaminated rags, place into "Solvent Rag" Satellite Accumulation Drum located in Machine Shop. When full, place in Hazardous Waste Building.
2. Solid paint cleanup material, place into Satellite Accumulation Drum located south of Paint House. When full, place in Hazardous Waste Building.
3. Laboratory waste, place in Satellite Accumulation Drum located behind laboratory. This drum is for use by on-shift production personnel performing water chemistry. When full, place in Hazardous Waste Building.
4. Outdated lab chemicals, these chemicals will be lab packed by the Environmental Plant Leader.
5. Aerosol can puncturing waste, collect in Satellite Accumulation Drum located on south side of Machine Shop. When full, place in Hazardous Waste Building.
6. Waste paint related material, place in Satellite Accumulation Drum located south of Paint House. When full, place in Hazardous Waste Building.
7. Bead blasting material, place in drum located next to Beadblaster in Welding Shop. When full, place in Hazardous Waste Building.

When full, all hazardous waste drums must be labeled "Hazardous Waste" and dated.

1FDEP Comment 10: Page 3-18, Section 3.9.2 Fill Material. What contaminant considerations, if any, are being applied to the stockpiled material generated as a result of the maintenance of the existing cooling canal system? Has any analytical testing (soil, groundwater, sediment) been conducted or planned, including metals? What contaminant criteria is proposed to be used to evaluate the stockpiled material?

Response 10: "Stockpiled material" (limestone) that is currently stored along the cooling canal system was generated during the original construction of the existing cooling canal system, not during "construction and maintenance" as stated in the SCA (see replacement page). This material was natural limerock, and there is no reason to believe it would have been contaminated. Structural samples were obtained from the stockpiled material which concluded that the material meets structural fill requirements. Also, recent samples of the stockpiled material were obtained on February 11, 2004. Four soil samples from the stored limerock have been analyzed for pesticides, herbicides, total recoverable petroleum hydrocarbons (TRPH) and metals. The analytical results are included as Attachment 1FDEP-10. The results indicate that all pesticides and herbicides are below laboratory detection limits. Concentrations of metals and TRPH were below the soil cleanup target levels for which the limerock is intended to be used.

1FDEP Comment 11A: Page 4-2, Third Paragraph (and Page 4-7, Third Paragraph). What reasonable assurances can be provided to show that dewatering will not affect any soil/groundwater contaminated areas, if any at the Turkey Point facility? Detailed information needs to be provided, including a map(s), showing these contaminated areas.

Response 11A: There are no pending remediation issues at the Turkey Point site. The most recent investigation performed at the site was a trenching investigation that confirmed that no residual oil exists in the subsurface. This field effort was conducted during 1st and 2nd quarter 2003. There is no reason to expect that other sources of contamination exist at the site that may be impacted by dewatering operations in the Project Area.

1FDEP Comment 11B: In the past, the facility was subject to the Hazardous Waste permitting requirements of Chapter 62-730, F.A.C. What is the status of the hazardous waste closure with the Department and with the EPA?

Response 11B: The facility was subject to the Hazardous Waste permitting requirements of Chapter 62-730 because of the power plant basins that operated at one time for the neutralization of pH waste as part of the water treatment processes. These basins were "clean closed" pursuant to 40 CFR 270.1(c)(5) and 40 CFR 264.228(a), by the FDEP with concurrence from the EPA (Closure permit number HF13-125617).

1FDEP Comment 11C: What groundwater monitoring requirements were conducted for the closure? If required as part of the hazardous waste closure, are the monitoring wells still available for sampling of groundwater? If so, does the facility sample and monitor groundwater from these wells? Please provide a list of the monitored parameters and the results from the sampling and enclose a map depicting these groundwater monitoring wells.

Response 11C: The closure was conducted in accordance with the applicable requirements of 40 CFR 264, which includes specific groundwater monitoring under Subpart F, the general facility standards of Subpart G (40 CFR 264.110-264.116), Subpart H and Subpart K (40 CFR 264.220-264.228) standards. The appropriate groundwater monitoring was conducted to demonstrate clean closure. The monitoring wells were subsequently abandoned in place in accordance with FDEP regulations.

Once Turkey Point completed clean closure, FPL submitted a change of status request from hazardous waste Treatment, Storage, and Disposal ("TSD") facility to a generator only status. Turkey Point received its change of status to hazardous waste generator only status from the FDEP on September 22, 1995. (see attached letter—Attachment 1FDEP-11).

1FDEP Comment 12: Page 4-7, Fourth paragraph and Page 4-8, Section 4.3.1, Third Paragraph. This is an important inclusion that needs to be emphasized to all facility personnel and construction contractors and sub-contractors and site workers.

Response 12: The comment is acknowledged and the statements on Pages 4-7 and 4-8 are standard FPL practices for any construction activities at FPL facilities.

1FDEP Comment 13A: Page 5-10, Section 5.3.2, Groundwater, Third Paragraph. Does the second sentence indicate that there may be a Class G-II (per 62-420, F.A.C.) groundwater lens above 40 feet? What site specific testing has been conducted to confirm this? Why are the primary, secondary and minimum criteria not included in the sampling?

Response 13A: No. The second sentence on Page 5-10, Section 5.3.2 of the SCA does not indicate that there is a Class G-II groundwater lens above 40 feet. The statement refers to general hydrological information in the area. As stated in the response to 1FDEP-4, the area that encompasses the Turkey Point cooling canal system is classified as G-III groundwater.

As stated in the response to 1FDEP-4, testing was performed and supplied to the Department in 1983 to support the G-III groundwater classification of the Turkey Point Plant site. No groundwater testing has been performed in the cooling canal system. However, the prevailing regional groundwater flow

is northwest to southeast. Testing was performed in the "Interceptor Ditch" in the early 1980s and continues in the groundwater wells west of the cooling canal system. This testing was and continues to be performed for conductivity to monitor the potential for saltwater intrusion west of the cooling canal system.

1FDEP Comment 13B: How does the facility implement the provisions of 62-520.520(8), F.A.C.?

Response 13B: Rule 62-520.520 F.A.C. is entitled, "Exemptions from Secondary Drinking Water Standards Outside a Zone of Discharge in Class G-II Ground Water". As described previously, the groundwater at the Turkey Point Plant site has been designated by FDEP as G-III since 1983 and thus the cited rule does not apply.

1FDEP Comment 13C: If the groundwater facility is Class G-III, how has the facility demonstrated reasonable assurances of compliance with the secondary standards referenced in Rule 62-520.430, F.A.C. "Standards for Class G-III Groundwater"?

Response 13C: Concerning compliance with Rule 62-520.430, F.A.C. as it applies to "Standards for Class G-III Ground Water", the only applicable standards are the "minimum criteria" established in Rule 62-520.400 F.A.C. and not "secondary standards" as indicated in the comment. Since the early 1980s, FPL has monitored the cooling canal system for total suspended solids, zinc, iron, copper, and specific conductance, salinity and pH as required by the IWWFP. Levels of these "indicator" parameters have not reached concentrations in the cooling canals to cause concerns that minimum criteria are exceeded in the surrounding groundwater/surface water. The values from the sample collected in July 2003 are presented in the following table, along with the secondary drinking water standards. The secondary standards are shown for comparison purposes only and do not apply to the cooling canal system.

Parameter	Result	Secondary Drinking Water Standard
Total Suspended Solids	24.0 mg/L	N/A
Copper	< 5.0 µg/L	1,000 µg/L
Iron	< 50.0 µg/L	300 µg/L
Zinc	< 5.0 µg/L	5,000 µg/L
Specific Conductance	77,200 micro-mhos	N/A
Salinity	53.8 ppt	NA
pH	7.9	6.5 – 8.5

Note: mg/L = milligrams per liter; µg/L = micrograms per liter; N/A = not applicable; ppt = parts per thousand.

1FDEP Comment 14: Page 5-13, Section 5.4, Hazardous Waste. In order to determine facility hazardous waste generation status, all hazardous waste streams from all sources at the facility must be counted, including hazardous wastes generated during construction such as waste hazardous paints, solvents, adhesives, oils, etc. This is outlined in 40 C.F.R. Parts 260-280 and Chapter 62-730, F.A.C.

Response 14: We acknowledge the requirement to count all hazardous waste streams generated on site, including waste generated during construction. This is standard FPL practice as indicated in our response to comment 1FDEP-9 and will be done.

1FDEP Comment 15: Volume 3 of 3 inside cover page has type: "Manatee Expansion Project".

Response 15: The comment is acknowledged. A replacement page is attached in the section of these Sufficiency Responses titled "Replacement Pages".

1FDEP Comment 16: Any land clearing or construction debris must be characterized for proper isposal. Potentially hazardous materials must be properly managed in accordance with Chapter 62-730, F.A.C. In addition, any solid wastes or other non-hazardous debris must be managed in accordance with Chapter 62-701, F.A.C.

Response 16: The comment is acknowledged.

2FDEP: Florida Department of Environmental Protection, Industrial Wastewater Section, Southeast District, Paul Sze

2FDEP Comment 1: Please submit a full-size copy of Figure 2.1-2. All the legends and other notations should be clearly legible and not overlapped. To facilitate Wastewater Permitting Section's review, the drawing should call out the locations for Lake Warren, its outfall structure, D-001, and the several oil/water separators, and wastewater treatment (neutralization) basin B-1, and solids settling basins B-2 and B-3, and their outfall structure, D-002.

Response: Attached is Figure 2FDEP-1 (11" by 17") that shows the Development Plan for the Turkey Point Expansion Project showing the following existing wastewater facilities: neutralization basin B1, solids settling basins B2 and B3, Lake Warren, oil/water separators and outfalls (DOO1 and OO2). These features are part of the existing Turkey Point Plant and permitted under Industrial Wastewater Facility Permit FL0001562 (See SCA Appendix 10.4). A full size copy of Figure 2FDEP-1 will be provided to the commenter.

2FDEP Comment 2: Please expand and revise the flow schematic as presented in Figures 3.5-1 and 3.5-2, to distinct the process "waste water sump" into its existing individual components of neutralization basin B-1, and solids settling basins B-2 and B-3, and any other new treatment components being proposed under the expansion. (Attached here for sample is a file copy of the flow diagram for March 1, 1993, showing more details for the flow schemes.)

Response 2: Figures 3.5-1 and 3.5-2 have been updated and are attached as replacement pages. These figures were revised to identify the existing and new facilities and were updated to reflect the updated Cooling Pond Modeling Report contained in the SCA as Appendix 10.7 (see response to 2FDEP-4). Figure 2FDEP-2 identifies the connections on the previous waste flow diagram. The waste water sump shown on Figures 3.5-1 and 3.5-2 is a new facility that will serve Unit 5 only. The sump location is shown on Figure 3.2-2 as Item 16, designated "stormwater sump". Neutralization Basin B-1 and solids settling basins B-2 and B-3 serve existing Units 1-4 exclusively and are already permitted.

As described in SCA Sections 3.6 and 5.2.1, there are four wastewater streams shown on Figures 3.5-1 and 3.5-2 that will be combined in the new wastewater sump. These wastewater streams will be generated by Unit 5 and are separate from the existing facility and include:

1. Equipment area stormwater and equipment drains routed through a new oil/water separator,
2. Process water treatment system wastewaters,
3. Heat Recovery Steam Generator blowdown quenched with cooling tower blowdown, and
4. Cooling tower makeup water treatment waste.

These four wastewater streams will be combined in the new wastewater sump, and then recycled to the cooling canal system serving Units 1 through 4.

2FDEP Comment 3: The projected water quality for upper Florida aquifer and the discussion thereof, should have included radionuclides, and more specifically gross alpha particles activity and radium-226 and radium-228, and also hydrogen sulfide and un-ionized ammonia. From experience, radionuclides frequently are presented in Floridan aquifer, in levels posing compliance concern relative to both groundwater and surface water standards.

Response 3: In preparing the SCA, FPL performed a literature search for all available water quality data for the upper Floridan aquifer in or near the site vicinity, and also obtained and analyzed samples from Ocean Reef Community's well number 4. The results were summarized in SCA Table 3.5-1, and included minimum, average, and maximum expected values of constituents, including total ammonia, in the cooling tower makeup water. Similarly, FPL obtained source water data for, and predicted concentrations of, other expected waste streams from Unit 5. FPL used that information to predict the quality of the expected combined wastewater to be recycled from Unit 5 to the cooling canal system. That analysis was presented in Section 5.2.1 of the SCA. That analysis concluded that the Unit 5 release to the cooling canal system would not cause a detectable increase in the ammonia concentration of the cooling canal system or in that system's associated discharge to groundwater. Therefore, it was concluded that there would be no detectible discharge of un-ionized ammonia from Unit 5.

No historical data was found for gross alpha particle activity, radium-226 or radium-228 in the upper Floridan aquifer. Samples are being analyzed for these parameters and will be forwarded when available. Data from Dames & Moore (1975) and recent sampling of the Ocean Reef well found hydrogen sulfide at the following levels:

minimum	-	1.0 mg/L
mean	-	2.4 mg/L
maximum	-	4.0 mg/L
number of samples	-	39

The Project wastewaters are being recycled to the existing cooling canal system, which is a zero-discharge facility (i.e., it has no discharge to surface waters). That facility does discharge to groundwaters, in accordance with its Industrial Wastewater Facility Permit (included in Appendix 10.4 of the SCA). That permit specifically states that the receiving ground water is

Class G-III. There are no specific standards for gross alpha particle activity, radium-226, radium-228 or hydrogen sulfide associated with Class G-III standards.

2FDEP Comment 4: Please reconcile the discrepancies in flow figures for the expansion among those presented in Figure 3.5-2 in Volume 1, and Figure 15 included in Appendix 10.7 "Cooling Pond Modeling Report" in Volume 3. It appears the latter might not have accounted for the R.O. concentrate and other process wastewater discharges involved.

Response 4: Appendix 10.7 has been updated to include all wastewater releases to the cooling canal system. The updated SCA Appendix 10.7 is attached as a replacement. The water use diagrams included in the SCA, which are Figures 2.3-8, 3.5-1, and 3.5-2, have also been updated and are attached as replacement pages. The R.O. waste stream of 56 GPM is accounted for with the other waste streams. The total waste stream is 4,746 GPM, while the R.O. waste stream is 1.2 percent of the total waste stream. Water from the Miami-Dade public water supply will be used as the water source for the demineralization process.

2FDEP Comment 5: Follow-up to item no. 4 above, please include in the revised "Cooling Pond Modeling Report", a discussion on how the increased discharge volume from the expansion project, could affect the operating water level in the cooling canal system, and its conformance with the current "No Discharge" prohibition in the NPDES permit. Also, please review the frequency and circumstances for any recent emergency discharge events.

Response 5: As described in updated Appendix 10.7, there is a very large tidal flow into and out of the cooling canal system, which is approximately 3,700,000 gpm. This enormous flow of water into and out of the cooling canal system is only possible because of the exceptional porosity of the underlying rock as described in SCA Section 2.3.4.1. The addition of Unit 5 wastewaters at a rate of 4,746 gpm average, or 7,570 gpm maximum, will have no effect on the water levels in the cooling canal system.

2FDEP Comment 6: The report should provide further detailed discussion on the potential adverse impact from outward migration of pollutants in the proposed discharges, to the water quality in both the groundwater outside the permitted zone of discharge, and the Biscayne Bay. For groundwater movement, the existing interceptor ditch may have certain benefits as a salinity barrier, but its effectiveness in prevention of general pollutants migrating in the deeper zone (beneath the trench bottom) needs to be further demonstrated. (Please include in the discussion a typical lateral cross-section profile for the cooling canals and the interceptor ditch.)

Response 6: The cooling canal system is already permitted as a wastewater treatment facility and has been operating within its permitted limits for more than 30 years. That system has no direct surface

water discharge to Biscayne Bay. It does, however, allow a discharge to the Class G-III ground water. FDEP and U.S. Environmental Protection Agency determined compliance with the Industrial Wastewater Facility Permit (Number FL0001652) could be demonstrated by monitoring of influents to the cooling canal system in lieu of ground water monitoring (see response to 1FDEP-13c).

The discussion in SCA Section 5.2 demonstrates that the addition of the Unit 5 discharge to the cooling canal system will not cause the discharge of cooling canal water to exceed either Class G-III standards or the Miami-Dade criteria for salt water.

FPL and SFWMD are parties to an agreement (see SCA Appendix 10.4 for copy of agreement) by which FPL quarterly monitors water level, water temperature, and conductivity, and calculates chlorinity, at one-foot intervals over the entire depth (70 feet, the full depth of the Biscayne Aquifer at this location) of each of four monitoring wells (see Figure 2FDEP-6a). Two of these wells (L-3 and L-5) are just west of the L-31E canal. The other two monitoring wells (G-28 and G-21) are just east of Tallahassee Road. These wells are located west of the cooling canal system to monitor any landward movement of the saltwater wedge. Conclusions reached from analysis of the results of the monitoring program, which has been ongoing since 1972, are:

1. Construction and operation of the cooling canal system has resulted in no significant impact to the Biscayne Aquifer west of the system, and
2. Operation of the Interceptor Ditch has protected the Biscayne Aquifer from saltwater intrusion.

Since the cooling canal system operates at about 1.6 times the salinity level of Biscayne Bay (refer to updated Appendix 10.7 in Replacement Pages), any leakage of cooling canal water west of the interceptor ditch would show up as an increase in salinity. Since no such increase has been observed, it is concluded no such leakage is occurring. Figure 2FDEP-6b is a typical lateral cross-section of the L-31E canal, interceptor ditch, and westernmost cooling canal. Additional cross-sections of the cooling canal system are presented in the updated Appendix 10.7 (see response to 2FDEP-4 above).

The discussion in SCA Section 5.2.1 demonstrates that, because the volume of the proposed discharge is so small relative to the volume of the cooling canal system, no increase in concentration of any pollutant would be detectable over the life of the plant. Flows between Biscayne Bay, the Class G-III groundwater, and the cooling canal system are discussed in SCA Appendix 10.7, and represented in the existing plant water balance SCA Figure 2.3-8. There is an outflow from the cooling canal system

during outgoing tides, which enters the Class G-III groundwater. Because the water levels in the eastern portion of the cooling canal system are depressed by the circulating water pumps, this outflow does not enter Biscayne Bay. There is also a very small flow that seeps through the berm that blocks the Card Sound Canal to the south. Because the water level in the south end of the cooling canal system is approximately the same as that in Card Sound, the head driving this seepage is also very small.

2FDEP Comment 7(a): A remark on page 2-7 states "only a small portion of the 5-mile study area contains a portion of the aquatic preserve." Using Figure 2.2-1 as a reference, it would appear the entire ocean side of the study area falls within the Biscayne Bay Aquatic Preserve Area, and also within the Biscayne Bay SWIM Planning Area.

Response 7(a): The statement on Page 2-7 is correct in that only a small portion of the Biscayne Bay quatic Preserve is located within 5 miles of the Project Area. Most of the area of Biscayne Bay ear the Turkey Point Plant is within the Biscayne Bay National Park. The areas designated as the Biscayne Bay Aquatic Preserve and the Biscayne Bay National Park are shown in Figures 2FDEP-7(a)-1 and 2FDEP-7(a)-2, respectively. The commenter is correct that the Biscayne Bay SWIM Planning Area encompasses the entire portion of Biscayne Bay within 5 miles of the Project Area.

2FDEP Comment 7(b): Please show the specific sampling locations where the two surface water samples, as referenced on page 2-27, for the cooling canal and L31E Canal were taken, and confirm their representativeness. (Please also check other sections of the report to assure the sampling locations are shown on proper drawings.)

Response 7(b): Figure 2FDEP-7(b) shows the locations of the two water samples. The sample taken in Canal L 31E is located in that portion of Figure 2FDEP-7(b) identified as Area 1. The sample taken in the cooling canal system is located in that portion of Figure 2FDEP-7(b) identified as Area 2 (on the intake side of the existing plant). These locations are representative of the water quality in the L 31E canal and the cooling canal system based on their location.

2FDEP Comment 7(c): Please provide the depths and screened intervals for the six groundwater monitoring wells west of L31E: L-3, L-5, G-6, G-21, G-27, G-28 and G-35, as referenced in SFWMD Agreement in Appendix 10.4.

Response 7(c): Pursuant to the SFWMD agreement dated July 15, 1983, monitor wells L-3, L-5, G-21, and G-28 are monitored. Wells G-6, G-27, and G-35 are not monitored. The monitor wells are

2-inch-diameter wells installed to a maximum depth of 70 feet. The upper 15 feet of the well is cased with schedule 40 PVC pipe, and the remaining 55 feet is screened.

2FDEP Comment 7(d): Please show for all the water quality results shown in Table 3.5-1 and 3.5-2 that are listed as "ND" or non-detectable, list the laboratory's detection limits for the pollutants.

Response 7(d): There were several sources of data for Table 3.5-1 including:

- South District Wastewater Treatment Plant Monitoring Wells,
- Dames & Moore water supply investigation,
- USGS data for the Grossman well, and
- Local wells sampled and analyzed by FPL.

The period of record for these data extends from 1963 through the present. Because of this wide range of time and location, the detection limit for each constituent has varied significantly. The minimum and maximum values of the detection limits for the undetected constituents in Table 3.5-1 are tabulated below:

Table 2FDEP-7(d)A. Detection Limits for Design Upper Floridan Water Quality

	Minimum	Maximum
Aluminum (mg/L)	0.0200	0.5
Antimony (ug/L)	5.0000	5000
Arsenic (ug/L)	3.0000	800
Cadmium (ug/L)	0.5000	110
Chlorine, Total (mg/L)	0.10	0.10
Cyanide (mg/L)	0.0050	0.01
Lead (ug/L)	3.0000	100
Mercury (ug/L)	0.08	72.00
Molybdenum (ug/L)	5.00	100.00
Nitrite as N (mg/L)	0.01	1.60
Oil & Grease (mg/L)	1.70	1.70
Phenols (mg/L)	0.01	0.01
Silver (ug/L)	2.00	100.00
Thallium (ug/L)	2.00	10.00
TKN as N (mg/L)	0.40	0.40

Similarly, the detection limits associated with the undetected constituents in Table 3.5-2 have also varied over time and location, and the minimum and maximum values of those detection limits are tabulated in the following table:

Table 2FDEP-7(d)B. Detection Limits for South District Wastewater Plant Design Reclaim Water Quality

Parameter	Units	Minimum	Maximum
Dieldrin	ug/L	0.006	50
Alpha-Endosulfan	ug/L	0.004	50
Beta-Endosulfan	ug/L	0.004	50
Endosulfan Sulfate	ug/L	0.004	50
Endrin Aldehyde	ug/L	0.001	50
Endothall	ug/L	0.01	0.025
Endrin	ug/L	0.001	50
Ethylene dibromide	ug/L	0.000005	0.00002
Glyphosate	ug/L	0.01	0.35
Heptachlor	ug/L	0.000005	50
Heptachlor epoxide	ug/L	0.000005	50
Hexachlorobenzene	ug/L	0.00001	0.01
Hexachlorocyclopentadiene	ug/L	0.00001	0.001
Lindane	ug/L	0.000001	0.00001
Methoxychlor	ug/L	0.00001	0.0005
Oxamyl (vydate)	ug/L	0.0005	0.05
Pentachlorophenol	ug/L	0.00001	0.05
Picloram	ug/L	0.00001	0.0002
Polychlorinated biphenyls	ug/L	0.0001	0.005
Simazine	ug/L	0.00001	0.007
1,1-Dichlorethylene	ug/L	0.0002	0.001
1,1,2-Trichloroethane	ug/L	0.0002	0.001
1,2-Dichloroethane	ug/L	0.0002	0.001
1,2-Dichloropropane	ug/L	0.0005	0.001
1,2,4-Trichlorobenzene	ug/L	0.0002	0.01
Benzene	ug/L	0.0002	0.001
cis-1,2-Dichloroethylene	ug/L	0.0002	0.001
Dichloromethane	ug/L	0.0002	0.001
Monochlorobenzene	ug/L	0.0002	0.001
o-Dichlorobenzene	ug/L	0.0002	0.001
Styrene	ug/L	0.0002	0.001
Toluene	ug/L	0.0002	0.001
Vinyl Chloride	ug/L	0.0002	0.001
Xylenes (total)	ug/L	0.0002	0.001
Ethylene dibromide	ug/L	0.000005	0.00002

FPL has been subsequently requested by the commenter to also provide the detection limits in Tables 1, 2, and 3 of Appendix 10.7. These are presented below for L31E and Cooling Canal water.

Table 2FDEP-7(d)C. Detection Limits for Appendix 10.7 Tables

Parameter	Units	Minimum	Maximum
Aluminum	ug/L	50	50
Antimony	ug/L	1.4	5.0
Arsenic	ug/L	3.0	3.0
Beryllium	ug/L	0.10	4.0
BOD	mg/L	2.0	2.0
BOD (Dissolved)	mg/L	2.0	2.0
Cadmium	ug/L	0.50	20.0
Chromium	ug/L	1.9	5.0
Copper	ug/L	5.0	5.0
Cyanide	mg/L	0.0050	0.0050
Fluoride	mg/L	1.0	250
Iron	ug/L	50	60
Iron (Dissolved)	ug/L	50	50
Lead	ug/L	0.25	3.0
Lead (Dissolved)	ug/L	3.0	3.0
Manganese	ug/L	2.0	8.1
Mercury	ug/L	0.047	0.20
Molybdenum	ug/L	5.0	100
Nickel	ug/L	2.0	2.0
Nitrate	mg/L	0.50	1.0
Nitrite	mg/L	0.20	1.0
Oil & Grease	mg/L	1.7	1.7
Ortho-Phosphate as P	mg/L	0.01	0.01
Phenols	mg/L	0.010	0.010
Selenium	ug/L	5.0	5.0
Silicon	ug/L	25	25
Silver	ug/L	0.2	2.0
Sulfide	mg/L	1.0	2.0
Thallium	ug/L	10	10
TSS	mg/L	3	3
Vanadium	ug/L	5.0	5.0
Zinc	ug/L	5.0	200

2FDEP Comment 7(e): Table 3.5-3 "cooling tower design" information as referenced on page 3-12 may be missing.

Response 7(e): The reference to Table 3.5-3 is a typographical error. The reference should have been Table 3.4-3, which is included in the Site Certification Application. This reference has been corrected and the page can be found in the section titled "Replacement Pages" in this document.

2FDEP Comment 8: The recirculated water in the cooling canal system is already considered "hypersaline" – salinity twice that of the Biscayne Bay. Please discuss if certain canal freshening possibilities, for example, freshening the canal water with clean stormwater runoff captured onsite, or even ocean water from Biscayne Bay, have been given due consideration. Another more costly possibility is the eventual segregation of the waste streams into the cooling canal system into high-strength waste (high mineral salts) and low-strength waste (thermal pollutant only) streams. The high-strength waste can be consumed in heat evaporation or other combustion process, with the salts recovered or removed. This should result in more effective reuse of the low-strength waste for general cooling purposes, and also lessen the increasing salinity loading on the cooling canal system.

Response 8: The construction of the existing Turkey Point Plant cooling canal system was a result of a 1971 consent agreement between the United States and FPL. Construction was completed in 1973 and the cooling system was closed off from Biscayne Bay and Card Sound. The cooling canal system has remained the same since that time.

Several studies were performed between 1973 and 1977 to evaluate reductions in salinity of the cooling canal system. These studies included tidal flushing and input of large quantities of water from the Floridan aquifer. The alternatives were found to be impractical and ultimately unnecessary. The latter was a result of the cooling canal system reaching an equilibrium salinity level. This stable salinity level allowed the cooling canal system to satisfactorily function as the cooling system for Turkey Point Units 1 through 4, as well as provide an environmental benefit to the endangered American crocodile. Since the late 1970s, crocodiles began inhabiting the cooling canal system with the canal berms serving as nesting areas. The majority of the cooling canal system is included in the U.S. Fish and Wildlife Service (USFWS) designation of critical habitat for the American crocodile.

As discussed in Sections 5.1 and 5.2 of the SCA, Turkey Point Unit 5 will not increase the salinity of cooling canal system, which has been operating successfully for about 30 years.

3FDEP: Florida Department of Environmental Protection, Environmental Resources and Permitting Section, Southeast District,

3FDEP Comment 1: Reduction and Elimination of Impacts:
Discuss why the elimination of impacts to wetlands is impossible and the steps that were taken in the project design that reduced these impacts.

Response: FPL has attached a document called "Rationale for locating additional power generation capacity at Turkey Point north of existing Units 1 and 2", dated November 14, 2003 (see Attachment 3FDEP-1). This document explains the planning process undertaken by FPL that led to identifying the existing Turkey Point Power Plant as the most suitable and cost effective location for this expansion project. The document also describes the process for identifying the physical location on the Turkey Point site for the expansion project. The document was submitted to the U.S. Army Corps of Engineers with FPL's application for a Federal Dredge and Fill Permit on November 14, 2003.

The document points out the public need for electric generation by 2007, FPL's obligation to meet that need, the severe load imbalance that is developing in South Florida, and the electrical transmission constraints that limit the geographic area where the power plant might be sited. Many other sites (specifically those located north of Palm Beach County) were considered but rejected based on the requirement to build hundreds of miles of transmission and natural gas pipeline systems. Constructing these linear facilities would result in hundreds of acres of environmental impacts (wetlands, uplands and land use). In addition, if a site were selected that required licensing through the Transmission Line Siting Act, the process would not be complete by 2007. Many of the sites considered do not have any existing power plant infrastructure that could be used for a new unit (e.g., control room, administration building, warehousing, parking, access road, etc.).

ALTERNATE SITES (examples):

- Midway (St Lucie County) – site is not located in Southern Florida. Greenfield development requiring new infrastructure.
- Andytown (Broward County) – located adjacent to the Everglades and wetland impacts would occur. Broward County has imposed a moratorium on power plant development. Greenfield development requiring new infrastructure including gas pipeline.
- Martin Power Plant (Martin County) – site is not located in Southern Florida. An expansion project is under construction at this site. After completion, the site will have the

capability to generate over 3,000 megawatts of power. Further development at this site would pose security concerns at this time.

- DeSoto (DeSoto County) – site not located in Southern Florida. Greenfield development requiring new infrastructure including transmission and gas pipeline.

The overriding factors that led to the selection of the Turkey Point site include:

- Location relative to load imbalance and power generation needs.
- Available transmission system.
- Available natural gas system.
- Available cooling canal system.
- Available power plant infrastructure (e.g., control room, administration bldg, warehousing, etc).
- Previously impacted site.
- Appropriate land use and zoning designations.

ONSITE OPTIONS EVALUATION:

In addition to alternate sites, FPL evaluated four locations on the Turkey Point plant site. The locations are shown on the drawing attached to the above referenced document. Evaluation criteria included the following:

- Wetland Impacts/Acreage: total amount of wetland impacted by the option.
- Wetland Impacts/Quality & Habitat Value: quality of wetland being impacted.
- Proximity to Biscayne National Park: location relative to the Biscayne National Park.
- Land use - Zoning: whether the option has the proper land use designation.
- Roads & Infrastructure Access: ability of each location option to use the existing road access and other infrastructure.
- Transmission Connections: compares location option's ability to tie into the existing Turkey Point transmission system.
- Nuclear Security: evaluates security requirements for Turkey Point Nuclear Units 3 and 4.

The preferred alternative that was selected (Option 2 in the analysis) was considered to be the least intrusive, most cost-effective location on the Turkey Point site for the proposed expansion project, even when the unavoidable wetland impacts and associated mitigation were considered. This site is appropriately zoned and was identified as a future power unit location in the early development of the

Turkey Point site. This particular location on the site maximizes opportunities to connect with existing infrastructure (proximity to transmission systems, natural gas pipeline; allows use of existing warehousing, administration buildings, control room, plant personnel) and minimizes impacts to the nuclear operation. This site impacts less wetlands than other potential sites on the Turkey Point Plant site due to the fact that it maximizes the connections to the existing facilities and minimizes the need for building additional infrastructure that would impact more acres of wetlands.

AVOIDANCE AND MINIMIZATION:

As mentioned, this option impacts less acreage of wetlands than other options, thereby avoiding wetland impacts. Minimization measures were pursued as follows:

- After meeting with the U.S. Army Corps of Engineers and receiving their input as well as input from various other local and state agencies, FPL modified the original engineering plans for this location. The proposed expansion project power block was relocated as far to the west and away from Biscayne Bay and Biscayne National Park as practical but still allowed connection to existing infrastructure. The light oil tank was relocated from the east to the west and the storm water pond was relocated to the south side of the nuclear access road. The storm water pond was relocated into the nuclear security area. It was determined that once the stormwater pond was constructed, access to that facility would be limited which would minimize nuclear security issues. These design changes resulted in the minimization of wetland impacts to the extent practical.
- Additional engineering design changes were made to avoid seagrasses in the area of the stormwater pond. FPL engineers located the pond north of the area where seagrasses were identified, thereby avoiding impacts.

MITIGATION:

The mitigation strategy that was developed to address unavoidable impacts incorporate: 1) onsite wetlands enhancement, 2) installation of culverts that will effectively improve flushing over a large area on the site, 3) replacement of an existing culvert with a larger culvert, and 4) improvement and restoration of a previously impacted, onsite area. The strategy also includes purchase of like-kind credits from the Everglades Mitigation Bank located in the same drainage basin as the proposed project area.

The installation of a larger culvert in the storm water pond area located of the plant access road will replace the existing culvert and allow more flow into and out of this isolated area. This will enhance the environment for the seagrasses as well as the wetlands in the area.

Together, these measures will mitigate impacts related to the Project, including wetlands in the Project area and the man-made lagoon, seagrasses and creeks within the power block area.

Mitigation:

3FDEP Comment 2: Is a conservation easement being proposed for the on site mitigation areas? If not, how will they be protected from future impacts?

Response 2: A conservation easement is not being proposed per se for the onsite mitigation areas. However, it is expected that a condition of certification will require preservation and maintenance of these areas. This type of condition of certification is typical and consistent with other projects reviewed under Florida's Power Plant Siting Act.

3FDEP Comment 3: Provide cross sections all on-site mitigation areas.

Response 3: SCA Appendix 10.1.4 presents the conceptual plan. As discussed with, and agreed by the commenter, typical cross-sections of the testing cooling canal berms are attached (see Attachment 3FDEP-3) and address the requested information required for SCA sufficiency. Once the mitigation plan is finalized that meets all applicable agency requirements (i.e., FDEP, USACE, and DERM), all detailed cross-sections will be developed. The commenter agreed that the development of detailed culvert cross sections is appropriate for a later stage of the Project's design.

3FDEP Comment 4: The online mitigation summary on p. 16 of Appendix A shows a 0.86 post mitigation WATER score for Area D-mid, but the WATER evaluation matrix shows 0.78. This should be verified, and the mitigation summary should be updated, and the required mitigation should be adjusted.

Response 4: The onsite mitigation summary contained the correct W.A.T.E.R. scores, whereas the W.A.T.E.R. evaluation matrix contained a typographical error. The cumulative score for Area D-mid (46.5) divided by the maximum possible score (54), results in a W.A.T.E.R. score of 0.86, not 0.78 as stated in W.A.T.E.R. evaluation matrix. Attachment 3FDEP-4 contains the recalculation of the W.A.T.E.R. score for Area D-mid.

3FDEP Comment 5: The onsite mitigation summary on p. 16 of Appendix A shows a 0.83 pre mitigation WATER score for Area H-east, but the WATER evaluation matrix shows 0.89, and 0.83 for the post-secondary impact. The value of 0.89 should be used to determine the actual lift on this area (which is 0.01, and not 0.07 as indicated). This will reduce the amount of mitigation credit generated at this Area.

Response 5: The comment is correct; the W.A.T.E.R. score for the 7.5-acre Area H-east after considering secondary impacts was used as the pre-mitigation W.A.T.E.R. score (0.83), although the accurate pre-mitigation W.A.T.E.R. score of 0.89 should have been used, as it represents current conditions. The proposed hydrologic improvements to Area H-east through construction of a culvert to Biscayne Bay would provide a lift of 0.01 credits/acre, or a total of 0.08 credits of mitigation (using the site suitability multiplier of 1.07), rather than the 0.56 credits calculated previously based on a lift of 0.07 credits/acre. Upon further consideration, the cost of installing a culvert through the red barn area to connect Area H-east to Biscayne Bay and the dredge-and-fill impacts within the Bay incurred during installation of the culvert outweigh the small amount of functional improvement predicted within Area H-east. Therefore, this culvert will be removed from the mitigation plan, which reduces the overall credits generated through onsite mitigation from 17.24 to 16.68. Attachment 3FDEP-5 contains the recalculation of the W.A.T.E.R. score that includes removal of the Area H-east culvert. To preserve the hydrology of Area H-east, water flow in the tidal channel located at the northeastern edge of the powerblock area (Area A) may be directed along the eastern edge of the powerblock into Area H-east, allowing continued tidal flushing to occur following construction of the Project. The additional 0.56 credits will obtained from onsite mitigation, bringing the total amount of mitigation to 35.33 credits.

3FDEP Comment 6: In light of the fact that they are proposing 36.94 acres of impact, and mitigating 35.33 acres, the optional mitigation that is proposed should be mandatory.

Response 6: The mitigation plan involves hydrological improvements onsite combined with the purchase of mitigation **credits** from the Everglades Mitigation Bank. While 36.94 acres of wetlands are proposed to be impacted, the required mitigation is calculated by credits, not acreage; therefore, it is not accurate that 35.33 credits of mitigation are equivalent to 35.33 acres of mitigation. The hydrologic improvements and restoration of the Australian pine ribs conducted onsite will enhance a total of about 117 **acres** of wetlands, which translates to 16.68 **credits** of mitigation based upon the improvement in functional values. Within the EMB, one credit of mitigation represents enhancement and restoration of approximately 7.5 acres of wetlands; therefore, the purchase of 18.09 credits is equivalent to the enhancement of about 136 acres of wetlands. Using these calculations, the onsite

and offsite mitigation plan will benefit a total of over 250 acres of wetlands to generate 35.33 credits of mitigation.

3FDEP Comment 7: Success of the mitigation could be measured by having them submit subsequent WATER scores that show that the proposed mitigation does offset the impact as proposed. If the WATER scores show that the mitigation is not meeting the expectations of the Department after 2 years, additional mitigation shall be proposed through a permit modification request.

Response 7: Comment acknowledged. Post-mitigation functional assessment of the onsite mitigation areas and subsequent verification will be implemented through the conditions of certification.

3FDEP Comment 8: For the off-site mitigation, please provide information from the Everglades Mitigation Bank that 18.09 credits are available. Also, provide details on what type of mitigation will be performed by the Everglades Mitigation Bank through the purchasing of these credits (i.e., demonstrate how the purchase of 18.09 credits in the mitigation bank will off set the impacts of this project).

Response 8: Offsite mitigation for unavoidable wetland impacts will be achieved through the purchase of 18.09 credits from the Everglades Mitigation Bank (EMB). The number of credits required was calculated as part of the W.A.T.E.R. analysis described in SCA Appendix 10.1.4 within the USACE Dredge and Fill Permit Application (see also response to 3FDEP-4). The EMB has issued a letter (see Attachment 3FDEP-8) that documents 18.09 saltwater credits have been reserved on FPL's behalf to offset unavoidable impacts to the wetlands associated with the Project. The EMB is located in the same drainage basin, adjacent to the Turkey Point plant site.

Maintenance activities and mitigation at the EMB are ongoing and described as follows. Mitigation activities on 4,223 acres of Phase I of the EMB were completed in 1997. Five years of monitoring has been completed and deemed "trending towards success" by the FDEP. A portion of the proposed mitigation credits for the Turkey Point Expansion Project will be drawn from Phase I which has a saltwater component consisting of mangrove shrub and mangrove tree island communities. The balance of credits will be drawn from Phase II of the EMB, which has a much larger, and more diverse saltwater component included within the boundaries of this phase of the Bank.

The tidally influenced portion of Phase II includes brackish high marsh dominated by Juncus-Distichlis grasses, shrub and dwarf mangrove flats, mangrove riverine systems, and coastal mangrove fringe. The goal of the EMB is to restore the 9,030 acres of Phase II to reasonably historic

conditions. This goal will be reached through placement of a conservation easement, exotic species eradication, replanting with appropriate native species, removal of physical features that currently block, impound or drain various physical components of Phase II, and utilize water presently lost as point source discharges to Card Sound to re-establish sheet flow across the EMB. In addition, habitat enhancements will be made to suitable areas of Phase II to encourage increased usage and recovery of several listed species including the American crocodile.

3FDEP Comment 9:

Recommended Specific Conditions:

() Initial mitigation of planting wetland plant species and hydrologic improvements shall occur within 30 days of completion of construction; at this time the permittee shall submit to the Department a baseline ("*time zero*") report. The report shall include details on the progress of the hydrologic improvements, a list of species planted, the number of individuals planted, and the date of the plantings. The report shall contain photographs, taken from referenced locations, to represent the entire site. Additionally, a drawing shall be included to show the location and direction of the camera. Subsequent monitoring reports shall be submitted quarterly, the first report being due 90 days after the baseline report. The quarterly reports shall include the number of plants surviving from the initial planting, additional seedlings planted, and explanations if survivorship is trending toward failure. The reports shall include photographs from the locations referenced in the baseline report.

() The mitigation site shall be successful when all of the following criteria have been continuously met for a period of at least two growing seasons (but no earlier than two years after the initial planting), without intervention I the form of irrigation, dewatering, removal of undesirable vegetation, or replanting of desirable vegetation:

(a) The percent cover of the mitigation wetland area exceeds 80 percent of the native wetland plants.
(b) Nuisance and exotic species are limited to 5 percent or less of the total cover.
(c) The desirable plants are reproducing naturally, either by normal, healthy vegetative spread, or through seedling establishment, growth and survival.
(d) The size distribution of the desirable species increases with time.

() the mitigation shall be determined successful when the above requirements of the permit have been met. The procedures for requesting a success determination and guidelines for the Department's response are provided herein.

(a) The permittee may notify the Department whenever the permittee believes the mitigation is successful, but in no event earlier than two years after the mitigation is implemented.
(b) The notice shall include a copy of the most recent Annual progress and Mitigation success Report and a narrative describing how the reported data support the contention that each of the mitigation criteria have been met. The permittee shall afford the Department personnel the opportunity to schedule and conduct an on-site inspection of the mitigation site to determine whether the criteria are met.
(c) Within 60 days of receipt of this notice, the Department shall notify the permittee by certified mail that the Department determined that one of the following:
    (1) That the mitigation has been successfully completed; or

(2) That the mitigation is not successful, identifying specifically those elements of the mitigation that do not meet the success criteria; or
(3) That the mitigation cannot be determined to be successful at this time, identifying specifically those elements of the mitigation that prevent it from determining whether the mitigation is successful.

(d) When the Department notifies the permittee that the mitigation is successful, or, if the Department fails to notify the permittee within the time period prescribed by this condition, then the permittee's mitigation obligation under the terms of the permit shall be deemed satisfied.

() The responsibility to determine if the mitigation is meeting the permit-specified success criteria shall not fall solely on the Department. An alternative mitigation plan must be submitted if 3 years after completion of planting, the mitigation site is not "clearly tending" towards attaining the success criteria. The plan shall be submitted within 60 days of a request from the Department or may be submitted at any time by the permittee. The permittee shall submit an alternative mitigation plan to the Department for review and approval according to the following:

(a) Contents of the alternative mitigation plan – The plan shall analyze why a particular mitigation site is not clearly trending towards success and propose actions which will ensure success. The permittee is on notice that the failure to meet a single success criterion will prevent the mitigation site from meeting the success criteria of this permit.
(b) Implementation schedule – As part of the alternative mitigation plan, the permittee shall propose a schedule for implementation and completion of all of the provisions of the alternative mitigation plan. Upon approval, the permittee shall implement the contingency plan pursuant to the approved schedule.

The permittee shall implement the approved plan within 60 days of Department approval of the alternative mitigation plan. The approved plan shall be made a part of this permit.

Narrative Progress Reports

Suggested Specific Conditions:

() Narrative progress reports should be submitted every 6 months indicating the status of the project. The cover page shall indicate the permit number, project name, and the permittee name. The first semi-annual progress report shall be submitted six months from the date of permit issuance, and reports shall continue to be submitted until all work authorized by the permit, including mitigation, has been completed. The report shall include the following information:

a. Date permitted activity was begun; if work has not begun on-site, please so indicate.
b. Brief description of extent of work (i.e., dredge, fill, monitoring, mitigation, management, maintenance) completed since the previous report or since the permit was issued. Show on copies of the permit drawings those areas where work has been completed.
c. Brief description and extent of work (i.e., dredge, fill, monitoring, mitigation, management, maintenance) anticipated in the next six months. Indicate on copies of the permit drawings those areas where it is anticipated that work will be done.
d. The progress of the permitted mitigation program. The reports shall include: photographs taken from the permanent stations, some of which must be in the vegetation sampling areas, a description of problems encountered and solutions undertaken, and anticipated work for the next six months.
e. This report shall include on the first page, just below the title, the certification of the following statement by the individual who supervised preparation of the report: "This report

represents a true and accurate description of the activities conducted during the six month period covered by this report."

Response 9: Comment acknowledged. FPL will review the recommended conditions of certification and work with the Southeast District Environmental Resources and Permitting Section as well as other affected agencies (e.g., Dade County Environmental Resource Management, U.S. Army Corps of Engineers) through the Site Certification process on the mitigation plan requirements for the Turkey Point Expansion Project. The goal is to have a consistent set of conditions on the mitigation plan that meets all applicable agency requirements.

3FDEP Comment 10: Dewatering:
Any dewatering will require a permit from the South Florida Water Management District.

Response 10: It is recognized that any dewatering activities will be subject to conditions of certification recommended by the South Florida Water Management District. Due to the Site Certification process, a separate permit will not be required.

3FDEP Comment 11: Erosion Controls:
It would be helpful to have figures depicting the location of the erosion control devices mentioned in Section E.

Response 11: The erosion control devices mentioned in Section E of SCA Appendix 10.1.4 are shown on SCA Figure 3.8-1, sheets 1 and 2. Additional devices (e.g., hay bales) will be field added, if and when they are determined to be necessary. More detailed discussion is presented in SCA Appendix 10.8.

4FDEP: Florida Department of Environmental Protection, Bureau of Air Regulation, Al Linero

4FDEP Comment 1: Please confirm whether the exhaust from the combined cycle units will actually be approximately 300 degrees F when firing fuel oil compared with 200 F when firing natural gas. This can affect the ambient modeling performed. With the low sulfur values for the fuel oil (and less sulfuric acid mist condensation), it would not seem necessary to waste the heat with the higher exhaust temperature. If the exhaust temperatures will indeed be lower, please submit updated modeling analyses.

Response: The Heat Recovery Steam Generator (HRSG) exhaust temperature of about 300 degrees Fahrenheit (°F) is accurate for ultra low sulfur light oil firing and the modeling submitted is valid. The HRSG design is optimized for natural gas firing, the primary fuel. When firing distillate oil, the stack temperature is naturally higher due to the higher mass flow and exhaust heat. For example, at a combustion turbine inlet temperature of 59 degrees and 60-percent relative humidity, light oil firing has an exhaust heat of 50 million British thermal units per hour (MMBtu/hr) higher than natural gas firing. In addition, the mass flow is about 4 percent higher. The HRSG supplier (Nooter-Erikson) for the Martin Expansion Project, a similar 4-on-1 combined cycle unit also firing oil, confirmed that the HRSG exhaust temperature when firing oil is a result of the design optimization for natural gas and differences between exhaust heat and mass flow. Together, this produces a temperature difference of about 130°F between natural gas and light oil firing. Operational optimization can only change this difference by a few degrees. There is no operational adjustment that can be done regarding sulfuric acid mist condensation.

4FDEP Comment 2: Please clarify that there will not be operation in simple cycle. For reference one citation is Section 1 of 2, F2 Page 21, showing SC – 42 ppm NO_x for oil. Please double check whether the 15 ppm references are for simple cycle peaking and steam augmentation or for oil firing under combined cycle.

Response 2: Simple cycle was inadvertently indicated on Section 1 of 2, F2 Page 21 of the application forms, showing 42 ppm NO_x for oil firing mode. Simple cycle operation will not be an operating mode for Units 5A through 5D. Additionally, Allowable Emissions 3 of 3 indicating 15 ppm is also for simple cycle peaking and should have been removed from the application form. A revised Section 1 of 2, F2 Page 21, page 4 of 7 is attached as a replacement page. The maximum NO_x concentration for all natural gas firing modes including peaking will be 2.5 parts per million by volume dry (ppmvd) corrected to 15-percent O_2 and 10 ppmvd corrected to 15-percent O_2 when firing light oil.

4FDEP Comment 3: Please double-check the estimated emissions in TPY. It looks like they were estimated assuming 4,880 hours at full load natural gas, 2,880 hours with duct burners, and 500 hours of oil firing. Are there 500 hours unaccounted for? Are the estimated emissions not affected by this?

Response 3: The 500 hours of light oil firing are accounted for in the maximum potential emission calculations. The estimated maximum potential annual emissions are summarized in SCA Appendix 10.1.5, Section 2, Table 2-4 and Table 2-6. Table 2-4 summarizes various operating scenarios to determine the maximum emissions on a pollutant-specific basis. The maximum PM/PM_{10}, NO_x, VOC, HAPs, and lead emissions occur with 5,380 hours at full load natural gas, 2,880 hours with duct firing, and 500 hours of light oil firing. The maximum SO_2 and SAM emissions occur with 5,480 hours at full load, 2,880 hours with duct firing, and 400 hours of power augmentation. The maximum CO emissions occur at 5,380 hours at full load natural gas, 2,480 hours with duct firing, 400 hours with power augmentation, and 500 hours of oil firing. All maximum potential emissions are based on 8,760 hours of operation.

4FDEP Comment 4: General Electric (GE) advised in publication GER-4213 (discussed by DEP with FPL when permitting Martin and Manatee Projects) that they will provide a guarantee of 5 ppm for CO emissions on a case-by-case basis to avoid installation of oxidation catalyst. Our own data from numerous installations confirm low emissions on the order of 0.5 to 2.0 ppm. The ten year old Martin Power Plant GE combustion turbines also exhibit very low CO emissions. Please justify the higher values requested in light of GE's claims and the actual performance of the new GE 7FA units throughout the state. We will also need more information to justify the higher values requested for other modes. Perhaps GE now has more information on NO_x emissions for those modes.

Response 4: Based on FDEP's comment, FPL has discussed the CO guarantee with GE and GE has agreed to supply a gas-fired CO emission guarantee of 5 ppmvd. FPL is willing to accept an emission limit of 5 ppmvd for the CT when firing natural gas at base load conditions.

Based on the CO guarantee of 5 ppmvd when firing natural gas and applying the previously submitted concentrations of 15 and 20 ppmvd during power augmentation and light oil firing, respectively, the Best Available Control Technology (BACT) cost effectiveness of adding an oxidation catalyst was recalculated. Based on the Project-specific design data, the estimated cost effectiveness is over $6,800 per ton of CO removed. See attached Tables B-8a, B-9a, and B-11a. This estimation is in the same range of GE's calculated cost effectiveness of greater than $8,000 per ton of CO for natural gas firing with a base CO emission concentration of 5 ppmvd or less (GE Publication GER-4213). The slight difference is associated with higher Project CO concentrations associated with fuel oil and power augmentation firing modes. It should be noted that the actual CO emissions would likely be

less than 1 ppmvd during normal operation. Therefore, the actual cost effectiveness would likely be greater than $25,000 per ton of CO removed.

GE was also contacted regarding the NO_x emissions for peak operation and power augmentation. While there is considerable information on base load operation, GE does not have the same data for NOx emissions related to these modes and the NO_x emissions provided in the application are the current GE performance estimates. For peak firing, there is an increase in the turbine firing temperature over base load operation. The result is higher thermal NO_x production and an incremental increase in NO_x generation over base load. This is reflected in the performance provided for peak operation on gas fuel.

For power augmentation, the introduction of steam in the lean burning DLN combustion systems has a destabilizing effect on the combustion process. To maintain combustion stability, the system must be retuned during operation with steam injection to maintain combustion stability. The system is retuned to create rich spots that act as pilot areas for the rest of the combustor, thus providing the required stability. The retuning balances combustion stability with NO_x production. The performance reflects the increase in thermal NO_x over dry DLN operation on gas fuel.

4FDEP Comment 5: The most stringent nitrogen oxides limits nationwide for combined cycle power plant permits are now approximately 1.5 to 2.0 ppm averaged over a period of one hour. Please submit an analysis of the costs to achieve such lower limits and averaging times. A few of these are at projects in which FPL Energy LLC is the owner or a partner so the data should be relatively easy to obtain.

Response 5: Review of the national combustion turbine spreadsheet maintained by EPA Region 4 staff indicates that the combined cycle Projects with NO_x limits lower than 2.5 are located in the Northeast and the California and Arizona non-attainment areas and, as such, would represent lowest achievable emission rate (LAER), not best available control technology (BACT). Nevertheless, a cost analysis has been performed to show the incremental cost effectiveness from 2.5 ppmvd to 2.0 and 1.5 ppmvd NO_x emissions. The incremental cost effectiveness to achieve 2.0 ppmvd NO_x from 2.5 ppmvd is estimated to be $4,430 per ton of NO_x removed. See attached Tables B-3b, B-4b, and B-6b. The incremental cost effectiveness to achieve 1.5 ppmvd NO_x from 2.5 ppmvd is estimated to be $6,350 per ton of NO_x removed. See attached Tables B-3c, B-4c and B-6c. The incremental NO_x reduction from 2.5 ppmvd to 2.0 and 1.5 ppmvd is estimated at 17.7 and 35.4 TPY, respectively. This range in annual NO_x emission reduction for gas firing would not have any meaningful environmental benefits. The air quality impacts for gas firing are below the PSD significant impact

and screening criteria thresholds. Moreover, this reduction is insignificant compared to the estimated 2005 total NO_x emissions of 81,030 TPY from all sources in the Miami-Dade County as reported in the FDEP Air Quality Maintenance Plan (2005–2015) Dade, Broward, and Palm Beach Counties report. Based on insignificant environmental gain in an area classified as attainment for all pollutants, the additional cost to reduce NO_x emissions lower than 2.5 ppmvd corrected to 15% O_2 are considered an unreasonable cost for the Project and considered unjustifiable because the control levels represent current LAER and not current BACT.

As mentioned in the comment, FPLE the non-regulated entity of FPL Group has several projects throughout the United States. For those projects with NOx emission limits at 2.5 ppmvd corrected to 15 percent oxygen and less, the limits were established as LAER as part of ozone non-attainment requirements, rather than BACT, as required for PSD review in attainment areas (see Table 4FDEP-5). In fact, the IDC Bellingham project, with a NOx emission limit of less than 2 ppmvd (corrected to 15 percent oxygen) as cited in the Department's comment, has been canceled. As stated in Appendix B of the Air Construction/PSD Permit Application (Appendix 10.1.5 of the SCA), LAER is a more stringent regulatory standard than BACT. Comparisons with Turkey Point Expansion Project are not necessarily appropriate given the difference in air quality requirements between non-attainment and attainment areas.

The proposed averaging time of 24-hour block average is appropriate given the compliance complexity with shorter averaging times and environmental significance of NO_x emissions. A shorter averaging time for compliance, such as a 3-hour average, adds unnecessary complexity in assessing compliance and reporting. For example, there would be 8 times more values for determining compliance with a 3-hour average compared to a 24-hour block average, with no benefit to the environment. Also, the environmental importance of NO_x emissions on the environment is related to longer averaging times (e.g., regional haze and ambient air quality standards).

4FDEP Comment 6: Comment on the ability of present monitors to measure very low NO_x emissions. For example, the Thermo Environmental 42CLS was specifically designed for turbines and has two default ranges: 0-2 ppm and 0-200 ppm, presumably to capture both startup and continuous NO_x emissions. According to their web site, the lower detectable limit for this analyzer is about 0.01 ppm with a one-minute average.

Response 6: FPL proposes to use continuous emission monitoring (CEM) equipment for the measurement of NO_x that performs at the levels of accuracy similar to the Thermo Environmental Company (TECO) 42CLS identified in the FDEP comment. FPL currently uses the TECO 42CLS

model in several of its Continuous Emission Monitoring Systems (CEMS). While published accuracy of these analyzers has shown detection limits of nearly 0.01 ppm, it is important to understand that these numbers were based on experience with calibration gases and laboratory conditions that are not normally experienced in the monitoring of flue gas from combustion turbines. A real concern by FPL and many in the utility industry and regulatory agencies is the measurement error and uncertainty at the low NO_x levels (2 ppm and below), which may be greater than the standard itself in the monitoring of emission units. FPL recognizes the accuracy of the analyzers can be well below the standard but also recognizes that the accuracy of the CEMS for emission units is significantly different. Beside the NO_x analyzer, the CEMS includes diluent monitor, sample nozzle, sample umbilical, calibration line, moisture removal system, and supporting equipment. These additional necessary components of the CEMS increase error into the system.

At the very low NO_x levels being monitored, there are several issues that may have a large impact on the accuracy of the systems being used to monitor emissions. The Electric Power Research Institute (EPRI) has studied low-level NO_x measurements and related compliance issues on gas fired combustion turbines in the Low Level NO_x Project. Several EPRI sponsored studies have revealed that measurement of NO_x at low levels can encounter interference from ammonia in flue gas which, in the presence of water and CO_2, will form NO. In several tests, they observed that all ammonia had converted while in the sample line and no ammonia was detected by the analyzers in the CEMS. This interference could impact readings by increasing NO_x values measured by the analyzer and erroneously indicating higher than actual NO_x emissions from the unit. An additional concern involves the accuracy of the systems as demonstrated by the calibration and RATA performance. While the majority of the analyzers have demonstrated acceptable performance under the Part 75 requirements, a review of their actual performance suggests that the measurement uncertainty and error is far greater at these low levels. Reviews of the span drift and bias tests under a Part 60 review of existing systems operating below 2 ppm found that 75 percent of them failed the bias test (<10 percent of standard) during a RATA while passing the more generous Part 75 requirements on bias (<5.5 ppm). The Part 75 requirement would allow a monitoring system to pass a bias test provided the results were 7 ppm (more than three times the standard) but fail under the more rigorous Part 60 requirements.

The implication is that there is a great deal of measurement uncertainty at these low limits when monitoring flue gas in industrial applications and that appropriate measurement averaging times are important in establishing appropriate emission limits.

4FDEP Comment 7: Submit copies of the accepted (or subsequently negotiated) bids to supply the SCR systems for Manatee Unit 3 and Martin Unit 8. Because they are current actual accepted bids for projects virtually identical to Turkey Point Unit 5, they might comprise the most accurate capital costs for such systems.

Response 7: The SCR system was not individually bid as part of either the Martin Unit 8 or Manatee Unit 3 Projects. The SCR system is part of the HRSG manufacturer's (Nooter-Ericksen) contract, and there are no separate costs for the SCR system identified in the contract. Nooter-Ericksen has indicated that the estimated costs for the SCR systems for the Martin and Manatee Project were $4,200,000 for four HRSG systems. This cost includes the SCR system (catalyst, frame, casing housing, AIG-skid, and piping) and erection. The costs do not include site preparation, foundations, ammonia storage tanks, controls, electrical, and indirect costs.

4FDEP Comment 8: Review the actual vendor analyses for the NO_x removal to show whether the oil case (from 42 ppm to 10 ppm) governs the size of the reactor or if it is the gas case (9 to 2.5 ppm) that governs the reactor size.

Response 8: Using the Martin Expansion Project design, the reactor size of the SCR system is designed for NO_x emissions of 2.5 ppmvd corrected to 15-percent oxygen when firing natural gas. Based on this reactor size, the lowest guaranteed NO_x emissions offered by the vendors when firing light oil is 10 ppmvd corrected to 15-percent oxygen.

4FDEP Comment 9: Please provide the annual projected fuel throughputs for Turkey Point Fossil Units 1 and 2 for each of the years 2004 through 2012. This projection should be based upon FPL's published 2003 RFP evaluation of its next planned generating unit (the 2007 capacity need of four combined cycle units on one steam generator at Turkey Point) as well as the "most likely" FPL Fossil Fuel Price and Natural Gas Availability Forecast issued in September 2003. The same forecasted annual load which was used to justify this capacity addition should also be used.

Response 9: The projected annual fuel utilization for Turkey Point Units 1 and 2 is presented in Table 4FDEP-9. The fuel utilization is based on heat input in MMBtu for natural gas and oil. These projections are based on FPL's Fossil Fuel Price and Natural Gas Availability Forecast (September 2003) and consistent with annual load forecasts in the 2003 RFP evaluation.

4FDEP Comment 10: Please discuss how natural gas use at Turkey Point Unit 5 is likely to impact natural gas availability for Turkey Point Units 1 and 2, as well as, the Port Everglades and Riviera Plants. For example, the new plant will use nearly twice as much natural gas compared with the amounts used by all of the existing units at the three plants combined in 2002. Please describe any planned or necessary upgrades to existing pipelines to convey additional natural gas supplies to Turkey Point

Response 10: Natural gas use at Turkey Point Unit 5 will not impact natural gas availability to the existing units at the Turkey Point, Port Everglades or Riviera plants. In fact, FPL's contractual rights to deliver natural gas to all of its facilities from the Florida Gas Transmission System (FGT) will remain unchanged with two exceptions. First, FPL's contractual rights to deliver natural gas into Dade and Broward Counties will increase. Second, FPL's contractual rights to deliver natural gas into the Turkey Point site will increase to accommodate the additional natural gas requirements of Turkey Point Unit 5. Additional compression will be added to the existing gas infrastructure near the Turkey Point site to meet the additional natural gas requirements of the proposed unit.

Gulfstream Natural Gas System's (Gulfstream) pipeline extension into FPL's Martin facility provides FPL with increased options for moving gas around its system and enhancing the natural gas availability to FPL's units downstream of the Martin North lateral. The extension of the Gulfstream pipeline into Martin will allow FPL to displace natural gas from the FGT system onto the Gulfstream system. This displacement will occur in two parts. First, when the Martin Unit 8 project is operational in June 2005, two existing combustion turbines that are currently served by FGT will move onto the Gulfstream system under a long-term firm contract. Second, the Gulfstream extension into Martin is capable of fueling the requirements of all of the remaining units at Martin. This will provide FPL with the flexibility, on a daily basis, to move additional gas onto the Gulfstream system at Martin. This flexibility allows FPL to maintain the existing natural gas availability to FPL's units south of Martin.

The natural gas availability to all of FPL's facilities will not be impacted by the operation of Turkey Point Unit 5. Therefore, FPL will continue to dispatch all fuels to maintain the reliability of its system, to meet environmental requirements and to provide economic benefit to its customers. Additionally, Turkey Point Unit 5 will provide a benefit on FPL's system through the displacement of less efficient, dual-fired generation. Turkey Point Unit 5 will displace less efficient generation at plants such as Turkey Point, Port Everglades and Riviera, resulting in lower capacity factors on these units and less residual fuel oil burn. The effect of this generation displacement is shown in projections provided in Table 4FDEP-9 for Turkey Point Unit 1 and 2.

4FDEP Comment 11: The project is located 21 kilometers from the Everglades National Park Class I Area and is adjacent to the Biscayne National Park (not a Class I area). Per the application some visibility impacts are projected from Unit 5 in the Class I Area even though the projected emissions from Unit 5 are only 191 tons per year (TPY) of SO_2 and 387 TPY of NO_x (assuming no change in

fuel use by Unit 1 and 2). Provide a description of the process by which the combination of meteorological and operational parameters can cause the visibility impacts projected.

Response 11: This comment addresses the issues of visibility impairment that can take the form of plume blight for nearby areas (i.e., distances within 50 km) and regional haze for long distances (i.e., distances beyond 50 km). Information is provided in the responses to 4FDEP-17 and 4FDEP-18.

4FDEP Comment 12: Discuss measures to mitigate the potentially greater actual impacts on visibility from potential decreased natural gas availability for Units 1 and 2. These units already emitted about 9,000 tons of SO_2 and 6,000 tons of NO_x in 2002 (per the EPA Acid Rain Website). For reference, the two existing units emit roughly two orders of magnitude more emissions (per unit of electricity produced) than the proposed new unit. The impact is greatest when the existing units use more residual fuel oil.

Response 12: As discussed in the response to 4FDEP-10, the operation of Turkey Point Unit 5 will not affect the availability of natural gas to Turkey Point Units 1 and 2. The projected operation of the Turkey Point Units 1 and 2 does not indicate an increase in annual NO_x or SO_2 emissions as a result of the operation of Turkey Point Unit 5. The average emissions for NO_x and SO_2 during the period 2000 through 2002 as reported in the EPA Acid Rain Database is 5,144 and 10,059 TPY, respectively. Using the projected fuel use contained in response to 4FDEP-9, the projected average emissions for NO_x and SO_2 during the period 2008 through 2012 is 2,196 and 5,733 TPY, respectively (see Tables 4FDEP-12a and -12b). This represents a projected emissions reduction in NO_x and SO_2 of 2,948 and 4,326 TPY, respectively. Such projected reductions from historical NO_x and SO_2 emissions would reduce the potential for visibility impacts in the Everglades National Park compared to historical emission levels.

In addition, in the early 1990s low NO_x burners (LNBs) were installed on Units 1 and 2 as reasonably achievable control technology (RACT). Maximum NO_x emissions rates prior to the installation of the LNBs were 0.78 and 0.56 lb/MMBtu for oil and gas firing, respectively, at baseload, steady-state conditions. The RACT NO_x emissions rates are 0.62 and 0.40 lb/MMBtu for oil and gas firing, respectively. At full load, the differential NO_x mass emission rates are 1,000 and 668 pounds per hour per unit lb/hr/unit for oil and gas firing, respectively. This difference is over 5 times the NO_x emissions resulting from the operation of Turkey Point Unit 5. Since these LNBs were installed after the NO_2 baseline date of February 8, 1988, the emission reductions effectively expand the PSD increment for NO_2 in the ENP and reduce the potential visibility impacts from baseline conditions.

4FDEP Comment 13: Has FPL evaluated the environmental benefit of utilizing two independent and reliable sources of natural gas rather than fuel oil as a backup? If so please include the analysis and conclusions thereof and any impacts on natural gas availability for Units and 2 and other plants in Southeast Florida.

Response 13: FPL has not evaluated the environmental benefit of an additional natural gas pipeline to the Turkey Point Plant site. The only viable alternative natural gas pipeline to the project is about 100 miles north of the Turkey Point Plant site. The environmental impacts associated with such a new natural gas pipeline to the Turkey Point Plant site would be significant. This would likely include hundreds of acres of wetland impacts. Such environmental impacts would seem inappropriate given the limited duration of use requested for the backup fuel, ultra low sulfur light oil (i.e., no more than 500 hours per year per CT).

In addition, the emissions resulting from the use of ultra low sulfur light oil will be extremely low, even when compared to natural gas. The sulfur content of this backup fuel at 0.0015 percent sulfur has the same equivalent sulfur content on a BTU basis as the average sulfur content in pipeline natural gas (i.e., 0.00077 lb sulfur per MMBTU). This backup fuel is also expected to have very low amounts of ash and fuel bound nitrogen with concomitant decreases in particulate matter and nitrogen oxides compared to the currently available backup fuel (i.e., 0.05 percent sulfur oil).

4FDEP Comment 14: Ammonia ultimately binds with nitrates and sulfates in the stack or in the environment to produce species that affect visibility. Please cite any reference in the application to a proposed ammonia standard for the purpose of PM control, proper operation of the SCR unit, visibility impact considerations, etc.?

Response 14: An ammonia emission standard was not proposed in the Air Construction/PSD Application for the purpose of PM control, SCR operation, or visibility impact considerations. An ammonia emission standard for Turkey Point Unit 5 will not have any environmental benefits regarding PM emissions or influence visibility impacts. The PM emissions resulting from the reaction of ammonia and other compounds in a combined cycle unit are a result of the reaction of sulfur trioxide (SO_3) and ammonia, forming ammonium sulfates. Nitrogen oxides (NO_x) are primarily comprised of nitrogen oxide (NO) with nitrogen dioxide (NO_2), a small component typically 10 percent or less. These species do not react with ammonia at stack temperatures and further atmospheric conversion is required for this reaction to take place. The additional PM emissions estimated for Turkey Point Unit 5 are limited by the amount of SO_3 formed and not the amount of ammonia. For example, ammonia slip from the SCR system operation is typically less than 5 parts per million by volume (ppmv) but still in the ppm range. In contrast, the SO_3

concentration estimated for the reaction with ammonia to form PM ranges from 0.1 to 0.13 ppm, which is at least an order of magnitude lower than ammonia concentrations. Therefore, ammonia concentrations in the exhaust gases will not influence PM emissions from the Project that can potentially influence visibility. For Turkey Point Unit 5, the additional PM (i.e., ammonium sulfate) formed ranged from 1.8 to 2.7 pounds per hour (lb/hr) and is shown in Table A-2 of Appendix A in the Air Construction/PSD Permit Application for natural gas firing at baseload. This additional PM is slightly greater than 20 percent of the total PM emitted. Similar calculations were performed for other loads and light oil to account for the reactions of ammonia.

In the environment, sulfur oxides and nitrogen oxides emitted form additional species that can react with ammonia to form ammonium salts. In the CALPUFF modeling, an ammonia background of 1 part per billion (ppb) was assumed. In contrast, the maximum predicted annual ammonia concentration in the Everglades National Park (ENP) is predicted to be less than 0.1 ppb from the Project.

4FDEP Comment 15: Based upon Table 2-6 of the application, the annual emission increase of NO_x associated with this project is 387 TPY. The Department notes that the average annual emissions of NO_x for the existing fossil units (as reported by FPL) during the past 2 years are over 4,600 TPY (~6,000 TPY per EPA Reports). This suggests that a reduction of approximately 8% in Units 1 and 2 compared to past actual emissions would allow the Unit 5 project to net out of a PSD review for NO_x (yielding no net NO_x increase). Additional cost-effective reductions could help ameliorate visibility in the Class I area. The Department is interested and supportive of efforts in this regard, should FPL have an interest in pursuing such a goal.

Response 15: Comment acknowledged. FPL is committed to providing reliable and cost effective electric energy while minimizing environmental impacts. Toward this goal, FPL has substantially decreased air emissions across the system over the last decade. Turkey Point Unit 5 will use the cleanest fuels and state-of-the-art pollution prevention/control technology to minimize impacts while producing electric power extremely efficiently. As presented in Response 4FDEP-12, the projected NO_x emissions for the period 2008 through 2012 are projected to decline by about 3,000 TPY or about 8 times the potential NO_x emissions from Turkey Point Unit 5.

In addition, as discussed in the Response to 4FDEP-12, Turkey Point Units 1 and 2 have been equipped with LNBs to reduce NO_x emissions. For the annual period of 2000 through 2002, the average NO_x emission rate for Turkey Point Units 1 and 2 was 0.32 lb/MMBtu based on information submitted to the EPA Acid Rain Database. This represents over a 30 percent reduction in NO_x emissions prior to the mid-1990s. Further NO_x reductions using pollution prevention combustion

technology would be difficult and uncertain for these units due to the compact furnace design. The heat release rate of these units is about 90 million British thermal units per hour per foot (MMBtu/hr/ft) of furnace volume, about twice the design heat release rate required to meet NO_x emission limits in NSPS Subpart Da for oil and gas firing (i.e., 0.2 lb NO_x/MMBtu for gas firing and 0.3 lb NO_x/MMBtu for oil firing).

4FDEP Comment 16: For CALMET processing, what meteorological stations were used for the surface and upper air data? Hourly Precipitation data?

Response 16: The meteorological stations used in the CALMET processing are presented in Sections C.5.5 through C.5.7 and listed in Tables C-4 and C-5 of the Air Permit Construction/PSD Application contained in Appendix 10.1.5 of the SCA. The surface and upper air stations are listed in Table C-4 while the precipitation stations are listed in Table C-5. It should be noted that one additional upper air station (Ft. Lauderdale) was used in processing the 1996 meteorological data.

4FDEP Comment 17: Within 50 km of the Everglades National Park, project impacts are expected to be above the 2.0 Screening Criteria Threshold for a VISCREEN model Level 2 case. Although these impacts were addressed in the application submitted, please provide further comment. Does the meteorology or stability class associated with impacts above 2.0 represent typical meteorology in the area? Are there any project specifications that can be altered to lower the predicted impacts?

Response 17: As stated in the Air Construction/PSD Application in SCA Appendix 10.1.5, the Project's impacts when firing natural gas are predicted to be less than the Screening Criteria Threshold values used to address PSD Class I visibility impacts within 50 km. For light oil firing, the Project values of Delta E and contrast were also predicted to be less than the Screening Criteria Thresholds of 0.05 and 2.0, respectively, in directions to the southwest of the Project. However, in directions to the west, the predicted Project values were less than the contrast screening criteria of 0.05 but slightly greater than the Delta E screening criteria of 2.0. These impacts are based on four combustion turbines operating simultaneously at baseload conditions at an ambient temperature of 35°F using the maximum hourly average PM and NO_x emissions for this operating scenario. It should be noted that the combustion turbines will be limited to firing oil for 500 hours or less per year.

The meteorological conditions when the Delta E screening criteria exceed 2.0 are infrequent. The stability conditions associated with the impacts above the 2.0 percent criteria are moderately to slightly stable with light windspeeds averaging about 5 miles per hour (mph) (see Table 7-5, SCA Appendix 10.1.5). For visibility impacts predicted above the 2.0 percent screening criteria that could

transport the Project's plume to the west toward the ENP (i.e., easterly winds), the frequency of stable stability and light windspeeds occurring is about 1 percent in a year. Since this is a relatively low frequency of meteorological conditions, these conditions would not be considered typical. Because the Project is located along the coast, more typical meteorology of the area would be represented by neutral stability conditions with moderate to high windspeeds averaging more than 10 mph.

It is highly unlikely that light oil will occur with the worst-case meteorology to produce impacts greater than the screening criteria in the ENP. Light oil firing will be used only for backup and will be limited by permit to no more than 500 hours per year (5.7 percent of the time). Assuming 500 hours per year operation on light oil, the probability of having corresponding worst-case meteorology is only 0.11 percent or less than 10 hours per year. In reality, light oil will only likely be used if natural gas supply is disrupted. This has only occurred in Florida once over the last 10 years for a period of about 3 days. This probability of occurrence is 0.08 percent. When combined with the probability of worst-case meteorology, the likely occurrence of exceeding the screening threshold is less than 0.002 percent or about once every 50 years.

4FDEP Comment 18: Beyond 50 km of the Everglades National Park, project impacts are expected to be above the Visibility Impairment % threshold of 5% on 4 days in the years modeled. Please provide further comment. What were the specific meteorological parameters seen on these days. Are there any project specifications that can be altered to lower the predicted impacts?

Response 18: The proposed Project's maximum impact on visibility for regional haze using the CALPUFF model is predicted to be 4.02 percent at the ENP for the combined cycle operation on natural gas (see Table 7-7, SCA Appendix 10.1.5). This value is below the Federal Land Manager's (FLM) 24-hour average screening threshold of 5-percent change.

When firing light oil, the Project's maximum impacts on visibility were predicted to be above the 5-percent threshold for the following four 24-hour periods:

- 7.10 percent on November 2, 1996;
- 6.39 percent on February 11, 1996;
- 5.26 percent on July 22, 1992; and
- 5.01 percent on December 24, 1990.

Thus, the number of periods predicted to be greater than the visibility change threshold, averaged about 1 day per year over the 3-year period modeled.

The four 24-hour periods were based on maximum hourly emissions operating at baseload conditions, firing light oil, and a turbine inlet temperature of 35°F. It should be noted that the maximum hourly NO_x emission rate for the Project of 318 lb/hr for four CTs used in the modeling for oil firing is higher than if the annual emission rate was prorated to an effective hourly rate in lb/hr (i.e., about 280 lb/hr for four CTs). For firing light oil, the baseload operating condition was assumed to occur for every hour in the year, even though the Project is seeking approval to fire light oil for no more than 21 days per year or 5.7 percent of the time.

In general, the maximum visibility impacts are predicted to occur at 50 km from Unit 5, at receptors located along the eastern boundary of the Class I area. The distance of 50 km is the closest distance at which visibility impacts for regional haze were modeled (based on the FLM guidance of using the CALPUFF model). However, the maximum visibility impact of 7.1 percent was predicted to occur about 120 km from Unit 5, at a receptor located on the northwestern boundary of the Class I area. This impact was predicted on November 2, 1996, when a cold front was passing over south Florida during the middle of the day. There was no precipitation reported from the weather stations used in the analysis.

The transport winds estimated every third hour for this period (i.e., November 2, 1996) are shown in Attachment 4FDEP-18-1. The direction of the arrow in the figures indicates the direction toward which the wind is blowing while the shading indicates the value of the wind speed (different color shading, shows different windspeeds). These winds are estimated at 120 meters (m) above the surface to represent the effective plume height for the Project. As shown in these figures, the wind directions over the Project site and ENP were generally light from the east in the morning hours and changed in the afternoon to the south then clockwise to northwest with moderate windspeeds. Based on the transport winds and predicted pollutant concentrations, the Project's visibility impacts were highest during the early morning hours when the winds were blowing from the east with very light windspeeds aloft. In fact, the surface windspeeds at the Miami International Airport were reported as calm for much of the morning.

Relative humidity is another important factor in estimating visibility impacts. In the CALPUFF model, a relative humidity factor is developed from the hourly relative humidity values and used to estimate visibility impacts. The higher the relative humidity and corresponding relative humidity factor, the higher the predicted visibility impact. The relative humidity factor at the receptor of maximum impact was high with a daily average value of 5.55. The relative humidity for the receptor

with the highest visibility impact was obtained from weather data reported at the Fort Myers Airport. By contrast, the daily average relative humidity factor for that day using hourly relative humidity values from Miami International Airport was about 3.4. As shown in Attachment 4FDEP-18-2 for hour 0700 for that day, there is a distinct change in relative humidity over the ENP. At the western portion of the park, relative humidity values from Fort Myers are used (indicated by the different color shading to the west of the park) while, for the remaining portions of the park, relative humidity values from Miami are used (indicated by the different color shading to the east of the park). This produces in the CALPUFF model a "relative humidity boundary" over several receptors located more than about 100 km from the Turkey Point Unit 5 location. Such a discontinuity would not likely occur and is an artifact of the meteorological data processing. It should be noted that the visibility impacts for the meteorological data processing portions of the park at which Miami relative humidity data are used were estimated to be less than a 4-percent change in visibility.

This predicted impact is unusual because of the location at which it was predicted (western boundary of the Class I area) and weather conditions which occurred during the day (high calculated relative humidity, low windspeeds).

As previously discussed, the other maximum visibility impacts above the 5-percent threshold were predicted along the eastern boundary of the Class I area with daily average relative humidity factors that varied from 2.68 to 4.05. For these periods, there was no precipitation reported from the nearest weather stations used in the analysis. The transport winds estimated every third hour for February 11, 1996; July 22, 1992; and December 24, 1990, are shown in Attachments 4FDEP-18-3 through 4FDEP-18-5, respectively.

For February 11, 1996, the visibility impacts were predicted during the early morning hours when the windspeeds aloft were light. During these hours, surface windspeeds at the Miami International Airport were reported as calm for much of the morning. For the remaining periods, most of the visibility impacts were predicted during the morning hours with light to moderate windspeeds.

As previously discussed, light oil firing will be used only for backup and will be limited by permit to no more than 500 hours per year (5.7 percent of the time). Assuming 500 hours per year operation on light oil, the probability of having corresponding worst-case meteorology is only 0.02 percent or about 1 day every 10 years. In reality, light oil will only likely be used if natural gas supply is disrupted. This has only occurred in Florida once over the last 10 years for about 3 days. This

probability of occurrence is 0.08 percent. When combined with the probability of worst-case meteorology, the likely occurrence of exceeding the visibility threshold is less than 0.0003 percent or about once every 900 years.

4FDEP Comment 19: Project impacts are above the Sulfur and Nitrogen Deposition Analysis Thresholds as well. Are there any project specifications that can be altered to lower the predicted impacts?

Response 19:

As discussed in Section 7.4.2 of the Air Construction/PSD Application (SCA Appendix 10.1.5), the soils in the ENP are well buffered and deposition from the operation of Turkey Point Unit 5 will have minimal effects. It should also be noted that the observed deposition of sulfur and nitrogen in the ENP, which is very low compared to the eastern United States, is many times (over 50) more than what Unit 5 would contribute at maximum potential emission rates. Turkey Point Unit 5 is using the latest pollution prevention and pollution control technology to minimize the emissions of SO_2 and NO_x. Natural gas and ultra low sulfur light oil have the lowest amounts of sulfur (S) available and will result in the lowest emissions of SO_2. A sulfur content of 2 grains S/100 scf of natural gas was used in the calculation of sulfur deposition. Natural gas is the primary fuel and primary basis for the predicted deposition in the ENP PSD Class I area. Sulfur in natural gas is a result of residual amount of hydrogen sulfide and methyl mercaptans; the latter is used as an odorant. A sulfur content of 2 grains S/100 scf was assumed to account for variability in sulfur content. However, the actual average sulfur content in Florida's pipeline natural gas is typically less than 1 grain S/100scf as reported by Florida Gas Transmission Company. The use of ultra low sulfur light oil (0.0015 percent) results in SO_2 emissions that are about three times lower than that firing natural gas assuming 2 grains S/100scf. This is the lowest sulfur specification for light oil possible. Therefore, the actual sulfur deposition will likely be below the screening thresholds.

As discussed in Response 4FDEP-5, the NO_x emission rates proposed for Turkey Point Unit 5 are considered best available control technology (BACT). Lower NO_x emissions rates to meet the screening thresholds are not practicable and have not been imposed as BACT.

4FDEP Comment 20: In Section 7.3.3, Impacts to Vegetation, all PSD pollutants for this project are addressed except for VOC. Does VOC effect vegetation, and if so, how will the predicted VOC emissions from the proposed project effect the vegetation in the area?

Response 20: There are no primary or secondary ambient air quality standards (AAQS) for VOCs. Secondary AAQS are promulgated to protect public welfare that includes impacts to vegetation. Therefore, ambient VOC concentrations are not considered to impact vegetation. VOC emissions are regulated based on the formation of ozone, which has a potential to affect vegetation when formed in the atmosphere. VOC and NO_x emissions are precursors to the formation of ozone. Ozone is not directly emitted from air pollution sources, but is formed down-wind from emission sources when VOC and NO_x emissions react in the presence of sunlight. Natural (without man-made sources) ambient concentrations of ozone are normally in the range of 20 to 39 $\mu g/m^3$ (0.01 to 0.02 ppm) (Heath, 1975).

Potential VOC emissions from the Project are 57 TPY or about 0.16 tons/day (TPD). This quantity is extremely small when compared to both other anthropogenic sources and natural sources of VOCs in Miami-Dade County. The total projected VOC emissions for Miami-Dade County for 2005 and 2015 are 419.6 and 402.9 TPD, respectively [Air Quality Maintenance Plan (2005-2015) Dade, Broward and Palm Beach Counties, FDEP, December 2002]. Of these amounts, mobile sources are projected to be about 23.4 percent or 98 TPD in 2005 and about 15.6 percent or 63 TPD in 2015. Natural sources, referred to as biogenic, are estimated to be 211.3 TPD for both 2005 and 2015.

There are a total of three monitoring locations in Miami-Dade County. The nearest monitor to the Project that measures ozone concentrations is located at Perdue (Monitor No. 025-0029). This station is operated by Miami-Dade County and measures concentrations according to EPA procedures. The trends in the 1-hour (since 1977) and 8-hour (since 1995) ozone concentrations are both decreasing. See Figures 7-17 and 7-18 of the Air Construction/PSD Application. Based on the ozone monitoring concentrations measured over the last several years in Miami-Dade County, the County is in attainment of the existing 1-hour ozone ambient air quality standard (AAQS) as well as the new 8-hour ozone AAQS. In addition, all ozone monitors in the three-county area of Dade, Broward, and Palm Beach area continue to be in compliance with the 1-hour ozone standard. As indicated in the FDEP Air Quality Maintenance Plan (2005–2015) for Dade, Broward, and Palm Beach Counties, the area has been consistently in compliance since 1990. The extremely small amount of VOC emissions from the Project would not have an effect on the formation of ozone in southern Florida.

The following paragraphs present the effects of ozone on vegetation. The effects of other PSD pollutants (e.g., SO_2, NO_2, etc.) were addressed in Section 7.3.3 of the Air Construction/PSD Permit Application (Appendix 10.1.5 of the SCA). In addition, since impacts to soils and wildlife are also

Air Quality Related Values (AQRVs) of the Everglades National Park (ENP), the effects of ozone on these AQRVs are addressed in this response.

Vegetation

Ozone can cause various damage to broad-leaved plants including: tissue collapse, interveinal necrosis and markings on the upper surface of leaves known as stippling (pigmented yellow, light tan, red brown, dark brown, red, or purple), flecking (silver or bleached straw white), mottling, chlorosis or bronzing, and bleaching. Ozone can also stunt plant growth and bud formation. On certain plants such as citrus, grape, and tobacco, it is common for leaves to wither and drop early.

Vegetative communities at the Turkey Point site and surrounding area consist primarily of mangrove. No ozone-sensitive species are found on the Project site or surrounding vicinity. Therefore, the effects of ozone on vegetation, as a result of VOC emissions from the Project, are expected to be insignificant.

Soils

The soils of the ENP are generally classified as histosols or entisols. Histosols (peat soils) are organic and have extremely high buffering capabilities based on their CEC, base saturation, and bulk density. Therefore, they would be relatively insensitive to atmospheric inputs. The entisols are shallow sandy soils overlying limestone, such as the soils found in the pinelands. 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 result in high alkalinity (as $CaCO_3$). The facility's contribution to ground level ozone is expected to be very low and dispersed over a large area. No impacts from ozone to soils at the Project and the surrounding vicinity are expected.

Wildlife

Although air pollution impacts to wildlife have been reported in literature, many of the incidents involve acute exposure to pollutants, usually caused by unusual or highly concentrated releases or unique weather conditions. Research with primates shows that ozone penetrates deeper into non-ciliated peripheral pathways and can cause lesions in the respiratory bronchioles and alveolar ducts as concentrations increases from 0.2 to 0.8 ppm (Paterson, 1997). These bronchioles are the most common site for severe damage. In rats, the Type 1 cells in the proximal alveoli (where gas exchange

occurs) were the primary site of action at concentrations between 0.5 and 0.9 ppm (Paterson, 1997). Work with rats and rabbits suggest that the mucus layer that lines the large airways does not protect completely against the effects of ozone, and desquamated cells were found from acute exposures at 0.25, 0.5, and 1.0 ppm. In animal research, ozone has been found to increase the susceptibility to bacterial pneumonia (Paterson, 1997). During the last decade, there also has been growing concern with the possibility that repeated or long-term exposure to elevated ozone concentrations may be causing or contributing to irreversible chronic lung injury.

The facility's contribution to ground-level ozone is expected to be very low and dispersed over a large area. Coupled with the historical ambient data and mobility of wildlife, the potential for exposure of wildlife to the facility's impacts that lead to high concentrations is extremely unlikely.

4FDEP Comment 21: We did not receive any comments from the National Park Service or EPA Region 4. We will pass these on if and when received. FPL was already interacting with the NPS with respect to modeling protocols and visibility issues. Either agency might submit comments during the sufficiency review or during the normal comment period.

Response 21: A comment letter was forwarded from the EPA Region IV, Mr. Gregg Worley, Chief, Air Permits Section. The responses to Mr. Worley's letter follow as Comments 4FDEP-21-1 through 4FDEP-21-3.

4FDEP Comment 21-1: The applicant proposed the use of good combustion practices as best available control technology (BACT) for CO and requested the following CO limits (page 4-2): 9 ppmvd while burning natural gas, 17 ppmvd while burning natural gas and duct firing, 22.6 ppmvd while burning natural gas and in high power mode with duct firing, and 20 ppmvd when burning fuel oil. However, Table 4-1 (page 4-16) of the application references the following CO limits: 7.3 ppmvd while burning natural gas, 10.2 ppmvd while burning natural gas and duct firing, 14.7 ppmvd while burning natural gas and in high power mode with duct firing, and 20 ppmvd when burning fuel oil. According to the vendor test data in Appendix B, the latter set of emission limits seem to be the correct ones.

Regardless of which set of emission limits are the correct ones, these CO limits are much higher than those recently seen as a result of BACT analyses throughout the country, including here in Region 4. For instance, we are seeing CO limits for both natural gas and fuel oil combustion in the low single digits (i.e., 2.0 ppmvd) in several recent permits in Georgia. According to the application, the CO emissions test data range from 0.0 ppmvd to 1.01 ppmvd when firing natural gas during load ranges from 50 to 100 percent. Irrespective of the exact control technology used, we would expect to see BACT CO limits near 2 ppmvd in the draft PSD permit for FPL Turkey Point.

Response 21-1: As presented in response to 4FDEP-4, FPL has discussed the CO guarantee with GE and GE has agreed to supply a gas-fired CO emission guarantee of 5 ppmvd, or 4.06 ppmvd

corrected to 15-percent oxygen, at baseload. GE's CO guarantee is meant to accommodate operating conditions at all permitted ambient conditions and has a small margin to account for measurement error and machine and fuel variations. FPL is willing to accept an emission limit of 5 ppmvd for the CT when operating on natural gas at baseload conditions. Good combustion practice is proposed as the BACT for CO and the requested CO limits are as follows: 5 ppmvd while burning natural gas, 17 ppmvd while burning natural gas and duct firing, 22.6 ppmvd while burning natural gas and in high power mode with duct firing, and 20 ppmvd when burning fuel oil. These limits are at stack oxygen conditions and are equivalent to the emissions limits identified in Table 4-1 on page 4-16, which are corrected to 15-percent oxygen. Appendix B of the application lists both the oxygen corrected and uncorrected ppmvd concentrations.

4FDEP Comment 21-2: Table 2-4 is a summary of the maximum potential annual emissions. In several of the scenarios, including the scenario generating maximum CO emissions, it is assumed that there will be a maximum of 400 hours/year of operation with power augmentation. In order for the BACT analysis to remain valid, this limit on power augmentation should be included as an enforceable requirement of the draft PSD permit. Additionally, any other underlying assumptions used in the BACT or air quality analyses, such as the 2,880 hours/year limit on duct burning, should also be included in the draft PSD permit. Finally, any operating limits (including the ones mentioned above) which were used in the analyses on a per CT basis should be included in the draft PSD permit on a per CT basis.

Response 21-2: FPL acknowledges that there will be enforceable PSD permit requirements based on the operating scenarios summarized in the permit application. However, because the four combined cycle units are identical with identical emission characteristics, the permitted operating limits for duct firing should be based on the aggregate fuel use of all four units [i.e., 5,702,400 MMBtu/yr (LHV) for duct firing on all 4 CTs]. Hourly operating limitations for light oil firing, power augmentation, and peak firing on a CT basis are acceptable to FPL. Such operating limitations as permit conditions would be identical to those issued for the FPL Martin and Manatee Projects.

4FDEP Comment 21-3: The applicant rejected catalytic oxidation as an economically infeasible control technology for reducing CO emissions from the CTs. According to the application, the resulting cost effectiveness was found to be $4,240/ton of CO removed. The annual operating costs included $214,193 for a heat rate penalty (0.2 percent of the megawatt (MW) output.) It is unclear if this value is based on a set dollar per kW of lost sales or based on the cost of additional natural gas to make up for the 0.2 percent loss in MW output. The applicant should provide a better explanation of how this number was calculated. Please note that we do not consider it appropriate to calculate a heat rate penalty based on lost sales. It should be calculated based on the cost of enough natural gas to make up for any loss in MW output. The annual heat rate penalty contributes $1,462/ton of CO removed to the total cost effectiveness. Consequently, any reduction in the heat rate penalty will make a significant difference in the cost effectiveness of catalytic oxidation. Finally, it should be

noted that catalytic oxidation has the added advantage of controlling VOC emissions, including volatile organic hazardous air pollutants.

Response 21-3: As indicated in the application, the oxidation catalyst annual operating costs included $214,193 for a heat rate penalty [0.2 percent of the megawatt (MW) output]. The heat rate penalty consists of the amount of additional fuel required to overcome the pressure drop and the cost of meeting electric demand from the incremental loss of electric power. For the latter, the energy lost would otherwise be available to meet demand in the FPL electric system. Since this electric energy is lost, FPL must make up the demand using other less efficient energy resources. This cost was estimated at $0.4/kW. The cost for additional fuel was estimated at $3/MMBtu based on the heat input (MMBtu/hr) basis. These costs were calculated as follows:

$$\text{Heat rate penalty} = 0.002(\text{MW})(\text{hour/yr})(\text{capacity factor})(1{,}000\ \text{kW/MW})(\$0.4/\text{kW}) + 0.002(\text{heat input})(\text{hour/yr})(\text{capacity factor})(\$3/\text{MMBtu})$$

$$\text{Heat rate penalty} == 0.002(172.44\ \text{MW})(8{,}760\ \text{hr/yr})(1)(1{,}000\ \text{kW/MW})(\$0.04/\text{kW}) + 0.002(1776\ \text{MMBtu/hr})(8{,}760\ \text{hr/yr})(1)(\$3/\text{MMBtu}) = \$214{,}193$$

As mentioned previously, FPL has discussed the CO guarantee with GE and GE has agreed to supply a gas fired CO emission guarantee of 5 ppmvd. A revised cost analysis has been performed based on the GE guarantee of 5 ppmvd (see discussion in response to 4FDEP-4). The resulting cost effectiveness is greater than $6,800 per ton of CO removed. In addition, based on expected actual CO emissions, the cost effectiveness will be likely be greater than $10,000 per ton of CO removed.

TABLES

Table 1FDEP-9. Turkey Point Unit 5 Waste Streams and Characterization

Waste Streams (Process Water Systems)	**Non Hazardous Basis for characterization**	**Hazardous Basis for characterization**	**Disposal Management Process**
Demineralized Water RO Reject	Based on analytical characterization of historical data		Disposed of as industrial wastewater into plants cooling canal system
Demineralization Wastewater	Based on analytical characterization of historical data		Disposed of by approved disposal contractor
Heat Recovery Steam Generator Blowdown	Based on analytical characterization of historical data		Disposed of as industrial wastewater into plants cooling canal system
Pretreatment Wastewater	Based on analytical characterization of historical data		Disposed of as industrial wastewater into plants cooling canal system
Cooling Tower Blowdown	Based on analytical characterization of historical data		Disposed of as industrial wastewater into plants cooling canal system
Cooling System Water (Biocide Addition Chlorine, scale inhibitor, pretreament chemicals	Based on analytical characterization by vendor supplying chemical		Disposed of as industrial wastewater into plants cooling canal system
Steam Cycle Water Treatment (hydrazine, ammonia, sodium phosphate)	Based on analytical characterization by historical data		Chemicals breakdown in steam cycle, any residual chemicals are disposed of by plant blowdown or boiler drain to plants cooling canal system
Heat Recovery and Steam Generator as well as pre boiler piping chemical cleaning	Based upon analytical waste stream characterization.	Based upon analytical waste stream characterization	If non hazardous will be disposed of by evaporative process on site. If hazardous, then disposed of by a licensed approved contractor
Miscellaneous Chemical Drains	Based on analytical characterization of historical data		Collected in plant sumps and disposed of by licensed contractor

Table 1FDEP-9. Turkey Point Unit 5 Waste Streams and Characterization

Waste Streams (Construction and Operations)	**Non Hazardous Basis for characterization**	**Hazardous Basis for characterization**	**Disposal Management Process**
Rags	As per EPA in 40 C.F.R. 279		Recycled via laundered by FDEP approved vendor or disposed of in land fill
Punctured aerosol Cans	As per EPA characterization letter		Disposed of by a approved scrap metal contractor
Captured paint residuals from punctured aerosol cans		Analytical data from waste characterization	As hazardous waste in accordance with 40 C.F.R Part 261
Xray Weld Testing			Process does not generate waste chemicals on site. Vendor is responsible for their waste generation.
Florescent Bulbs and Batteries		As per 40 C.F.R. 273 EPA determination	Recycled as universal waste
Oily Separated Waste Water	Based on analytical results		Separated water is routed to cooling canals. Oil is disposed of by a approved waste disposal contractor
Oily Solid Wastes	As per EPA in 40 C.F.R 279		Disposed of by a approved waste disposal contractor

Table B-8a. Direct and Indirect Capital Costs for CO Catalyst, GE Frame 7FA in Combined Cycle Combustion Turbine
(GE CO emission rate of 5 ppmvd)

Cost Component	Costs	Basis of Cost Component
Direct Capital Costs		
CO Associated Equipment	$627,009	Vendor Quote
Flue Gas Ductwork	$44,505	Vatavauk,1990
Instrumentation	$62,701	10% of SCR Associated Equipment
Sales Tax	$37,621	6% of SCR Associated Equipment/Catalyst
Freight	$31,350	5% of SCR Associated Equipment/Catalyst
Total Direct Capital Costs (TDCC)	$803,186	
Direct Installation Costs		
Foundation and supports	$64,255	8% of TDCC and RCC;OAQPS Cost Control Manual
Handling & Erection	$112,446	14% of TDCC and RCC;OAQPS Cost Control Manual
Electrical	$32,127	4% of TDCC and RCC;OAQPS Cost Control Manual
Piping	$16,064	2% of TDCC and RCC;OAQPS Cost Control Manual
Insulation for ductwork	$8,032	1% of TDCC and RCC;OAQPS Cost Control Manual
Painting	$8,032	1% of TDCC and RCC;OAQPS Cost Control Manual
Site Preparation	$5,000	Engineering Estimate
Buildings	$0	
Total Direct Installation Costs (TDIC)	$245,956	
Total Capital Costs	$1,049,142	Sum of TDCC, TDIC and RCC
Indirect Costs		
Engineering	$104,914	10% of Total Capital Costs; OAQPS Cost Control Manual
Construction and Field Expense	$52,457	5% of Total Capital Costs; OAQPS Cost Control Manual
Contractor Fees	$104,914	10% of Total Capital Costs; OAQPS Cost Control Manual
Start-up	$20,983	2% of Total Capital Costs; OAQPS Cost Control Manual
Performance Tests	$10,491	1% of Total Capital Costs; OAQPS Cost Control Manual
Contingencies	$31,474	3% of Total Capital Costs; OAQPS Cost Control Manual
Total Indirect Capital Cost (TInDC)	$325,234	
Total Direct, Indirect and Capital Costs (TDICC)	$1,374,376	Sum of TCC and TInCC

Table B-9a. Annualized Cost for CO Catalyst GE Frame 7FA in Combined Cycle Combustion Turbine
(GE CO emission rate of 5 ppmvd)

Cost Component	Cost	Basis of Cost Estimate
Diirect Annual Costs		
Operating Personnel	$6,240	8 hours/week at $15/hr
Supervision	$936	15% of Operating Personnel;OAQPS Cost Control Manual
Catalyst Replacement	$185,780	3 year catalyst life; base on Vendor Budget Quote
Inventory Cost	$24,668	Capital Recovery (10.98%) for 1/3 catalyst
Contingency	$6,529	3% of Direct Annual Costs
Total Direct Annual Costs (TDAC)	$224,154	
Energy Costs		
Heat Rate Penalty	$214,193	0.2% of MW output; EPA, 1993 (Page 6-20) and $3/mmBtu addl fuel costs
Total Energy Costs (TDEC)	$214,193	
Indirect Annual Costs		
Overhead	$4,306	60% of Operating/Supervision Labor
Property Taxes	$13,744	1% of Total Capital Costs
Insurance	$13,744	1% of Total Capital Costs
Annualized Total Direct Capital	$150,906	10.98% Capital Recovery Factor of 7% over 15 yrs times sum of TDICC
Total Indirect Annual Costs	$182,700	
Total Annualized Costs	$621,046	Sum of TDAC, TEC and TIAC
Cost Effectiveness	$6,816	per ton of CO Removed
	$7,961	per ton of Net Emission Reduction

Table B-11a. Maximum Potential Incremental Emissions (TPY) with Oxidation Catalyst

Pollutants	Incremental Emissions (tons/year) of SCR		
	Primary	Secondary	Total
Particulate	9.55	0.11	9.66
Sulfur Dioxide		0.04	0.04
Nitrogen Oxides	0.00	2.07	2.07
Carbon Monoxide	-91.1	1.24	-89.9
Volatile Organic Compounds		0.08	0.08
Total:	-81.6	3.56	-78.0
Carbon Dioxide (additional from gas firing)		1,970.6	1,970.6

Basis:

Lost Energy (mmBtu/year)	31,116
Secondary Emissions (lb/mmBtu): Assumes natural gas firing in NOx controlled steam unit.	
Particulate	0.0072
Sulfur Dioxide	0.0027
Nitrogen Oxides w/LNB	0.1333
Carbon Monoxide	0.0800
Volatile Organic Compounds	0.0052

Reference: Table 1.4-1 and 1.4-2, AP-42, Version 2/98

Table B-3b. Capital Cost for Selective Catalytic Reduction for the GE Frame 7FA Combined Cycle Combustion Turbine
(2.0 ppmvd corrected for gas firing)

Cost Component	Costs for SCR	Basis of Cost Component
Direct Capital Costs		
Pollution Control Equipment	$1,271,523	Vendor Estimates
Ammonia Storage Tank	$123,865	$35 per 1,000 lb mass flow developed from vendor quotes
Flue Gas Ductwork	$44,505	Vatavauk,1990
Instrumentation	$50,000	Additional NO_x Monitor and System
Taxes	$76,291	6% of SCR Associated Equipment and Catalyst
Freight	$63,576	5% of SCR Associated Equipment
Total Direct Capital Costs (TDCC)	$1,629,761	
Direct Installation Costs		
Foundation and supports	$130,381	8% of TDCC and RCC;OAQPS Cost Control Manual
Handling & Erection	$228,167	14% of TDCC and RCC;OAQPS Cost Control Manual
Electrical	$65,190	4% of TDCC and RCC;OAQPS Cost Control Manual
Piping	$32,595	2% of TDCC and RCC;OAQPS Cost Control Manual
Insulation for ductwork	$16,298	1% of TDCC and RCC;OAQPS Cost Control Manual
Painting	$16,298	1% of TDCC and RCC;OAQPS Cost Control Manual
Site Preparation	$5,000	Engineering Estimate
Buildings	$15,000	Engineering Estimate
Total Direct Installation Costs (TDIC)	$508,928	
Total Capital Costs (TCC)	$2,138,690	Sum of TDCC, TDIC and RCC
Indirect Costs		
Engineering	$162,976	10% of Total DirectCapital Costs; OAQPS Cost Control Manual
PSM/RMP Plan	$50,000	Engineering Estimate
Construction and Field Expense	$81,488	5% of TDCC; OAQPS Cost Control Manual
Contractor Fees	$162,976	10% of TDCC; OAQPS Cost Control Manual
Start-up	$32,595	2% of TDCC; OAQPS Cost Control Manual
Performance Tests	$16,298	1% of TDCC; OAQPS Cost Control Manual
Contingencies	$48,893	3% of TDCC; OAQPS Cost Control Manual
Total Indirect Capital Cost (TInCC)	$555,226	
Total Direct, Indirect and Capital Costs (TDICC)	$2,693,916	Sum of TCC and TInCC

Sources: Engelhard 2000. ABB Alstom 2000. EPA 1990, 1992 and 1996 (OAQPS Cost Control Manual). Golder 2000. Vatavuk 1990 (Estimating Costs of Air Pollution Control).

Table B-4b. Annualized Cost for Selective Catalytic Reduction for the GE Frame 7FA in Combined Cycle Operation
(2.0 ppmvd corrected for gas firing)

Cost Component	Costs for SCR	Basis of Cost Component
Direct Annual Costs		
Operating Personnel	$21,840	28 hours/week at $15/hr for SCR; SCONOx 2 times SCR costs
Supervision	$3,276	15% of Operating Personnel;OAQPS Cost Control Manual
Ammonia	$139,416	$580 per ton NH_3 based on 19% Aqueous NH_3
PSM/RMP Update	$15,000	Engineering Estimate
Inventory Cost	$4,654	Capital Recovery (10.98%) for 1/3 catalyst for SCR; SCONOx 1.5 times SCR
Catalyst Cost	$127,152	3 years catalyst life; Based on Vendor Budget Estimate
Contingency	$9,340	3% of Direct Annual Costs
Total Direct Annual Costs (TDAC)	$320,679	
Energy Costs		
Electrical	$28,032	80kW/h for SCR @ $0.04/kWh times Capacity Factor; 200 kW for SCONOx
MW Loss and Heat Rate Penalty	$406,966	0.36 % output for SCR; 0.6% for SCONOx; EPA, 1993
Steam Costs for SCONOx	$0	17,795 lb/hr 600 °F. 85 psig, steam (1,329 Btu/lb steam); 90% boiler eff.; $3/mmBtu
Natural Gas for SCONOx	$0	80 lb/hr: 0.044 lb/scf; 1,020 Btu/scf; $3/mmBtu
Total Energy Costs (TEC)	$434,998	
Indirect Annual Costs		
Overhead	98,719	60% of Operating/Supervision Labor and Ammonia
Property Taxes	26,939	1% of Total Capital Costs
Insurance	26,939	1% of Total Capital Costs
Annualized Total Direct Capital	295,792	10.98% Capital Recovery Factor of 7% over 15 years times sum of TDICC
Total Indirect Annual Costs (TIAC)	$448,390	
Total Annualized Costs	$1,204,066	Sum of TDAC, TEC and TIAC
Total Cost Effectiveness (9 to 2.0)	$3,791	per ton of NO_x Removed
Incremental Cost Effectiveness (2.5 to2.0)	$4,432	per incremental ton of NO_x Removed
	317.60	tons NOx removed /year; 2.0 ppmvd corrected to 15% oxygen

Source: Golder 2000. EPA 1993 (Alternative Control Techniques Document--NOx Emissions from Stationary Gas Turbines. Page 6-20)

Table B-6b. Maximum Potential Incremental Emissions (TPY) with Selective Catalytic Reduction (SCR) (2.0 ppm)

Pollutants	Incremental Emissions (tons/year) of SCR		
	Primary	Secondary	Total
Particulate	9.55	0.24	9.79
Sulfur Dioxide		0.09	0.09
Nitrogen Oxides	-317.60	4.42	-313.18
Carbon Monoxide		2.65	2.65
Volatile Organic Compounds		0.17	0.17
Ammonia	111.26		
Total:	-196.78	7.58	-189.20
Carbon Dioxide (all energy requirements)		4,201.36	4,201.36

Basis:	SCR	SCONOx™
Lost Energy (mmBtu/year)	66,337	132,674 total
Secondary Emissions (lb/mmBtu): Assumes natural gas firing in NOx controlled steam unit.		
Particulate	0.0072	
Sulfur Dioxide	0.0027	
Nitrogen Oxides w/LNB	0.1333	
Carbon Monoxide	0.0800	
Volatile Organic Compounds	0.0052	

(Note: Seconary emissions of criteria pollutants for SCONOx based on the total lost energy minus steam and natural gas since emissions of these pollutants will be controlled in the proposed unit. Emissions of CO2 will result for all uses.)

Reference: Table 1.4-1 and 1.4-2, AP-42, Version 2/98

Table B-3c. Capital Cost for Selective Catalytic Reduction for the GE Frame 7FA Combined Cycle Combustion Turbine (1.5 ppmvd corrected for gas firing)

Cost Component	Costs for SCR	Basis of Cost Component
Direct Capital Costs		
Pollution Control Equipment	$1,609,839	Vendor Estimates
Ammonia Storage Tank	$123,865	$35 per 1,000 lb mass flow developed from vendor quotes
Flue Gas Ductwork	$44,505	Vatavauk,1990
Instrumentation	$50,000	Additional NO_x Monitor and System
Taxes	$96,590	6% of SCR Associated Equipment and Catalyst
Freight	$80,492	5% of SCR Associated Equipment
Total Direct Capital Costs (TDCC)	$2,005,292	
Direct Installation Costs		
Foundation and supports	$160,423	8% of TDCC and RCC;OAQPS Cost Control Manual
Handling & Erection	$280,741	14% of TDCC and RCC;OAQPS Cost Control Manual
Electrical	$80,212	4% of TDCC and RCC;OAQPS Cost Control Manual
Piping	$40,106	2% of TDCC and RCC;OAQPS Cost Control Manual
Insulation for ductwork	$20,053	1% of TDCC and RCC;OAQPS Cost Control Manual
Painting	$20,053	1% of TDCC and RCC;OAQPS Cost Control Manual
Site Preparation	$5,000	Engineering Estimate
Buildings	$15,000	Engineering Estimate
Total Direct Installation Costs (TDIC)	$621,588	
Total Capital Costs (TCC)	$2,626,880	Sum of TDCC, TDIC and RCC
Indirect Costs		
Engineering	$200,529	10% of Total DirectCapital Costs; OAQPS Cost Control Manual
PSM/RMP Plan	$50,000	Engineering Estimate
Construction and Field Expense	$100,265	5% of TDCC; OAQPS Cost Control Manual
Contractor Fees	$200,529	10% of TDCC; OAQPS Cost Control Manual
Start-up	$40,106	2% of TDCC; OAQPS Cost Control Manual
Performance Tests	$20,053	1% of TDCC; OAQPS Cost Control Manual
Contingencies	$60,159	3% of TDCC; OAQPS Cost Control Manual
Total Indirect Capital Cost (TInCC)	$671,641	
Total Direct, Indirect and Capital Costs (TDICC)	$3,298,520	Sum of TCC and TInCC

Sources: Engelhard 2000. ABB Alstom 2000. EPA 1990, 1992 and 1996 (OAQPS Cost Control Manual). Golder 2000. Vatavuk 1990 (Estimating Costs of Air Pollution Control).

Table B-4c. Annualized Cost for Selective Catalytic Reduction for the GE Frame 7FA in Combined Cycle Operation
(1.5 ppmvd corrected for gas firing)

Cost Component	Costs for SCR	Basis of Cost Component
Direct Annual Costs		
Operating Personnel	$21,840	28 hours/week at $15/hr for SCR; SCONOx 2 times SCR costs
Supervision	$3,276	15% of Operating Personnel;OAQPS Cost Control Manual
Ammonia	$143,589	$580 per ton NH_3 based on 19% Aqueous NH_3
PSM/RMP Update	$15,000	Engineering Estimate
Inventory Cost	$6,323	Capital Recovery (10.98%) for 1/3 catalyst for SCR; SCONOx 1.5 times SCR
Catalyst Cost	$172,766	3 years catalyst life; Based on Vendor Budget Estimate
Contingency	$10,884	3% of Direct Annual Costs
Total Direct Annual Costs (TDAC)	$373,678	
Energy Costs		
Electrical	$28,032	80kW/h for SCR @ $0.04/kWh times Capacity Factor; 200 kW for SCONOx
MW Loss and Heat Rate Penalty	$419,308	0.36 % output for SCR; 0.6% for SCONOx; EPA, 1993
Steam Costs for SCONOx	$0	17,795 lb/hr 600 °F, 85 psig, steam (1,329 Btu/lb steam); 90% boiler eff.; $3/mmBtu
Natural Gas for SCONOx	$0	80 lb/hr; 0.044 lb/scf; 1,020 Btu/scf; $3/mmBtu
Total Energy Costs (TEC)	$447,340	
Indirect Annual Costs		
Overhead	101,223	60% of Operating/Supervision Labor and Ammonia
Property Taxes	32,985	1% of Total Capital Costs
Insurance	32,985	1% of Total Capital Costs
Annualized Total Direct Capital	362,178	10.98% Capital Recovery Factor of 7% over 15 years times sum of TDICC
Total Indirect Annual Costs (TIAC)	$529,371	
Total Annualized Costs	$1,350,389	Sum of TDAC, TEC and TIAC
Total Cost Effectiveness (9 to 1.5)	$4,027	per ton of NO_x Removed
Incremental Cost Effectiveness (2.5 to1.5)	$6,350	per incremental ton of NO_x Removed
	335.30	tons NOx removed /year; 2.0 ppmvd corrected to 15% oxygen

Source: Golder 2000. EPA 1993 (Alternative Control Techniques Document--NOx Emissions from Stationary Gas Turbines, Page 6-20)

Table B-6c. Maximum Potential Incremental Emissions (TPY) with Selective Catalytic Reduction (SCR) (1.5 ppm)

Pollutants	Incremental Emissions (TPY) of SCR		
	Primary	Secondary	Total
Particulate	9.55	0.25	9.80
Sulfur Dioxide		0.09	0.09
Nitrogen Oxides	-335.30	4.54	-330.75
Carbon Monoxide		2.73	2.73
Volatile Organic Compounds		0.18	0.18
Ammonia	111.26		
Total:	-214.48	7.78	-206.70
Carbon Dioxide (all energy requirements)		4,314.91	4,314.91

Basis:	SCR	SCONOx™
Lost Energy (mmBtu/year)	68,130	390,069 total
Secondary Emissions (lb/mmBtu): Assumes natural gas firing in NO_x controlled steam unit.		
Particulate	0.0072	
Sulfur Dioxide	0.0027	
Nitrogen Oxides w/LNB	0.1333	
Carbon Monoxide	0.0800	
Volatile Organic Compounds	0.0052	

(Note: Seconary emissions of criteria pollutants for $SCONO_x$ based on the total lost energy minus steam and natural gas since emissions of these pollutants will be controlled in the proposed unit. Emissions of CO_2 will result for all uses.)

Reference: Table 1.4-1 and 1.4-2, AP-42, Version 2/98

Table 4FDEP-5. Summary of NO_x Emission Limits for FPLE Projects

Facility	NOx level	Basis of NOx emission level	Project Status	Oil Backup?	CT Type
IDC Bellingham	<2.0 ppmvd	LAER	Project cancelled	No	GE 7FA
Bellingham	25 ppm gas 42 ppm oil	LAER	In operation	Yes	Westinghouse 501D5
Sayreville	25ppmvd	LAER	In operation	No	Westinghouse 501D5
Tesla*	2 ppmvd	LAER	Pending	No	GE 7FA
Bastrop	9 ppmvd	BACT	In operation	No	GE 7FA
Forney	9 ppmvd	BACT	In operation	No	GE 7FA
Lamar	9 ppmvd	BACT	In operation	No	GE 7FA
RISEC	2.0 ppmvd	LAER	In operation	No	Westinghouse 501F
Blythe	2.5 ppmvd	LAER	In operation	No	Siemens V84.3A

LAER = Lowest Achievable Emission Rate
BACT = Best Available Control Technology
* Will not likely be constructed under current market conditions.

Table 4FDEP-9. Projected Annual Fuel Heat Input (1,000 MMBtu) for Turkey Point Units 1 and 2

	2004	2005	2006	2007	2008	2009	2010	2011	2012
Oil									
Unit 1	8,311	9,435	8,703	7,966	3,815	2,928	4,791	4,850	4,846
Unit 2	8,940	9,044	9,211	9,481	5,131	4,893	6,561	6,611	6,996
Total	17,251	18,479	17,914	17,447	8,946	7,821	11,352	11,461	11,842
Gas									
Unit 1	2,502	2,222	2,186	1,550	1,170	1,084	1,303	1,260	1,147
Unit 2	2,619	2,630	2,315	1,782	1,326	1,322	1,421	1,354	1,318
Total	5,121	4,852	4,501	3,332	2,496	2,406	2,724	2,614	2,465
Total Units 1 and 2	22,372	23,331	22,415	20,779	11,442	10,227	14,076	14,075	14,307

Source: FPL, 2004

Table 4FDEP-12a. Projected Annual NO_x Emissions for Turkey Point Units 1 and 2

	2004	2005	2006	2007	2008	2009	2010	2011	2012
Oil									
Unit 1	1,479.9	1,680.0	1,549.7	1,418.5	679.3	521.4	853.1	863.6	862.9
Unit 2	1,591.9	1,610.4	1,640.2	1,688.2	913.7	871.3	1,168.3	1,177.2	1,245.7
Total	3,072	3,290	3,190	3,107	1,593	1,393	2,021	2,041	2,109
Gas									
Unit 1	359.3	319.1	313.9	222.6	168.0	155.7	187.1	180.9	164.7
Unit 2	376.1	377.7	332.4	255.9	190.4	189.8	204.1	194.4	189.3
Total	735	697	646	478	358	346	391	375	354
Total Units 1 and 2	3,807	3,987	3,836	3,585	1,951	1,738	2,413	2,416	2,463

Note: NO_x emissions based on allocating reported Acid Rain CEM emission rates based on historical fuel usage (i.e., gas and oil) for 2000 through 2002 and the differential NOx emission rates based on RACT emission requirements.

Average NO_x Emissions: 0.36 lb/MMBtu for oil-firing
0.29 lb/MMBtu for gas-firing

Average 2008-2012: 2,196

Table 4FDEP-12b. Projected Annual SO_2 Emissions for Turkey Point Units 1 and 2

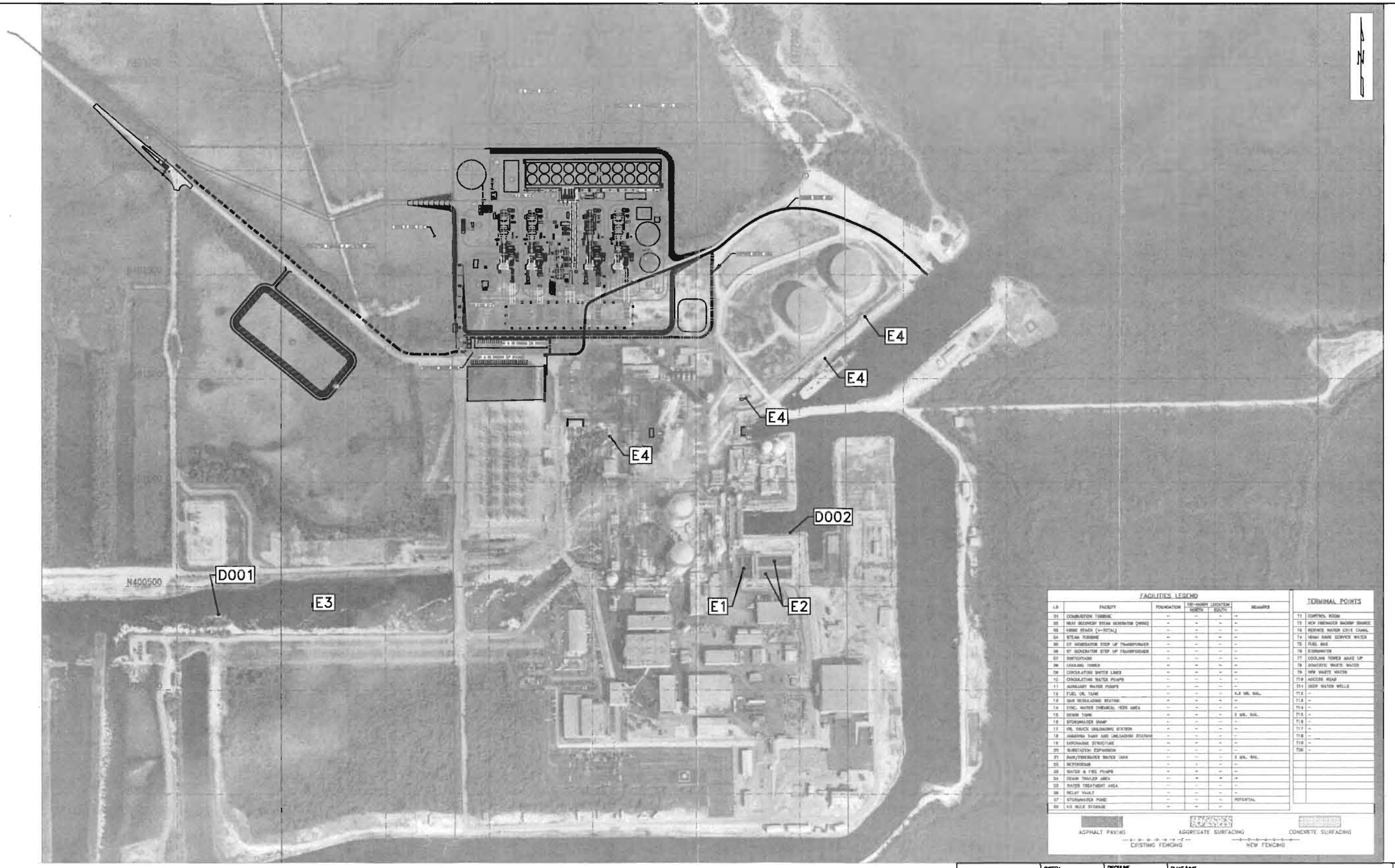
	2004	2005	2006	2007	2008	2009	2010	2011	2012
Oil									
Unit 1	4,571.1	5,189.3	4,786.7	4,381.3	2,098.3	1,610.4	2,635.1	2,667.5	2,665.3
Unit 2	4,917.0	4,974.2	5,066.1	5,214.6	2,822.1	2,691.2	3,608.6	3,636.1	3,847.8
Total	9,488	10,163	9,853	9,596	4,920	4,302	6,244	6,304	6,513
Gas									
Unit 1	75.1	66.7	65.6	46.5	35.1	32.5	39.1	37.8	34.4
Unit 2	78.6	78.9	69.5	53.5	39.8	39.7	42.6	40.6	39.5
Total	154	146	135	100	75	72	82	78	74
Total Units 1 and 2	9,642	10,309	9,988	9,696	4,995	4,374	6,325	6,382	6,587

Note: SO_2 emissions based on 1% sulfur fuel and typical natural gas sulfur content.

SO_2 Emissions: 1.1 lb/MMBtu for oil-firing
0.06 lb/MMBtu for gas-firing

Average 2008-2012: 5,733

FIGURES



E1 – NEUTRALIZATION BASIN B1
E2 – SOLIDS SETTLING BASINS B2 & B3
E3 – COOLING CANAL (LAKE WARREN)
E4 – EXISTING OIL/WATER SEPARATORS
D001 – EXISTING OUTFALL
D002 – EXISTING OUTFALL

REV	DATE	REVISION DESCRIPTION	BY	CH	COR	APR	ORG
1	01/21/04	Response to Sufficiency Question 2FDEP-1	GMG			TDJ	PGBL

FPL

SYSTEM: N/A	DISCIPLINE: CS	PLANT/UNIT: TURKEY POINT
SCALE: 1"=200'	CAD FILE NAME: 2FDEP-1.DWG	TITLE: EXPANSION PROJECT AERIAL DERIVED DEVELOPMENT PLAN
DRAWING SIZE: D(24"X36")	FPL ARCHIVE NAME: N/A	
DRAWING NUMBER: Figure 2FDEP-1	SHEET: 1 OF 1	REV: 1

BAR CODE

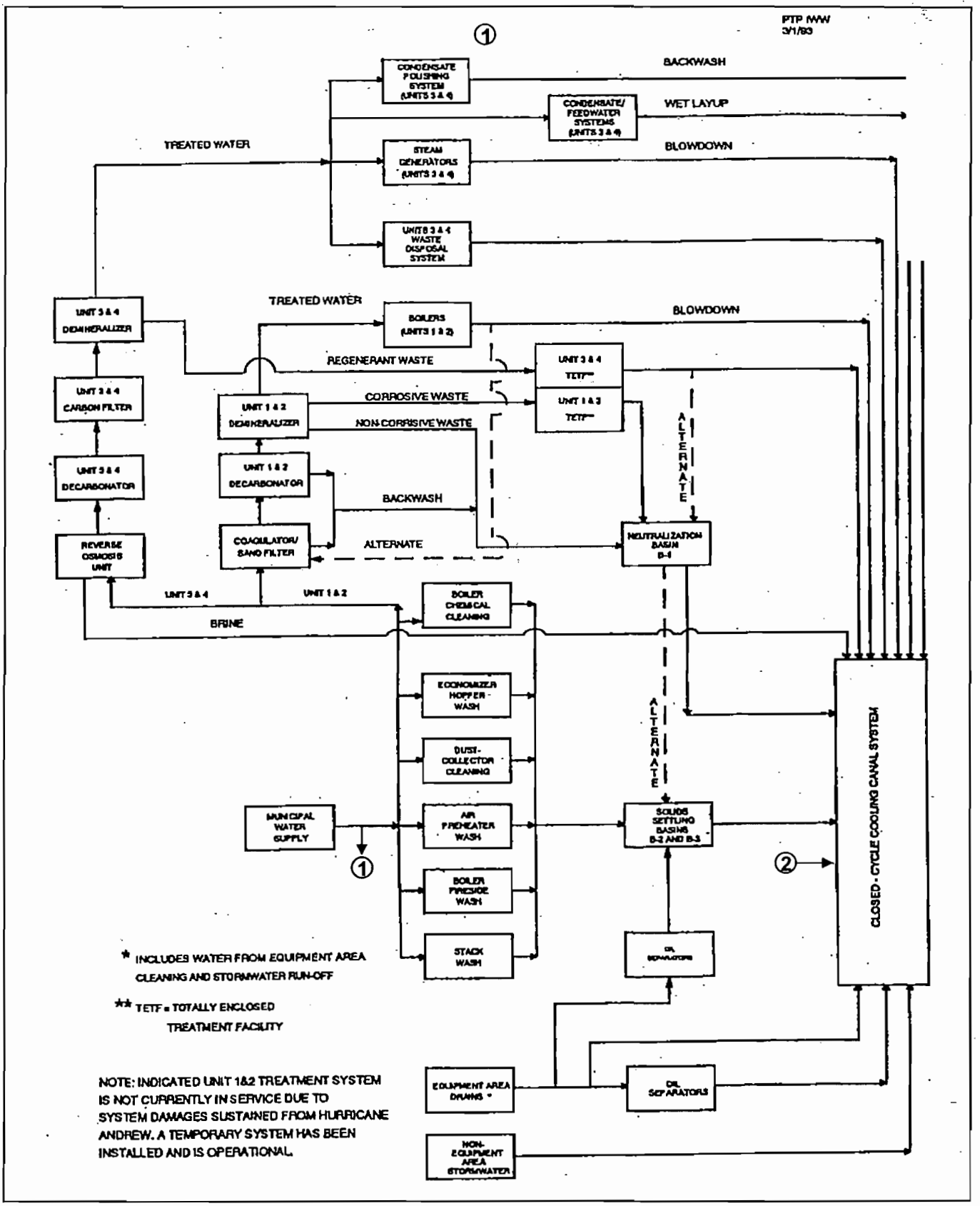


Figure 2FDEP-2
Waste Flow Diagram

①/② See replacement pages for Figures 3.5-1 and 3.5-2.

Source: FPL, 1993; Golder, 2004.

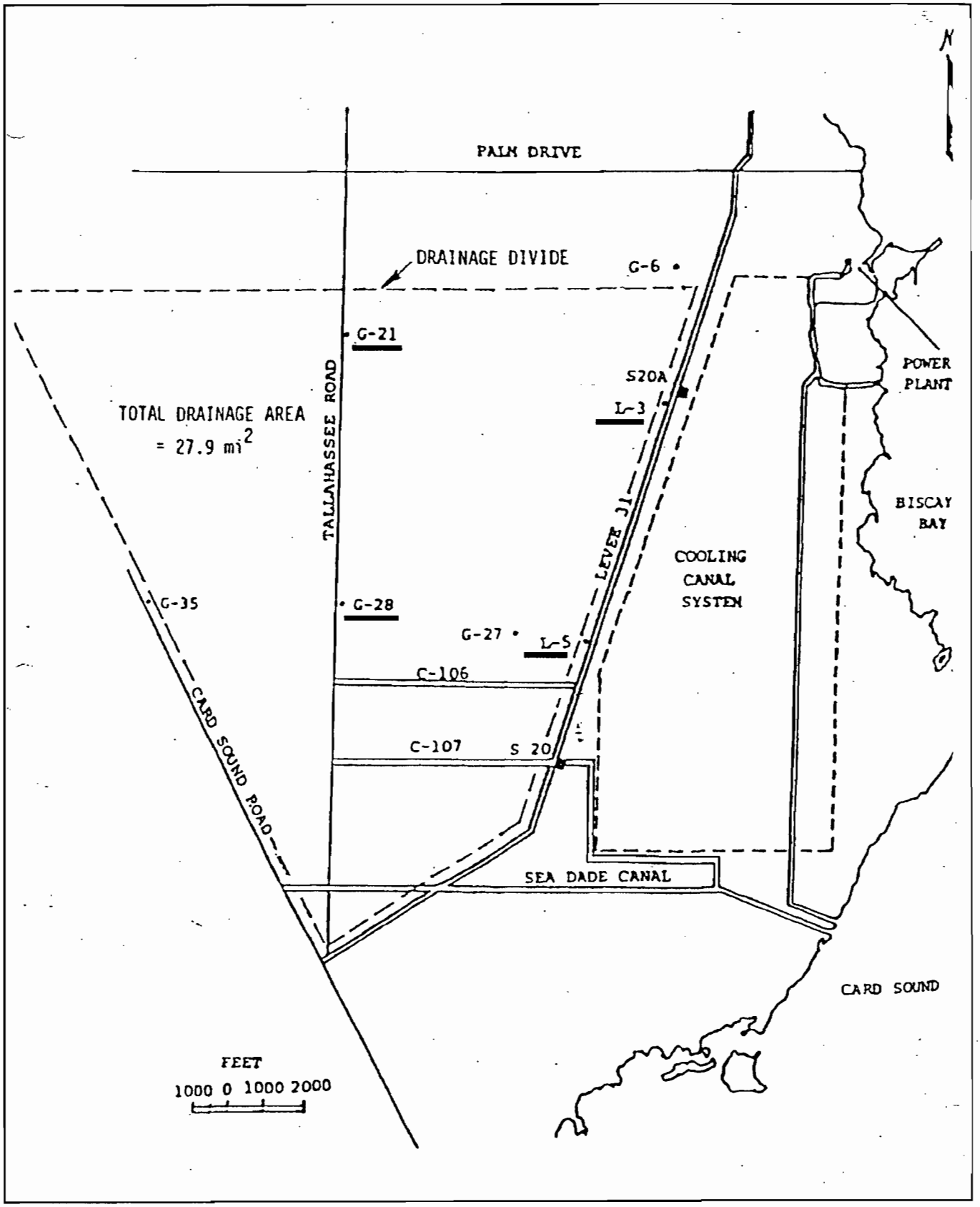


Figure 2FDEP-6a
Monitor Well Locations

Source: SFWMD, 1983.

FPL

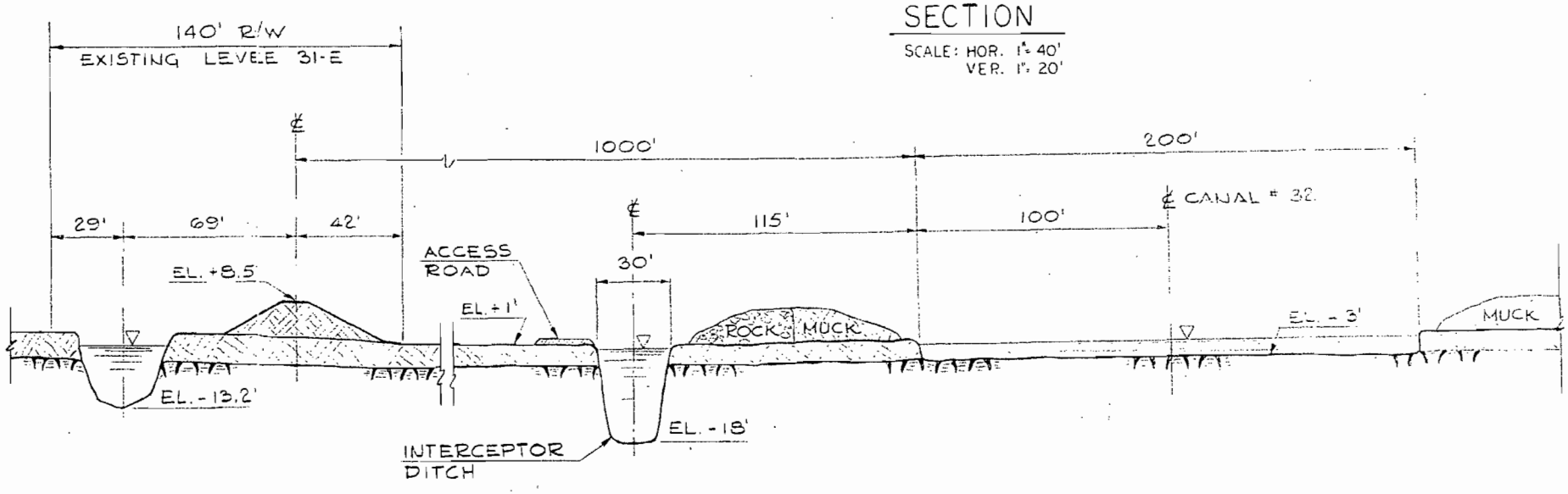


Figure 2FDEP-6b
Typical Lateral Cross-Section of the L-31E, Interceptor Ditch, and Westernmost Cooling Canal

Source: Bechtel Corporation, 1972.

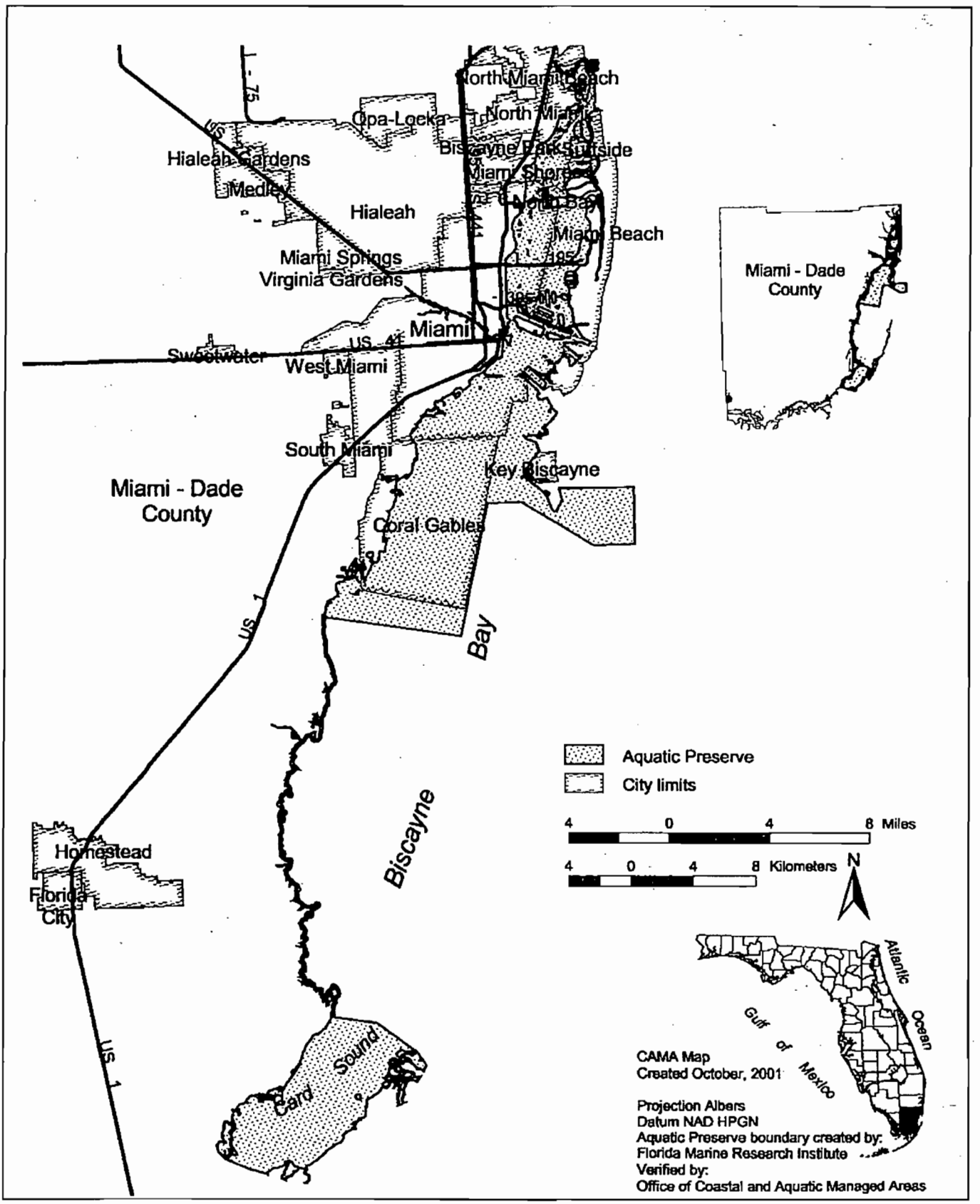


Figure 2FDEP-7(a)-1
Biscayne Bay Aquatic Preserve

Source: FMRI, 2001.

FPL

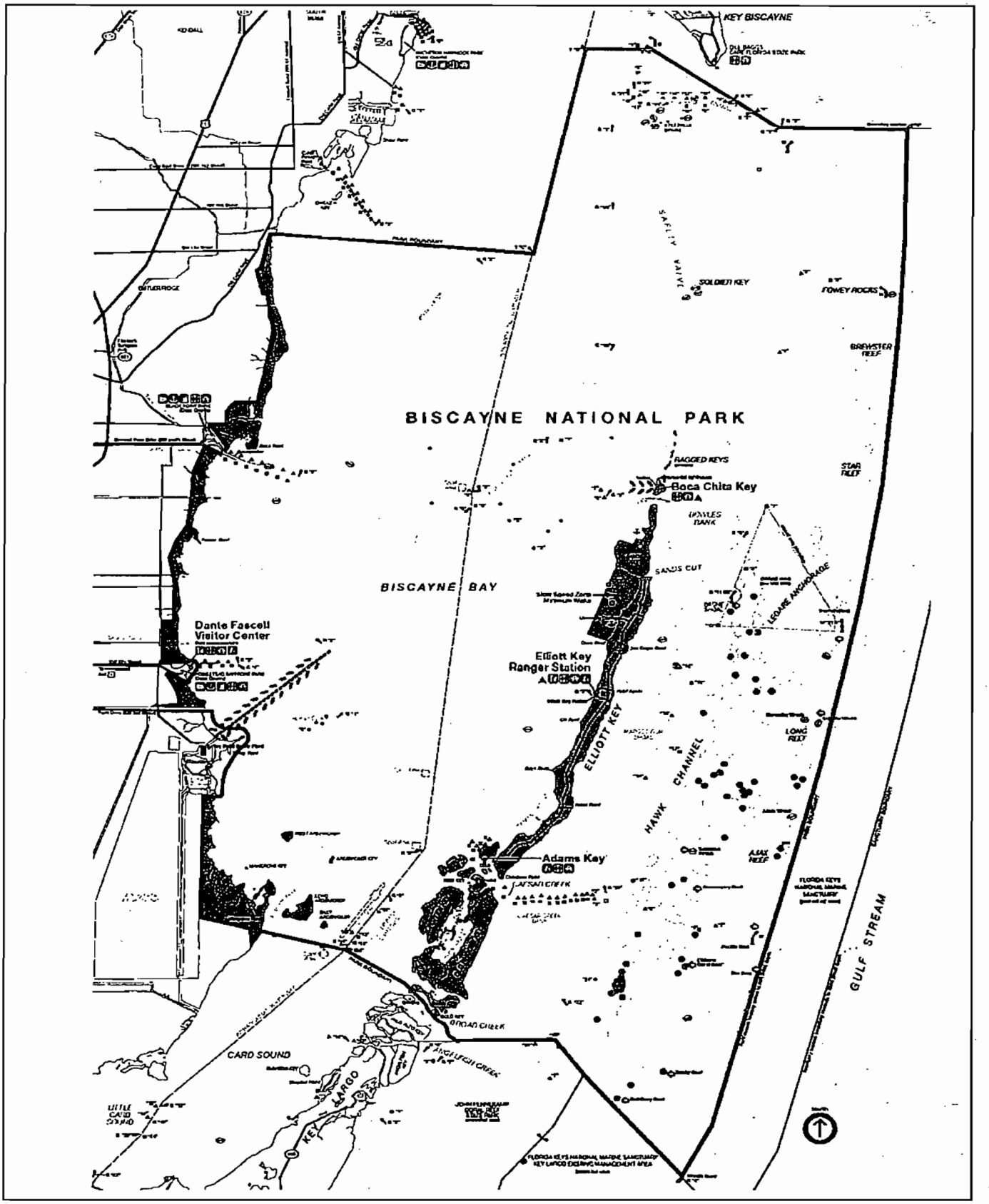
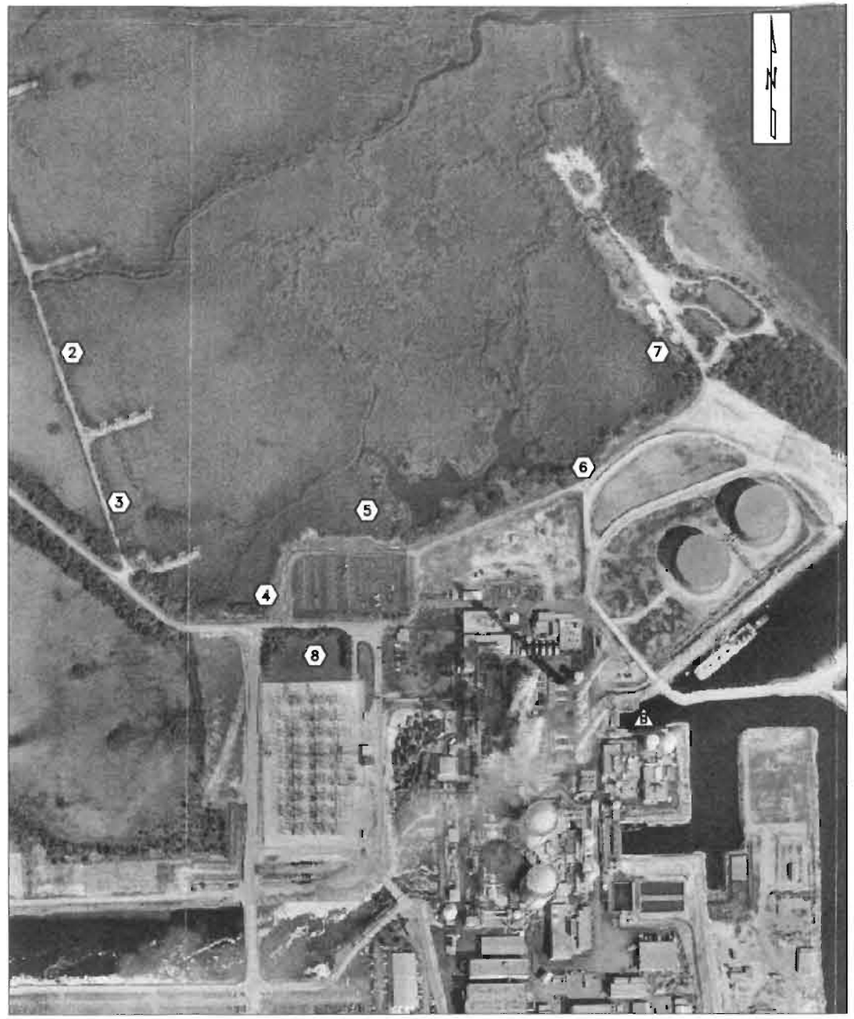


Figure 2FDEP-7(a)-2
Biscayne Bay National Park

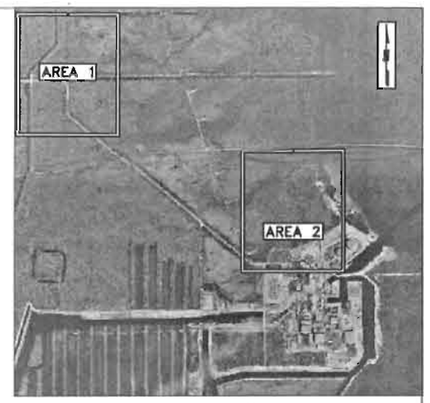
Source: BNP, 2004.

FPL

AREA 1



AREA 2



KEY PLAN

(1) SOIL BORING LOCATIONS

A LOCATION OF L31E SAMPLE

B LOCATION OF COOLING CANAL SAMPLE

REV	DATE	REVISION DESCRIPTION	BY	CH	COR	APR	ORG
B	01/21/04	Response to Sufficiency Question 2fdep-7(b)	GMG			TDJ	PGBL

FPL

SYSTEM: N/A	DISCIPLINE: CS	PLANT/UNIT: TURKEY POINT
SCALE: NTS	CAD FILE NAME: SFDEP-7(B).DWG	TITLE: EXPANSION PROJECT SOIL BORINGS
DRAWING SIZE: D(24"X36")	FPL ARCHIVE NAME: N/A	
DRAWING NUMBER: Figure 2FDEP-7(b)	SHEET: 1 OF 1	REV: B

BAR CODE

ATTACHMENTS

ATTACHMENT 1FDEP-4

G-III DETERMINATION LETTER

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

SOUTHEAST FLORIDA
DISTRICT

P.O. BOX 3858
3301 GUN CLUB ROAD
WEST PALM BEACH, FLORIDA 33402-3858

September 6, 1983

Mr. W.J. Barrow, Jr.
Manager of Permitting & Programs
Florida Power & Light Company
Environmental Affairs Department
Post Office Box 14000
Juno Beach, Florida 33408

IW - Dade County
Florida Power & Light Co
Turkey Point Power Plant

Dear Mr. Barrow:

Re: Request to Amend Operating Permit IO 13-57079, Florida Power & Light Company Turkey Point Power Plant Wastewater Treatment Plant, to Change the designation of the Groundwater from Class G-II to Class G-III

This office has reviewed your request to amend your operating permit, IO 13-57079 to change the designation of the groundwater from Class G-II to Class G-III. Based on the August 5, 1983 meeting at our office and related documentation and review it was decided that a certain portion of the area should be designated as Class G-III groundwaters. Your request for the amendment of operating permit IO 13-57079 is hereby approved.

The permit is changed as follows:

Page 1 - Description change to:

To operate a Liquid Industrial Waste Treatment and Disposal Facility treating and disposing of Liquid Industrial Waste from the generation of electricity by steam. A volume of 2853.3 MGD of condenser cooling water and a volume of 55,470 GPD of treated waste water is discharged to a closed loop cooling canal system. A part of the water contained in the canal is recirculated through the cooling system for the steam plant condensers, a part is discharged through an area of 6,700 acres to groundwater as described in Specific Condition #2. Residues in the solids settling basins and the oil in the Oil/Water Separators are removed periodically by outside contractors.

Page 3 - Specific Condition 2 Change to:

Specific Condition

2. The Zone of Discharge shall be in accordance with 17-4.245 FAC and is described as follows:

The area bounded by a line along the west bank of the interceptor ditch and extending northeasterly to the Turkey Point Plant entry road; then due eastward from this junction to Biscayne Bay; and a line along the west bank of the interceptor ditch extending southward to the Sea Dade Canal, to Card Sound, then north along the coastline to intersect with the north boundary.

The groundwaters contained in this area are classified as G-III Groundwaters.

All other conditions of the original permit shall remain in effect for the duration of the permit. This letter shall be attached to the original permit and becomes a part thereof.

Should you have any questions please contact this office, telephone 305/689-5800.

Sincerely,

Roy M Duke

Roy M. Duke
District Manager

RMD:wkj/b

cc: Metro Dade County Environmental Resource Management
Don Kell, Groundwater Section

ATTACHMENT 1FDEP-10

SAMPLING ANALYSES REPORTS
AND CHAIN-OF-CUSTODY FORMS

USBIOSYSTEMS

Client #: WPB-00-100501
Address: Florida Power & Light
6001A Village Blvd.
West Palm Beach, FL 33407
Attn: Susie Adams

Page: Page 1 of 2
Date: 02/18/2004
Log #: L87037-1

Sample Description:

Turkey Point Expansion

Analytical Report: 1
Date Sampled: 02/11/2004
Time Sampled: 10:15
Date Received: 02/12/2004
Collected By: Client

Parameter	Results	Units	Method	Reportable Limit	Extr. Date	Anly. Date	Analyst
Percent Solids							
Percent Solid	95	%	SM2540B	0.10	02/12	02/12	KB
Chlorinated Herbicides							
Dalapon	BDL	ug/kg (dw)	8151	53	02/16	02/17	AW
MCPP	BDL	ug/kg (dw)	8151	2100	02/16	02/17	AW
Dicamba	BDL	ug/kg (dw)	8151	21	02/16	02/17	AW
MCPA	BDL	ug/kg (dw)	8151	2100	02/16	02/17	AW
Dichlorprop	BDL	ug/kg (dw)	8151	21	02/16	02/17	AW
2,4-D	BDL	ug/kg (dw)	8151	21	02/16	02/17	AW
2,4,5-TP	BDL	ug/kg (dw)	8151	21	02/16	02/17	AW
2,4,5-T	BDL	ug/kg (dw)	8151	21	02/16	02/17	AW
Dinoseb	BDL	ug/kg (dw)	8151	21	02/16	02/17	AW
2,4-DB	BDL	ug/kg (dw)	8151	21	02/16	02/17	AW
Dilution Factor	1.0		8151		02/16	02/17	AW
Surrogate Recoveries:							
DCAA	32	%	8151	9-132	02/16	02/17	AW
Organochlorine Pesticides							
alpha-BHC	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
gamma-BHC	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
beta-BHC	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
Heptachlor	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
delta-BHC	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
Aldrin	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
Heptachlor Epoxide	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
gamma-Chlordane	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
alpha-Chlordane	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
Endosulfan I	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
4,4'-DDE	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB

Client #: WPB-00-100501
Address: Florida Power & Light
6001A Village Blvd.
West Palm Beach, FL 33407
Attn: Susie Adams

Date: 02/18/2004
Log #: L87037-1

Sample Description:

Turkey Point Expansion

Analytical Report: 1
Date Sampled: 02/11/2004
Time Sampled: 10:15
Date Received: 02/12/2004
Collected By: Client

Parameter	Results	Units	Method	Reportable Limit	Extr. Date	Anly. Date	Analyst
Organochlorine Pesticides	**(continued)**						
Dieldrin	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
Endrin	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB
4,4'-DDD	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB
Endosulfan II	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB
4,4'-DDT	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB
Endrin Aldehyde	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB
Endosulfan Sulfate	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB
Methoxychlor	BDL	ug/kg (dw)	3550/8081	18	02/13	02/15	SB
Endrin Ketone	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB
Toxaphene	BDL	ug/kg (dw)	3550/8081	110	02/13	02/15	SB
Dilution Factor	1.0		3550/8081		02/13	02/15	SB
Surrogate Recoveries:							
TCMX	86	%	3550/8081	22-137	02/13	02/15	SB
DCB	108	%	3550/8081	27-120	02/13	02/15	SB

All analyses were performed using EPA, ASTM, NIOSH, USGS, or Standard Methods and certified to meet NELAC requirements.
Flags: BDL or U-below reporting limit; DL-diluted out; IL-meets internal lab limits; MI-matrix interference; NA-not appl.
Flags: CFR-Pb/Cu rule; ND-non detect(RL estimated); NFL-no free liquids; dw-dry wt; ww-wet wt; C(#)-see attached USB code
FLDEP Flags: J(#)-estimated 1:surr. fail 2:no known QC req. 3:QC fail %R or %RPD; 4:matrix int. 5:improper fld. protocol
FLDEP Flags: L-exceeds calibration; Q-holding time exceeded; T-value < MDL; V-present in blank
FLDEP Flags: Y-improper preservation; B-colonies exceed range; I-result between MDL and PQL

QAP# 980126 | DOH# E86240 | NC CERT# 444
SUB DOH# 86122,86109,E86048 | ADEM ID# 40850 | IL CERT# 200020
SC CERT# 96031001 | TN CERT# 02985
USACE | GA CERT# 917
VA CERT# 00395 | USDA Soil Permit# S-35240

Respectfully submitted,

Mike Kimmel
Senior Project Manager

Client #: WPB-00-100501
Address: Florida Power & Light
6001A Village Blvd.
West Palm Beach, FL 33407
Attn: Susie Adams

Date: 02/18/2004
Log #: L87037-2

Sample Description:

Turkey Point Expansion

Analytical Report: 2
Date Sampled: 02/11/2004
Time Sampled: 10:20
Date Received: 02/12/2004
Collected By: Client

Parameter	Results	Units	Method	Reportable Limit	Extr. Date	Anly. Date	Analyst
Percent Solids							
Percent Solid	94	%	SM2540B	0.10	02/12	02/12	KB
Chlorinated Herbicides							
Dalapon	BDL	ug/kg (dw)	8151	53	02/16	02/17	AW
MCPP	BDL	ug/kg (dw)	8151	2100	02/16	02/17	AW
Dicamba	BDL	ug/kg (dw)	8151	21	02/16	02/17	AW
MCPA	BDL	ug/kg (dw)	8151	2100	02/16	02/17	AW
Dichlorprop	BDL	ug/kg (dw)	8151	21	02/16	02/17	AW
2,4-D	BDL	ug/kg (dw)	8151	21	02/16	02/17	AW
2,4,5-TP	BDL	ug/kg (dw)	8151	21	02/16	02/17	AW
2,4,5-T	BDL	ug/kg (dw)	8151	21	02/16	02/17	AW
Dinoseb	BDL	ug/kg (dw)	8151	21	02/16	02/17	AW
2,4-DB	BDL	ug/kg (dw)	8151	21	02/16	02/17	AW
Dilution Factor	1.0		8151		02/16	02/17	AW
Surrogate Recoveries:							
DCAA	35	%	8151	9-132	02/16	02/17	AW
Organochlorine Pesticides							
alpha-BHC	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
gamma-BHC	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
beta-BHC	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
Heptachlor	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
delta-BHC	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
Aldrin	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
Heptachlor Epoxide	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
gamma-Chlordane	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
alpha-Chlordane	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
Endosulfan I	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
4,4'-DDE	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB

Client #: WPB-00-100501
Address: Florida Power & Light
6001A Village Blvd.
West Palm Beach, FL 33407
Attn: Susie Adams

Date: 02/18/2004
Log #: L87037-2

Sample Description:

Turkey Point Expansion

Analytical Report: 2
Date Sampled: 02/11/2004
Time Sampled: 10:20
Date Received: 02/12/2004
Collected By: Client

Parameter	Results	Units	Method	Reportable Limit	Extr. Date	Anly. Date	Analyst
Organochlorine Pesticides (continued)							
Dieldrin	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
Endrin	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB
4,4'-DDD	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB
Endosulfan II	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB
4,4'-DDT	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB
Endrin Aldehyde	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB
Endosulfan Sulfate	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB
Methoxychlor	BDL	ug/kg (dw)	3550/8081	18	02/13	02/15	SB
Endrin Ketone	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB
Toxaphene	BDL	ug/kg (dw)	3550/8081	110	02/13	02/15	SB
Dilution Factor	1.0		3550/8081		02/13	02/15	SB
Surrogate Recoveries:							
TCMX	98	%	3550/8081	22-137	02/13	02/15	SB
DCB	117	%	3550/8081	27-120	02/13	02/15	SB

All analyses were performed using EPA, ASTM, NIOSH, USGS, or Standard Methods and certified to meet NELAC requirements.
Flags: BDL or U-below reporting limit; DL-diluted out; IL-meets internal lab limits; MI-matrix interference; NA-not appl.
Flags: CFR-Pb/Cu rule; ND-non detect(RL estimated); NFL-no free liquids; dw-dry wt; ww-wet wt; C(#)-see attached USB code
FLDEP Flags: J(#)-estimated 1:surr. fail 2:no known QC req. 3:QC fail %R or %RPD; 4:matrix int. 5:improper fld. protocol
FLDEP Flags: L-exceeds calibration; Q-holding time exceeded; T-value < MDL; V-present in blank
FLDEP Flags: Y-improper preservation; B-colonies exceed range; I-result between MDL and PQL

QAP# 980126 | DOH# E86240 | NC CERT# 444
SUB DOH# 86122,86109,E86048 | ADEM ID# 40850 | IL CERT# 200020
SC CERT# 96031001 | TN CERT# 02985
USACE | GA CERT# 917
VA CERT# 00395 | USDA Soil Permit# S-35240

Respectfully submitted,

Mike Kimmel
Senior Project Manager

Client #: WPB-00-100501
Address: Florida Power & Light
6001A Village Blvd.
West Palm Beach, FL 33407
Attn: Susie Adams

Date: 02/18/2004
Log #: L87037-3

Sample Description:

Turkey Point Expansion

Analytical Report: 3
Date Sampled: 02/11/2004
Time Sampled: 10:25
Date Received: 02/12/2004
Collected By: Client

Parameter	Results	Units	Method	Reportable Limit	Extr. Date	Anly. Date	Analyst
Percent Solids							
Percent Solid	90	%	SM2540B	0.10	02/12	02/12	KB
Chlorinated Herbicides							
Dalapon	BDL	ug/kg (dw)	8151	56	02/16	02/17	AW
MCPP	BDL	ug/kg (dw)	8151	2200	02/16	02/17	AW
Dicamba	BDL	ug/kg (dw)	8151	22	02/16	02/17	AW
MCPA	BDL	ug/kg (dw)	8151	2200	02/16	02/17	AW
Dichlorprop	BDL	ug/kg (dw)	8151	22	02/16	02/17	AW
2,4-D	BDL	ug/kg (dw)	8151	22	02/16	02/17	AW
2,4,5-TP	BDL	ug/kg (dw)	8151	22	02/16	02/17	AW
2,4,5-T	BDL	ug/kg (dw)	8151	22	02/16	02/17	AW
Dinoseb	BDL	ug/kg (dw)	8151	22	02/16	02/17	AW
2,4-DB	BDL	ug/kg (dw)	8151	22	02/16	02/17	AW
Dilution Factor	1.0		8151		02/16	02/17	AW
Surrogate Recoveries:							
DCAA	50	%	8151	9-132	02/16	02/17	AW
Organochlorine Pesticides							
alpha-BHC	BDL	ug/kg (dw)	3550/8081	1.9	02/13	02/15	SB
gamma-BHC	BDL	ug/kg (dw)	3550/8081	1.9	02/13	02/15	SB
beta-BHC	BDL	ug/kg (dw)	3550/8081	1.9	02/13	02/15	SB
Heptachlor	BDL	ug/kg (dw)	3550/8081	1.9	02/13	02/15	SB
delta-BHC	BDL	ug/kg (dw)	3550/8081	1.9	02/13	02/15	SB
Aldrin	BDL	ug/kg (dw)	3550/8081	1.9	02/13	02/15	SB
Heptachlor Epoxide	BDL	ug/kg (dw)	3550/8081	1.9	02/13	02/15	SB
gamma-Chlordane	BDL	ug/kg (dw)	3550/8081	1.9	02/13	02/15	SB
alpha-Chlordane	BDL	ug/kg (dw)	3550/8081	1.9	02/13	02/15	SB
Endosulfan I	BDL	ug/kg (dw)	3550/8081	1.9	02/13	02/15	SB
4,4'-DDE	BDL	ug/kg (dw)	3550/8081	3.7	02/13	02/15	SB

Client #: WPB-00-100501
Address: Florida Power & Light
6001A Village Blvd.
West Palm Beach, FL 33407
Attn: Susie Adams

Page: Page 2 of 2
Date: 02/18/2004
Log #: L87037-3

Sample Description:

Turkey Point Expansion

Analytical Report: 3
Date Sampled: 02/11/2004
Time Sampled: 10:25
Date Received: 02/12/2004
Collected By: Client

Parameter	Results	Units	Method	Reportable Limit	Extr. Date	Anly. Date	Analyst
Organochlorine Pesticides	**(continued)**						
Dieldrin	BDL	ug/kg (dw)	3550/8081	1.9	02/13	02/15	SB
Endrin	BDL	ug/kg (dw)	3550/8081	3.7	02/13	02/15	SB
4,4'-DDD	BDL	ug/kg (dw)	3550/8081	3.7	02/13	02/15	SB
Endosulfan II	BDL	ug/kg (dw)	3550/8081	3.7	02/13	02/15	SB
4,4'-DDT	BDL	ug/kg (dw)	3550/8081	3.7	02/13	02/15	SB
Endrin Aldehyde	BDL	ug/kg (dw)	3550/8081	3.7	02/13	02/15	SB
Endosulfan Sulfate	BDL	ug/kg (dw)	3550/8081	3.7	02/13	02/15	SB
Methoxychlor	BDL	ug/kg (dw)	3550/8081	19	02/13	02/15	SB
Endrin Ketone	BDL	ug/kg (dw)	3550/8081	3.7	02/13	02/15	SB
Toxaphene	BDL	ug/kg (dw)	3550/8081	110	02/13	02/15	SB
Dilution Factor	1.0		3550/8081		02/13	02/15	SB
Surrogate Recoveries:							
TCMX	96	%	3550/8081	22-137	02/13	02/15	SB
DCB	115	%	3550/8081	27-120	02/13	02/15	SB

All analyses were performed using EPA, ASTM, NIOSH, USGS, or Standard Methods and certified to meet NELAC requirements.
Flags: BDL or U-below reporting limit; DL-diluted out; IL-meets internal lab limits; MI-matrix interference; NA-not appl.
Flags: CFR-Pb/Cu rule; ND-non detect(RL estimated); NFL-no free liquids; dw-dry wt; ww-wet wt; C(#)-see attached USB code
FLDEP Flags: J(#)-estimated 1:surr. fail 2:no known QC req. 3:QC fail %R or %RPD; 4:matrix int. 5:improper fld. protocol
FLDEP Flags: L-exceeds calibration; Q-holding time exceeded; T-value < MDL; V-present in blank
FLDEP Flags: Y-improper preservation; B-colonies exceed range; I-result between MDL and PQL

QAP# 980126 | DOH# E86240 | NC CERT# 444
SUB DOH# 86122,86109,E86048 | ADEM ID# 40850 | IL CERT# 200020
SC CERT# 96031001 | TN CERT# 02985
USACE | GA CERT# 917
VA CERT# 00395 | USDA Soil Permit# S-35240

Respectfully submitted,

Mike Kimmel
Senior Project Manager

Client #: WPB-00-100501
Address: Florida Power & Light
6001A Village Blvd.
West Palm Beach, FL 33407
Attn: Susie Adams

Date: 02/18/2004
Log #: L87037-4

Sample Description:

Turkey Point Expansion

Analytical Report: 4
Date Sampled: 02/11/2004
Time Sampled: 10:30
Date Received: 02/12/2004
Collected By: Client

Parameter	Results	Units	Method	Reportable Limit	Extr. Date	Anly. Date	Analyst
Percent Solids							
Percent Solid	93	%	SM2540B	0.10	02/12	02/12	KB
Chlorinated Herbicides							
Dalapon	BDL	ug/kg (dw)	8151	54	02/16	02/17	AW
MCPP	BDL	ug/kg (dw)	8151	2200	02/16	02/17	AW
Dicamba	BDL	ug/kg (dw)	8151	22	02/16	02/17	AW
MCPA	BDL MI	ug/kg (dw)	8151	2700	02/16	02/17	AW
Dichlorprop	BDL	ug/kg (dw)	8151	22	02/16	02/17	AW
2,4-D	BDL	ug/kg (dw)	8151	22	02/16	02/17	AW
2,4,5-TP	BDL	ug/kg (dw)	8151	22	02/16	02/17	AW
2,4,5-T	BDL	ug/kg (dw)	8151	22	02/16	02/17	AW
Dinoseb	BDL	ug/kg (dw)	8151	22	02/16	02/17	AW
2,4-DB	BDL	ug/kg (dw)	8151	22	02/16	02/17	AW
Dilution Factor	1.0		8151		02/16	02/17	AW
Surrogate Recoveries:							
DCAA	52	%	8151	9-132	02/16	02/17	AW
Organochlorine Pesticides							
alpha-BHC	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
gamma-BHC	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
beta-BHC	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
Heptachlor	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
delta-BHC	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
Aldrin	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
Heptachlor Epoxide	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
gamma-Chlordane	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
alpha-Chlordane	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
Endosulfan I	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
4,4'-DDE	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB

Client #: WPB-00-100501
Address: Florida Power & Light
6001A Village Blvd.
West Palm Beach, FL 33407
Attn: Susie Adams

Date: 02/18/2004
Log #: L87037-4

Sample Description:

Turkey Point Expansion

Analytical Report: 4
Date Sampled: 02/11/2004
Time Sampled: 10:30
Date Received: 02/12/2004
Collected By: Client

Parameter	Results	Units	Method	Reportable Limit	Extr. Date	Anly. Date	Analyst
Organochlorine Pesticides	**(continued)**						
Dieldrin	BDL	ug/kg (dw)	3550/8081	1.8	02/13	02/15	SB
Endrin	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB
4,4'-DDD	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB
Endosulfan II	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB
4,4'-DDT	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB
Endrin Aldehyde	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB
Endosulfan Sulfate	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB
Methoxychlor	BDL	ug/kg (dw)	3550/8081	18	02/13	02/15	SB
Endrin Ketone	BDL	ug/kg (dw)	3550/8081	3.5	02/13	02/15	SB
Toxaphene	BDL	ug/kg (dw)	3550/8081	110	02/13	02/15	SB
Dilution Factor	1.0		3550/8081		02/13	02/15	SB
Surrogate Recoveries:							
TCMX	82	%	3550/8081	22-137	02/13	02/15	SB
DCB	104	%	3550/8081	27-120	02/13	02/15	SB

All analyses were performed using EPA, ASTM, NIOSH, USGS, or Standard Methods and certified to meet NELAC requirements.
Flags: BDL or U-below reporting limit; DL-diluted out; IL-meets internal lab limits; MI-matrix interference; NA-not appl.
Flags: CFR-Pb/Cu rule; ND-non detect(RL estimated); NFL-no free liquids; dw-dry wt; ww-wet wt; C(#)-see attached USB code
FLDEP Flags: J(#)-estimated 1:surr. fail 2:no known QC req. 3:QC fail %R or %RPD; 4:matrix int. 5:improper fld. protocol
FLDEP Flags: L-exceeds calibration; Q-holding time exceeded; T-value < MDL; V-present in blank
FLDEP Flags: Y-improper preservation; B-colonies exceed range; I-result between MDL and PQL

QAP# 980126 | DOH# E86240 | NC CERT# 444
SUB DOH# 86122,86109,E86048 | ADEM ID# 40850 | IL CERT# 200020
SC CERT# 96031001 | TN CERT# 02985
USACE | GA CERT# 917
VA CERT# 00395 | USDA Soil Permit# S-35240

Respectfully submitted,

Mike Kimmel
Senior Project Manager

Best Available Copy

FPL

87037/TNG

CHAIN-OF-CUSTODY FORM

Site Name and Address: TURKEY POINT EXPANSION (TPE	Sampler PRINT & SIGN: Telephone No.: Ed Prant 561-3465312	Page of

Containers (Describe and identify source using A-Z):
12 ea - 250 ML Jars # 004304
12 ea - 125 ML Jars # 002606

CompQAP Information of Sampler:
CHECK ONE:
___ CompQAP Number: ___ Approval Date ___
___ CompQAP Number ___ Approval Date ___

CUSTODY SEALS (Y) N
PH CONTROL

Sample Container Source:

Analyses Required/Preservation

S=soil; W=water; SS=saline water; GW=groundwater; SD=sediment; SW=surface water
O = other (describe in remarks)

	Sample Number	Sample Location		Date	Time	Grab (G) or Composite (C)	Matrix	No. of Containers	Radionuclides	N	VA	PESTICIDES	HERBICIDES	TRPH	# 5GL
01	1	TPE	0.4'	2/10/04	10:15	G	S	2	✓	✓	✓	✓	✓		P ___ V ___
02	2	TPE	↓		10:20	G	S		✓	✓	✓	✓	✓		P ___ V ___
03	3	TPE	0.8'		10:25	G	S	2	✓	✓	✓	✓	✓		P ___ V ___
04	4	TPE	↓		10:30	G	S	2	✓			✓	✓		P ___ V ___
															P ___ V ___
															P ___ V ___

Remarks:

Send Lab Report To:

COC OK (Y) N

Clean Sample Containers Relinquished By: Idaleen Torres	Date/Time 2/10/04	Custody Seal(s) Intact? N/A	Method of Shipment Hand	Clean Sample Containers Received By: Ed Prant	Date/Time 2/10/04	Custody Seal(s) Intact? HAND
Relinquished By: Ed Prant	Date/Time 2/12/04 7:07	Custody Seal(s) Intact? N/A	Method of Shipment HAND	Received By: D Williamson	Date/Time 2/12/04 3:07P	Custody Seal(s) Intact? Hand.
Relinquished By: Idaleen Torres	Date/Time 2/10/04 3:23 PM	Custody Seal(s) Intact?	Method of Shipment	Received By: [illegible]	Date/Time 2/12/04 1543	Custody Seal(s) Intact?
Relinquished By: [illegible]	Date/Time 2/12/04 1640	Custody Seal(s) Intact?	Method of Shipment	Received By: [illegible]	Date/Time 2/12/04 1731	Custody Seal(s) Intact?

Laboratory Remarks:

Cooler Temperature Checks:

FPL

CHAIN-OF-CUSTODY FORM

CC-04-TPE-0001

Site Name and Address: TURKEY POINT EXPANSION (TPE

Sampler PRINT & SIGN: Ed Pleasant

Telephone No.: 561-346-5312

Page of

Containers (Describe and identify source using A-Z):
12 ea - 250 ML Jars # 004304
12 ea - 125 ML Jars # 002606

CompQAP Information of Sampler:
CHECK ONE:
___ CompQAP Number: ___ Approval Date
___ CompQAP Number ___ Approval Date

Sample Container Source:

Analyses Required/Preservation

Sample Number	Sample Location	Date	Time	No. of Containers	Matrix	Grab (G) or Composite (C)	RCRA METALS	Ni	V/A	PESTICIDES	HERBICIDES	TRPH	04	TPE	02
1	TPE	2/11/04	10:15	G	S	1	✓	✓	✓	✓	✓	✓	0001		
2	TPE		10:20	G	S	1	✓	✓	✓	✓	✓	✓	2		
3	TPE		10:25	G	S	2	✓	✓	✓	✓	✓	✓	3		
4	TPE		10:30	G	S	2	✓	✓	✓	✓	✓	✓	4		

S=soil; W=water; SS=saline water; GW=groundwater; SD=sediment; SW=surface water
O = other (describe in remarks)

Remarks: A separate lab report from US Biosystems contains Herbicides + Pesticides SMW 2/23/04

Send Lab Report To:
Gary Andersen - PTF/PTF
Barbara Linkiewicz - JES/JB
J. Gnecco - CPM/JB
Ed Pleasant - JES/JB
L. Granmer - GPA/JB
MARISTER RUIZ - GPA/JB

Clean Sample Containers Relinquished By:	Date/Time	Custody Seal(s) Intact?	Method of Shipment	Clean Sample Containers Received By:	Date/Time	Custody Seal(s) Intact?
Jackeen Torres	2/10/04	N/A	Hand	Ed Pleasant	2/10/04	HAND
Relinquished By: Ed Pleasant	Date/Time 2/12/04 3:07	Custody Seal(s) Intact? N/A	Method of Shipment HAND	Received By: [signature]	Date/Time 2/12/04 3:07P	Custody Seal(s) Intact? Hand.
Relinquished By:	Date/Time	Custody Seal(s) Intact?	Method of Shipment	Received By:	Date/Time	Custody Seal(s) Intact?
Relinquished By:	Date/Time	Custody Seal(s) Intact?	Method of Shipment	Received By:	Date/Time	Custody Seal(s) Intact?

Laboratory Remarks:

Cooler Temperature Checks:

THIS REPORT CONTAINS 5 PAGE(S)
SMW 2/23/04

Testing Facility	State of Florida Certification Numbers	Customer Address
FPL Central Laboratory **6001A Village Blvd.** **West Palm Beach, Fl 33407** **Phone # (561) 640-2055**	***Environmental Chemistry: E56078*** **CompQAP/QA Manual #: 920041**	***Turkey Point Expansion*** **9700 SW 344th Street Homestead, Florida 33035**

Report of Analyses For: Turkey Point Expansion - TPE-1

Lab Sample #	Field Sample #	Parameter	Sample Collection Date	Analysis Date	EPA Method	Result / Units	Qual.	MDL
04-TPE-02-0001		Metals: Arsenic (in soil)	02/11/2004 10:15 AM	02/18/2004	6010	1.3 MG/KG	I,V	0.75
04-TPE-02-0001		Metals: Barium (in soil)	02/11/2004 10:15 AM	02/18/2004	6010	<10.0 MG/KG	U	10
04-TPE-02-0001		Metals: Cadmium (in soil)	02/11/2004 10:15 AM	02/18/2004	6010	<0.50 MG/KG	U	0.5
04-TPE-02-0001		Metals: Chromium (in soil)	02/11/2004 10:15 AM	02/18/2004	6010	6.4 MG/KG	I	3
04-TPE-02-0001		Metals: Lead (in soil)	02/11/2004 10:15 AM	02/18/2004	6010	<4.0 MG/KG	U	4
04-TPE-02-0001		Metals: Mercury (in soil)	02/11/2004 10:15 AM	02/19/2004	7471	<0.02 MG/KG	U	0.02
04-TPE-02-0001		Metals: Nickel (in soil)	02/11/2004 10:15 AM	02/19/2004	6010	1.5 MG/KG	I	0.5
04-TPE-02-0001		Metals: Selenium (in soil)	02/11/2004 10:15 AM	02/18/2004	6010	1.8 MG/KG	I	1
04-TPE-02-0001		Metals: Silver (in soil)	02/11/2004 10:15 AM	02/19/2004	6010	<0.5 MG/KG	NC,U	0.5
04-TPE-02-0001		Metals: Vanadium (in soil)	02/11/2004 10:15 AM	02/18/2004	6010	2.9 MG/KG	I	1.5
04-TPE-02-0001		Total Recoverable Petroleum Hydrocarbons	02/11/2004 10:15 AM	02/18/2004	FL-PRO	<30 MG/KG	U	30

Samples Analyzed By: Tracey Vanderberg, Sharon Verrett

Samples Approved By:

Result Comments: I - The reported value is between the MDL and the PQL.; V - Analyte detected in both sample and method blank.; U - Analyzed but not detected.; NC - All analyses were performed using EPA methods & certified to meet NELAC requirements.

Sample Comments:

Parameter Comments: 04-TPE-02-0001/Total Recoverable Petroleum Hydrocarbons - OTP Surrogate within in-house and method limits C-39 outside limits low.

Routing: Barbara Likiewicz; Ed Preast

File Index: A-TPE-1

Testing Facility	State of Florida Certification Numbers	Customer Address
FPL Central Laboratory 6001A Village Blvd. West Palm Beach, Fl 33407 Phone # (561) 640-2055	Environmental Chemistry: E56078 CompQAP/QA Manual #: 920041	Turkey Point Expansion 9700 SW 344th Street Homestead, Florida 33035

Report of Analyses For: Turkey Point Expansion - TPE-2

Lab Sample #	Field Sample #	Parameter	Sample Collection Date	Analysis Date	EPA Method	Result / Units	Qual.	MDL
04-TPE-02-0002		Metals: Arsenic (in soil)	02/11/2004 10:20 AM	02/18/2004	6010	1.1 MG/KG	I,V	0.75
04-TPE-02-0002		Metals: Barium (in soil)	02/11/2004 10:20 AM	02/18/2004	6010	<10 MG/KG	U	10
04-TPE-02-0002		Metals: Cadmium (in soil)	02/11/2004 10:20 AM	02/18/2004	6010	<0.50 MG/KG	U	0.5
04-TPE-02-0002		Metals: Chromium (in soil)	02/11/2004 10:20 AM	02/18/2004	6010	6.0 MG/KG	I	3
04-TPE-02-0002		Metals: Lead (in soil)	02/11/2004 10:20 AM	02/18/2004	6010	<4.0 MG/KG	U	4
04-TPE-02-0002		Metals: Mercury (in soil)	02/11/2004 10:20 AM	02/19/2004	7471	<0.02 MG/KG	U	0.02
04-TPE-02-0002		Metals: Nickel (in soil)	02/11/2004 10:20 AM	02/19/2004	6010	1.3 MG/KG	I	0.5
04-TPE-02-0002		Metals: Selenium (in soil)	02/11/2004 10:20 AM	02/18/2004	6010	2.1 MG/KG	I	1
04-TPE-02-0002		Metals: Silver (in soil)	02/11/2004 10:20 AM	02/19/2004	6010	<0.5 MG/KG	NC,U	0.5
04-TPE-02-0002		Metals: Vanadium (in soil)	02/11/2004 10:20 AM	02/18/2004	6010	3.0 MG/KG	I	1.5
04-TPE-02-0002		Total Recoverable Petroleum Hydrocarbons	02/11/2004 10:20 AM	02/18/2004	FL-PRO	<30 MG/KG	U	30

Samples Analyzed By: Tracey Vanderberg, Sharon Verrett

Samples Approved By: DMWilliamson

Result Comments: I - The reported value is between the MDL and the PQL.; V - Analyte detected in both sample and method blank.; U - Analyzed but not detected.; NC - All analyses were performed using EPA methods & certified to meet NELAC requirements.

Sample Comments:

Parameter Comments:

Routing: Barbara Likiewicz; Ed Preast

File Index: A-TPE-1

Testing Facility	State of Florida Certification Numbers	Customer Address
FPL Central Laboratory 6001A Village Blvd. West Palm Beach, Fl 33407 Phone # (561) 640-2055	Environmental Chemistry: E56078 CompQAP/QA Manual #: 920041	Turkey Point Expansion 9700 SW 344th Street Homestead, Florida 33035

Report of Analyses For: Turkey Point Expansion - TPE-3

Lab Sample #	Field Sample #	Parameter	Sample Collection Date	Analysis Date	EPA Method	Result / Units	Qual.	MDL
04-TPE-02-0003		Metals: Arsenic (in soil)	02/11/2004 10:25 AM	02/18/2004	6010	1.0 MG/KG	I,V	0.75
04-TPE-02-0003		Metals: Barium (in soil)	02/11/2004 10:25 AM	02/18/2004	6010	<10 MG/KG	U	10
04-TPE-02-0003		Metals: Cadmium (in soil)	02/11/2004 10:25 AM	02/18/2004	6010	<0.50 MG/KG	U	0.5
04-TPE-02-0003		Metals: Chromium (in soil)	02/11/2004 10:25 AM	02/18/2004	6010	7.7 MG/KG		3
04-TPE-02-0003		Metals: Lead (in soil)	02/11/2004 10:25 AM	02/18/2004	6010	<4.0 MG/KG	U	4
04-TPE-02-0003		Metals: Mercury (in soil)	02/11/2004 10:25 AM	02/19/2004	7471	<0.02 MG/KG	U	0.02
04-TPE-02-0003		Metals: Nickel (in soil)	02/11/2004 10:25 AM	02/19/2004	6010	1.9 MG/KG	I	0.5
04-TPE-02-0003		Metals: Selenium (in soil)	02/11/2004 10:25 AM	02/18/2004	6010	2.3 MG/KG	I	1
04-TPE-02-0003		Metals: Silver (in soil)	02/11/2004 10:25 AM	02/19/2004	6010	<0.50 MG/KG	NC,U	0.5
04-TPE-02-0003		Metals: Vanadium (in soil)	02/11/2004 10:25 AM	02/18/2004	6010	5.0 MG/KG	I	1.5
04-TPE-02-0003		Total Recoverable Petroleum Hydrocarbons	02/11/2004 10:25 AM	02/18/2004	FL-PRO	<30 MG/KG	U	30

Samples Analyzed By: Tracey Vanderberg, Sharon Verrett

Samples Approved By: DM Williamson

Result Comments: I - The reported value is between the MDL and the PQL.; V - Analyte detected in both sample and method blank.; U - Analyzed but not detected.; NC - All analyses were performed using EPA methods & certified to meet NELAC requirements.

Sample Comments:

Parameter Comments: 04-TPE-02-0003/Total Recoverable Petroleum Hydrocarbons - OTP Surrogate within in-house and method limits C-39 outside limits low.

Routing: Barbara Likiewicz; Ed Preast

File Index: A-TPE-1

Testing Facility	State of Florida Certification Numbers	Customer Address
FPL Central Laboratory 6001A Village Blvd. West Palm Beach, Fl 33407 Phone # (561) 640-2055	Environmental Chemistry: E56078 CompQAP/QA Manual #: 920041	Turkey Point Expansion 9700 SW 344th Street Homestead, Florida 33035

Report of Analyses For: Turkey Point Expansion - TPE-4

Lab Sample #	Field Sample #	Parameter	Sample Collection Date	Analysis Date	EPA Method	Result / Units	Qual.	MDL
04-TPE-02-0004		Metals: Arsenic (in soil)	02/11/2004 10:30 AM	02/18/2004	6010	1.3 MG/KG	I	0.75
04-TPE-02-0004		Metals: Barium (in soil)	02/11/2004 10:30 AM	02/18/2004	6010	<10 MG/KG	U	10
04-TPE-02-0004		Metals: Cadmium (in soil)	02/11/2004 10:30 AM	02/18/2004	6010	<0.50 MG/KG	U	0.5
04-TPE-02-0004		Metals: Chromium (in soil)	02/11/2004 10:30 AM	02/18/2004	6010	6.1 MG/KG	I	3
04-TPE-02-0004		Metals: Lead (in soil)	02/11/2004 10:30 AM	02/18/2004	6010	<4.0 MG/KG	U	4
04-TPE-02-0004		Metals: Mercury (in soil)	02/11/2004 10:30 AM	02/19/2004	7471	<0.02 MG/KG	U	0.02
04-TPE-02-0004		Metals: Nickel (in soil)	02/11/2004 10:30 AM	02/19/2004	6010	1.3 MG/KG	I	0.5
04-TPE-02-0004		Metals: Selenium (in soil)	02/11/2004 10:30 AM	02/18/2004	6010	2.2 MG/KG	I	1
04-TPE-02-0004		Metals: Silver (in soil)	02/11/2004 10:30 AM	02/19/2004	6010	<0.50 MG/KG	NC,U	0.5
04-TPE-02-0004		Metals: Vanadium (in soil)	02/11/2004 10:30 AM	02/18/2004	6010	3.1 MG/KG	I	1.5
04-TPE-02-0004		Total Recoverable Petroleum Hydrocarbons	02/11/2004 10:30 AM	02/18/2004	FL-PRO	<30 MG/KG	U	30

Samples Analyzed By: Tracey Vanderberg, Sharon Verrett

Samples Approved By:

Result Comments: I - The reported value is between the MDL and the PQL.; U - Analyzed but not detected.; NC - All analyses were performed using EPA methods & certified to meet NELAC requirements.

Sample Comments:

Parameter Comments: 04-TPE-02-0004/Total Recoverable Petroleum Hydrocarbons - OTP Surrogate within in-house and method limits C-39 outside limits low.

Routing: Barbara Likiewicz; Ed Preast

File Index: A-TPE-1

ATTACHMENT 1FDEP-11

TSD CHANGE OF STATUS LETTER

FROM FDEP

Department of
Environmental Protection

Lawton Chiles
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

September 22, 1995

Mr. Robert Bergstrom, Counsel
Florida Power & Light Company
11770 U.S. Highway 1
North Palm Beach, FL 33408-3003

Change of Status Request:

FPL-Sanford; FLD 000 807 784;
Closure Permit HF64-115925

FPL-Cape Canaveral; FLD 000 631 721;
Closure Permit HF05-115495

FPL-Putnam; FLD 000 807 289;
Closure Permit HF54-115021

FPL-Port Everglades; FLD 000 807 115;
Closure Permit HF06-114797

FPL-Turkey Point; FLD 000733683;
Closure Permit HF13-125617

FPL-St. Lucie; FLD 000807479;
Closure Permit HF56-121975

FPL-Fort Myers; FLD 000807305;
Closure Permit HF36-114759

FPL-Manatee; FLD 000807297;
Closure Permit HF41-116152

Mr. Bergstrom:

The Florida Department of Environmental Protection has reviewed your request, dated August 11, 1995, for a change of status for each of the above-referenced facilities from a regulated Treatment, Storage, Disposal (TSD) facility to a Generator.

Based on the Department's previous acceptance of the closure certification for the regulated unit(s) at each of these facilities, submitted pursuant to 40 CFR Part 264 requirements as outlined in the Department's closure permit(s), your change of status request is approved.

In accordance with Departmental procedure, records pertaining to each of these facilities will be updated immediately to reflect the new Generator status.

Should you have any questions, please contact Alex Owutaka of my staff at (904) 488-0300.

Sincerely,

Satish Kastury, Administrator
Hazardous Waste Regulation

Sk/ao
cc: Alan Farmer,USEPA/Region IV
Kent Williams,USEPA/Region IV
Jeff Pallas, USEPA/Region IV
Bill Bostwick, FDEP/Orlando
Mike Fitzsimmons, FDEP/Jacksonville
Vivek Kamath, FDEP/W. Palm Beach
Phil Barbaccia, FDEP/Ft. Myers
Bill Kutash, FDEP/Tampa
Bob Snyder, FDEP/Orlando
Ashwin Patel, FDEP/Jacksonville
Knox Mckee, FDEP/W. Palm Beach
Charles Emery, FDEP/Ft. Myers
Bill Crawford, FDEP/Tampa

ATTACHMENT 3FDEP-1

RATIONALE FOR LOCATING ADDITIONAL POWER GENERATING CAPACITY AT TURKEY POINT NORTH OF EXISTING UNITS 1 AND 2

Rationale for locating additional power generation capacity at Turkey Point north of existing Units 1 and 2. (November 14, 2003)

As a regulated public utility under State law, Florida Power & Light Company (FPL) is obligated to furnish reasonably sufficient, adequate, and efficient electric service to all customers in its service territory. FPL's Ten Year Power Plant Site Plan (2003-2012) presents the results of its planning efforts which are aimed at identifying the power needs of its customer base for the next 10-year period and considering FPL's alternatives to meet those needs. This is an annual planning process conducted in accordance with Florida Administrative Code Rule 25.22-071. The objective of the planning process is to develop an estimate of the capacity need for the system and cost-effective methods to meet that need. Specific preferred and potential sites where future generation may be installed are identified in the plan.

As part of FPL's integrated planning process, FPL's specific projected capacity needs for 2007 were identified. An additional estimated 1,066 megawatts (MW) of power will be required by 2007. FPL's planning efforts also identified a growing imbalance in Southeast Florida between regional load and generating capacity located within the region. Specifically, the region in need of the most power encompasses the Miami-Dade, Broward, and Palm Beach counties of Southeast Florida. Based on current generation locations and recognizing transmission system losses, FPL identified that these factors favor the location of additional generation in the southeastern portion of the state.

The PSC has developed a bid rule requiring public utilities that identify a self-build generation option that requires a Need Determination conduct an open solicitation for generation alternatives. The goal of this "Request for Proposal" (RFP) process is to evaluate and select the most cost effective and reliable generation alternative to meet the power needs of its customers. FPL issued an RFP in August 2003 and received responses to the RFP on October 24, 2003, which are currently under review. Meanwhile, FPL is initiating the permitting and licensing process for its self-build option prior to the final evaluation of the bids that were received. The timing of this action is deemed prudent and necessary to meet the June 2007 need. FPL has communicated in its RFP that it expects other proposers to consider maintaining sufficient progress on their proposed projects so that this need will be met in a timely manner.

FPL's SELF-BUILD OPTION

FPL's next planned generating unit is a combined cycle, natural gas-fired power plant at the existing Turkey Point Power Plant site. FPL has demonstrated, through exhaustive analysis, that this project is the most cost effective and reliable, self-build option to meet the power supply needs of its customers. This proposed project site was identified as the best location for the new capacity when considered against other possible properties owned by FPL as well as other greenfield sites. The Turkey Point facility is an active power generation facility and provides adequate physical space, a significant buffer, connection to existing transmission systems and the existing natural gas pipeline system. This site is in a good location to provide power to the South Florida area. Also this project will be connected to the existing control room, administration building and warehousing facilities associated with existing Units 1 and 2, thereby avoiding additional environmental and cost impacts created by new buildings of this nature that would be required on a greenfield site.

ALTERNATIVE SITES

Other sites that were considered included undeveloped properties as well as FPL-owned, operating power plants. Undeveloped properties at Midway (St Lucie County), Andytown (Broward County), and Levee (Miami-Dade County) were considered. Each of these sites has physical and environmental challenges. The Martin Power Plant (Martin County) was also considered. The cost effectiveness evaluation together with the environmental impact review led us to select the Turkey Point site as the best, most reliable and most cost-effective, self-build alternative to meet the power supply needs of its customers.

ALTERNATIVE LOCATIONS AT THE TURKEY POINT SITE

Once the Turkey Point location was selected, FPL's engineers and planners embarked on a process of evaluating the most logical and cost-effective physical location on the 11,000-acre property. Four main areas were considered prior to settling on the proposed location (see Figure 1). Minimizing environmental impacts (specifically wetland and critical wildlife habitat impacts) while maximizing use of existing infrastructure were the main guiding factors considered during this evaluation. Impact to nuclear security and appropriateness of existing zoning were also considered in the evaluation.

Methodology

Alternative locations were evaluated using an analytical technique that rates each alternative against specific evaluation criteria. To reflect the relative importance of each criterion, weights that were used as a multiplier for each criterion rating were developed. Individual weighted criterion ratings were then summed for all criteria to develop an overall rank.

Rating of each alternative with respect to the specific criteria was performed using the technique described by Mr. Asok K. Motayed (1980). The methodology differs from most rating schemes, which usually involve assigning absolute numbers to each alternative to indicate its strength/weakness against subjectively weighted criteria. This technique attempts to reduce the subjectivity by simply comparing the alternatives, two at a time, with respect to the different criteria. Judgments such as poor, excellent, or how much better one area is than another are not made. The only necessary determination is which alternative is primarily better, or if the sites are generally equal when compared to a given criterion. Table 1 presents a detailed step-by-step description of the process.

Site coefficients were determined for each potential site to indicate the acceptability of the site with respect to each criterion. The coefficients were calculated by comparing the alternatives, two at a time, with respect to each criterion. For example, the location that is determined to be more suitable or superior with respect to the given criteria was assigned one point; the other location (i.e., the inferior location) was assigned zero. If the two locations were determined to be about the same, each was assigned one-half point. This one-to-one comparison was conducted for all combinations of the alternatives (e.g., A to B, A to C, A to D).

For each criterion, the results of the alternative comparisons (i.e., comparison ratings) were summed for each potential location. The coefficients were then calculated by dividing the sums by the total number of comparisons. So that no criterion receives a zero rating, a dummy variable (i.e., location) was included that, by definition, was inferior to all other criteria. As a result, the alternative coefficients for each discipline criterion are less than 1 (see Table 2A). The criteria for each discipline were then summed to obtain an overall evaluation criterion coefficient (see Table 2B).

Each evaluation criterion was compared in a similar manner to obtain the criteria weights (see Table 2C). The evaluation criterion coefficients and weights were then compiled by multiplying the

location coefficients for each evaluation criterion by its weight. The resultant weighted scores were summed for each potential location to determine the composite ratings (see Table 2D) and an overall rank.

Three environmental, one land use and three engineering critera were selected to evaluate the potential differences between alternative locations. These criteria reflect the major environmental, land use and engineering categories that can influence the suitability of potential locations at the Turkey Point site. The three environmental criteria were wetland impacts/acreage, wetland impacts/quality & habitat value and proximity to the Biscayne National Park. The three engineering criteria were road and infrastructure access, transmission connections and nuclear security. Criterion definitions are summarized below. Criteria ratings for each evaluation criterion were based on pair wise comparisons of each site option. Criteria weights were developed by pair-wise comparison of each evaluation criterion. The use of the pair-wise comparison is less subjective since the determination of preference is based on assessing the attributes of one location against the other for each evaluation criterion. If the locations are close, then they are rated equal.

Evaluation Criteria:

- Wetland Impacts/Acreage: This criterion is based on the total amount of wetland impacted by the option.
- Wetland Impacts/Quality & Habitat Value: This criterion is based on the quality of wetland being impacted.
- Proximity to Biscayne National Park: This criterion is based on the location of the location option relative to the Biscayne National Park.
- Land use-Zoning: This criterion is based on whether a specific option has the proper land use designation.
- Roads & Infrastructure Access: This criterion compares the ability of each location option to use the existing road access and other infrastructure.
- Transmission Connections: This criterion compares each location option and its ability to tie into the existing Turkey Point transmission system.
- Nuclear Security: This criterion evaluates each location option and the security requirements for Turkey Point Nuclear Units 3 and 4.

Location Descriptions

Option 1 is located west of the existing power plant in an area previously used for testing cooling systems with a series of canals and berms remaining in place. This area would result in an impact to approximately 65 acres of wetlands, including canals and berms that are designated as part of FPL's management program for infants of the federally endangered American Crocodile. In addition, this area is not zoned specifically for power plants. This area provides good access to the gas pipeline but only moderate access to the transmission system due to its location on the west side of the transmission system, rather than the north side. Use of the Option 1 site would require construction of a new administration building, control room, parking, and warehouse facilities. This option is also located entirely within the nuclear security zone.

Option 2 is the option FPL has selected and is located north of the existing power plant. Part of the area is already developed with roads and parking areas associated with Units 1 and 2. The remaining area would require impacting approximately 37 acres of high quality wetlands. An additional three acres of wetlands may experience secondary impacts within a 25-foot buffer surrounding the impact area. Portions of the Option 2 site area to be occupied by the power block are zoned Industrial, which allows the development of power plants. Original drawings, from the early 1970s, indicate this area was identified for future power plant expansion. Development of a new facility on the north side of the existing power plant allows the most direct access to gas pipeline and transmission lines. Connection to the transmission system would be from the correct direction (north) thereby minimizing costs. The existing control room, administration building and warehousing facilities can also be used to serve the expansion project. The power block for the expansion unit and all construction-related activity (except the construction of a storm water management system) could be accomplished without impact to the nuclear facility's security.

Option 3 is located west and south of the existing power plant in an area with medium quality wetlands. This area would result in an impact to approximately 85 acres of wetlands. This area is not zoned specifically for power plants. Placing the expansion project in this location would not allow utilization of existing power plant control room, administration building, parking, site access roads and warehouse facilities. Access to the existing transmission system is limited and would require the expansion of the transmission corridor and more complicated power line connections and possibly a new switch yard (this location is on the wrong side of the existing system switch yard). Access to the natural gas pipeline is also less accessible. This area is also within the nuclear security area and would present considerable security issues during the construction and operation of the facility.

Nuclear security dictates that a separation be established between nuclear operations and all other areas of the facility. Basically, this area is on the wrong side of the property to take advantage of the existing natural gas/oil power plant (Units 1and 2).

Option 4 is located south and slightly west of the Nuclear Power Plant in an area with low quality wetlands. This area would result in an impact to approximately 90 acres of wetlands. This area is not zoned specifically for power plants. This option presents the same challenges as Option 3 with an even closer proximity to nuclear operations and farther away from transmission and natural gas systems.

Another option that was considered was the placement of the expansion project immediately south of the existing nuclear facility. This option would require the removal and relocation of vital nuclear facilities and the existing security facilities. A nuclear security building, administration building, maintenance building, simulator training facility and warehousing are located in this area. These facilities are required for nuclear operations and must be located in close proximity to the Nuclear Plant. Relocation of these facilities is impractical, costly, and would result in the impact of an area equivalent in size. Any area in close enough proximity would also result in impacts to wetlands. Cost for this relocation would be in excess of one hundred million dollars. This option would require approval of the NRC, a long and complicated process. The NRC would not approve this type of activity unless the need was clearly evident. Based on previous experience with the NRC, their focus would be on security issues. NRC has communicated their requirement for clear separation between Nuclear and non-Nuclear operations.

LOCATION EVALUATION

Table 3 presents the results of the comparison of evaluation criteria and the weights of the individual criterion. The most important criterion was judged to the nuclear security since this alone may make a location infeasible. Together the three environmental criterion were determined to be 0.537 and have the greatest influence on the final ratings. In contrast, three engineering criteria (i.e, 0.333) would not have as great an influence, even with the importance of the nuclear security issue. Land use was determined to be 0.130, which is higher than the road and infrastructure access and transmission connections but lower in significance the environmental criteria and nuclear security.

Tables 4A through 4G present the pair-wise comparisons of each location. As noted in the methodology a "dummy" location is added to insure that no location has a value of zero. The results of the unweighted and weighted ratings are presented in Table 5. The evaluation determined that Option 2 is the highest rated location given the comparison of this location against other locations for all the environmental, land use and engineering criteria. The overall ratings for Option 2 did not change based on using unweighted or weighted ratings.

CONCLUSION

Option 2 is considered to be the least intrusive, most cost-effective location on the Turkey Point site for the proposed expansion project, even when the wetlands impacts and associated mitigation are considered. This site is appropriately zoned and was considered as a future power unit location in the early development of the Turkey Point site. This particular location on the site maximizes opportunities to connect with existing infrastructure and minimizes impacts to the nuclear operation.

Once this option was selected, the engineers designed the expansion project to maximize the connections to the existing facilities. After meeting with the US Army Corps of Engineers and receiving their input as well as input from various other local and state agencies, FPL relocated the proposed expansion project, moving the power block as far to the west and away from Biscayne Bay and Biscayne National Park as practical. The light oil tank was relocated from the east to the west and the storm water pond was relocated to the south side of the nuclear access road. It was determined that once the storm water pond was constructed, access to that facility would be limited which would minimize nuclear security issues. These design changes resulted in the minimization of wetland impacts to the extent possible.

FPL recognizes the need to mitigate for the unavoidable wetland impacts for any of the options considered. FPL has developed a mitigation strategy for impacts to Option 2 that incorporates: on-site wetlands restoration; a culvert project that will effectively improve flushing over a large area on the site; and improvement and restoration of a previously impacted, on-site area. Any remaining credits that may be required will be purchased from the Everglades Mitigation Bank which is in the same drainage basin as the proposed project area.

References:

FPL 2003. Ten Year Power Plant Site Plan 2003-2012. Submitted to the Florida Public Service Commission. April, 2003.

Motayed, A. K. 1980. Alternative Evaluation of Power Plant Sites. Journal of the Energy

Table 1. Alternative Analysis Procedures

Step	Description
1	Perform one-to-one comparison of all alternatives for each discipline criterion to determine ratings
2	Sum comparison ratings for each alternative
3	Obtain unweighted discipline coefficient for each criterion by dividing sum of comparison ratings for each alternative (Step 2) by the total sum over all alternatives for each criterion
4	Perform one-to-one comparison rating of all criteria
5	Sum comparison rating for each criterion and discipline
6	Obtain criterion weight by dividing sum of comparison ratings for each criterion (Step 5) by total sum over all criteria
7	For each alternative, multiply the unweighted alternative coefficient for each criterion (Step 3) by the corresponding criterion weight (Step 6) to obtain weighted scores for each alternative and criterion
8	Sum weighted scores to obtain composite score
9	Rank alternatives in order of increasing composite score

Table 2. Illustrative Example of Rating and Ranking Procedure Used in Analysis of Potential Locations (Page 2 of 2)

D. Summation of Evaluation Criteria Rating for Each Potential Location

Evaluation Criterion	Potential Location A	B	C
Unweighted:			
X	0.33	0.42	0.25
Y	0.42	0.33	0.25
Z	0.42	0.25	0.33
Composite Rating:	1.17	1.00	0.83
Ranking	1	2	3
Weighted:			
X	0.11	0.14	0.08
Y	0.07	0.06	0.04
Z	0.21	0.13	0.17
Composite Rating	0.039	0.33	0.29
Ranking	1	2	3

[a] Criterion ratings are not shown.

Table 3. Evaluation Criteria Comparisons

Evaluation Criteria	Criteria Comparisons Rating																													Sum	Criterion Weight	Count
Wetland Impacts/Acreage	0.5	0.5	1	1	1	0	1																							5	0.185	7
Wetland Impacts/Quality & Habit Value	0.5							1	0.5	1	1	0	1																	5	0.185	7
Proximity to Biscayne National Park		0.5						0						1	1	1	0	1												4.5	0.167	7
Land Use - Zoning			0						0.5					0					1	1	0	1								3.5	0.130	7
Road & Infrastructure Access				0						0					0				0				0.5	0	1					1.5	0.056	7
Transmission Connections					0						0					0				0			0.5			0	1			1.5	0.056	7
Nuclear Security						1						1					1				1			1		1		1	6	0.222	7
Dummy							0						0					0				0			0		0	0	0	0.000	7
																														27		

Table 4A. Wetland Impacts/Acreage

Potential Location	Location Comparison Ratings										Sum	Unweighted Coefficient	Weighted Coefficient
Option 1	0	1	0.5	1							2.5	0.250	0.046
Option 2	1				1	1	1				4	0.400	0.074
Option 3		0			0			0.5	1		1.5	0.150	0.028
Option 4			0.5			0		0.5		1	2	0.200	0.037
Dummy				0			0		0	0	0	0.000	0.000
											10		

Table 4B. Wetland Impacts/Quality & Habit Value

Potential Location	Location Comparison Ratings										Sum	Unweighted Coefficient	Weighted Coefficient
Option 1	1	0	0	1							2	0.200	0.037
Option 2	0				0	0	1				1	0.100	0.019
Option 3		1			1			0.5	1		3.5	0.350	0.065
Option 4			1			1		0.5		1	3.5	0.350	0.065
Dummy				0			0		0	0	0	0.000	0.000
											10		

Table 4C. Proximity to Biscayne National Park

Potential Location	Location Comparison Ratings										Sum	Unweighted Coefficient	Weighted Coefficient
Option 1	1	1	1	1							4	0.400	0.067
Option 2	0				0.5	0.5	1				2	0.200	0.033
Option 3		0			0.5			0.5	1		2	0.200	0.033
Option 4			0			0.5		0.5		1	2	0.200	0.033
Dummy				0			0		0	0	0	0.000	0.000
											10		

Table 4D. Land Use - Zoning

Potential Location	Location Comparison Ratings										Sum	Unweighted Coefficient	Weighted Coefficient
Option 1	0	0.5	0.5	1							2	0.200	0.026
Option 2	1				1	1	1				4	0.400	0.052
Option 3		0.5			0			0.5	1		2	0.200	0.026
Option 4			0.5			0		0.5		1	2	0.200	0.026
Dummy				0			0		0	0	0	0.000	0.000
											10		

Table 4A. Wetland Impacts/Acreage

Table 4E. Road & Infrastructure Access

Potential Location	Location Comparison Ratings										Sum	Unweighted Coefficient	Weighted Coefficient
Option 1	0	0.5	0.5	1							2	0.200	0.011
Option 2	1				1	1	1				4	0.400	0.022
Option 3		0.5			0			0.5	1		2	0.200	0.011
Option 4			0.5			0		0.5		1	2	0.200	0.011
Dummy				0			0		0	0	0	0.000	0.000
											10		

Table 4F. Transmission Connections

Potential Site	Location Comparison Ratings										Sum	Unweighted Coefficient	Weighted Coefficient
Option 1	0	1	1	1							3	0.300	0.017
Option 2	1				1	1	1				4	0.400	0.022
Option 3		0			0			1	1		2	0.200	0.011
Option 4			0			0		0		1	1	0.100	0.006
Dummy				0			0		0	0	0	0.000	0.000
											10		

Table 4G. Nuclear Security

Potential Site	Location Comparison Ratings										Sum	Unweighted Coefficient	Weighted Coefficient
Option 1	0	1	1	1							3	0.300	0.067
Option 2	1				1	1	1				4	0.400	0.089
Option 3		0			0			1	1		2	0.200	0.044
Option 4			0			0		0		1	1	0.100	0.022
Dummy				0			0		0	0	0	0.000	0.000
											10		

Table 5. Overall Ratings

Potential Site	Location Comparison Ratings										Sum	Unweighted Coefficient	Weighted Coefficient
Option 1	2	5	4.5	7	0	0	0	0	0	0	18.5	1.850	0.270
Option 2	5	0	0	0	5.5	5.5	7	0	0	0	23	2.300	0.311
Option 3	0	2	0	0	1.5	0	0	4.5	7	0	15	1.500	0.219
Option 4	0	0	2.5	0	0	1.5	0	2.5	0	7	13.5	1.350	0.200
Dummy	0	0	0	0	0	0	0	0	0	0	0	0.000	0.000
											70	7	1

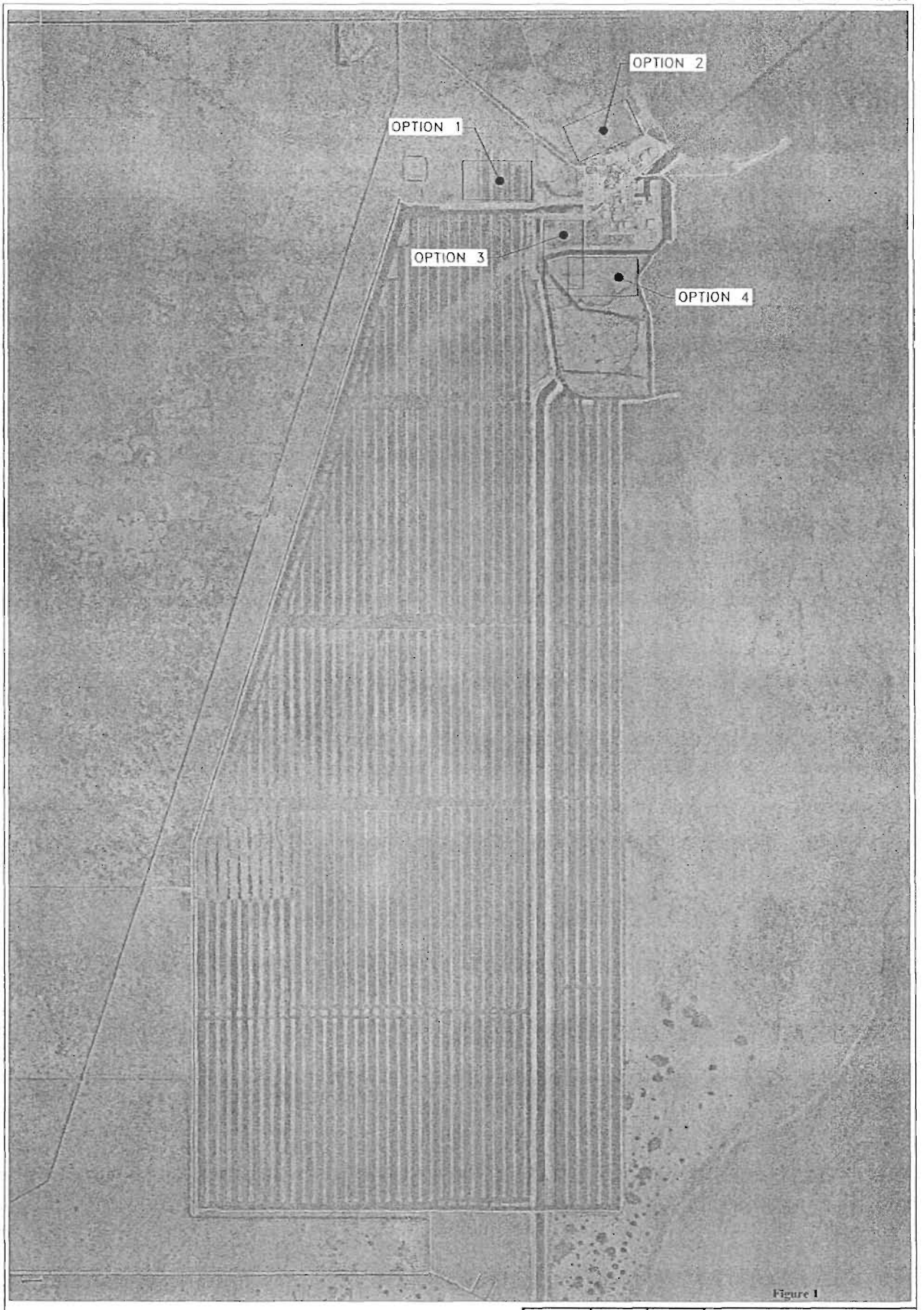


Figure 1

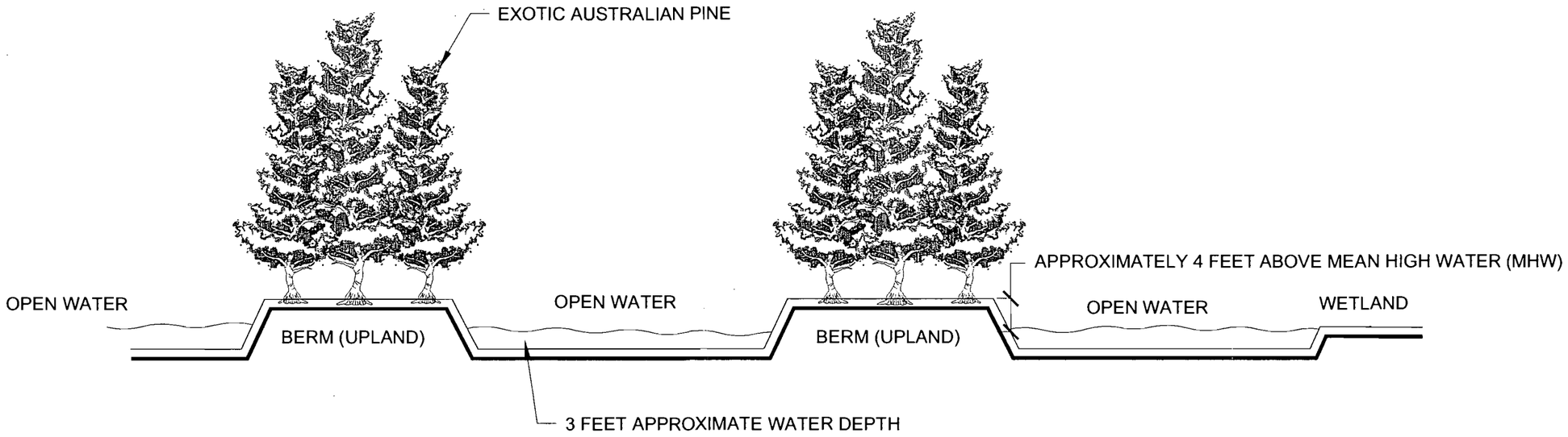
REV	DATE	REVISION DESCRIPTION	DWG BY	TDJ CH	CDR APR	PGB ORC
0	01/12/05	ISSUED FOR USE				

FPL	SYSTEM: N/A	DISCIPLINE: CS	PLANT/UNIT: TURKEY POINT
	SCALE: 1"=2500'	CAD FILE NAME: COMP.DWG	TITLE: EXPANSION PROJECT PLANT SITING OPTIONS
	DRAWING SIZE: A (8.5X11)	FILE ARCHIVE NAME: N/A	
	DRAWING NUMBER: SK-TPF-EXP-010		SHEET: 1 OF 1 / REV: 0

ATTACHMENT 3FDEP-3

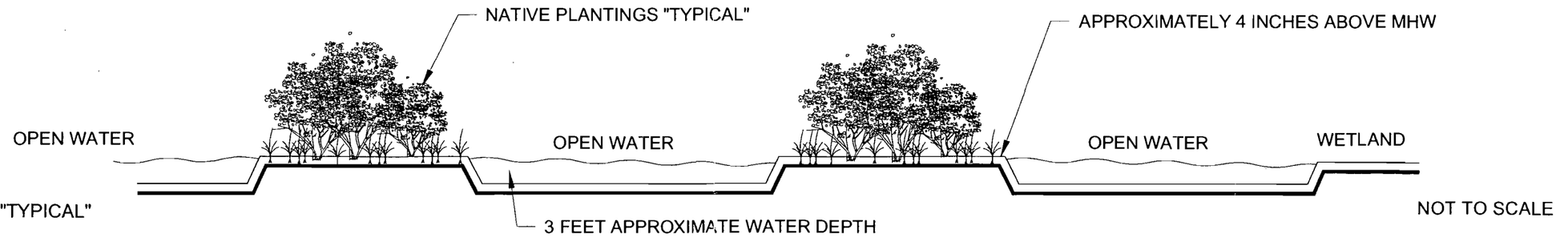
MITIGATION CROSS-SECTIONS

EXISTING CONDITIONS



POST MITIGATION CONDITIONS

ELEVATION AND PLANTING PLAN



CROSS-SECTIONS "TYPICAL"

DATE: 02-16-04

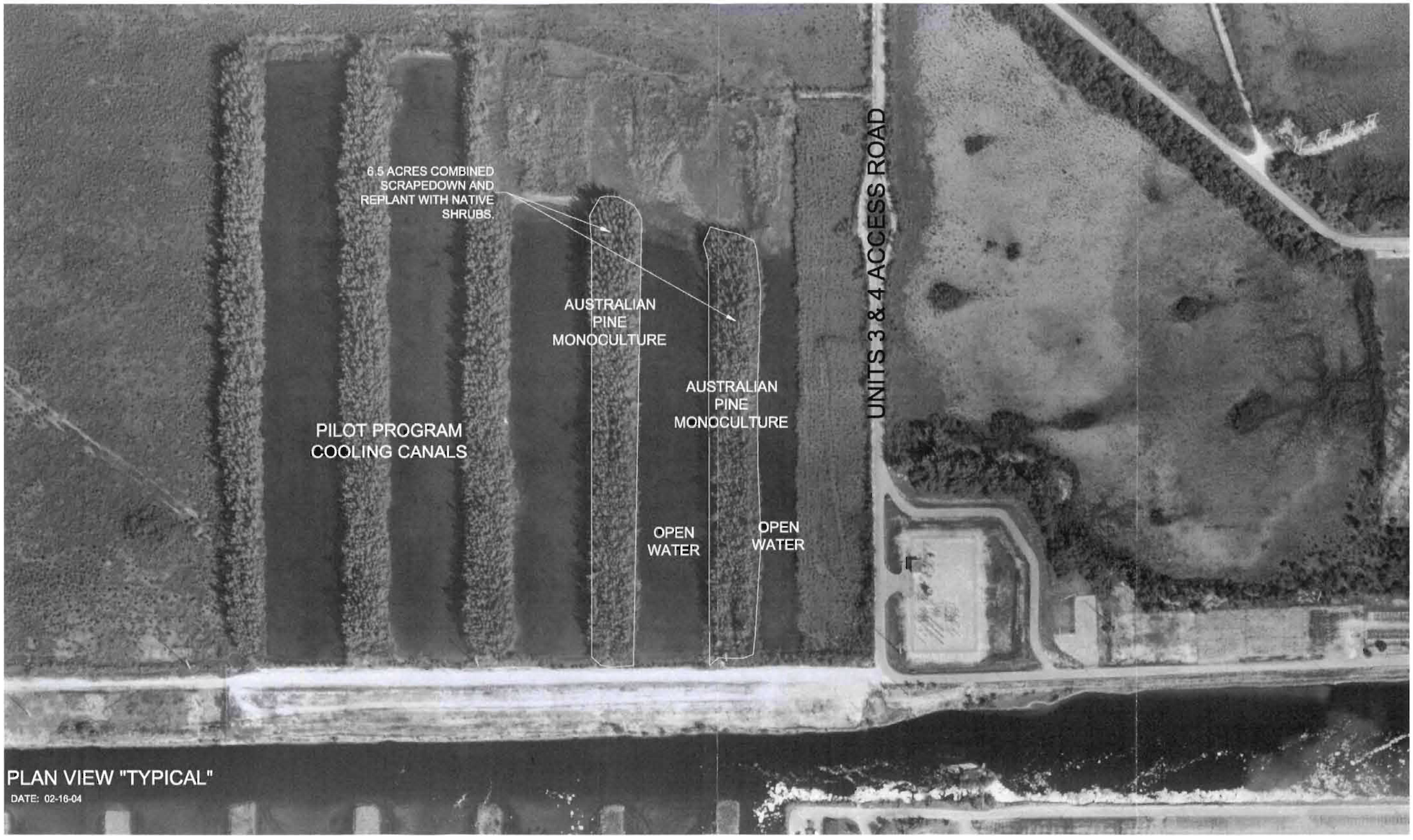
NOT TO SCALE

FPL

TURKEY POINT EXPANSION PROJECT

TEST COOLING BERMS' ON-SITE MITIGATION PROPOSAL

Cotleur Hearing
1934 Commerce Lane
Suite 1
Jupiter, Florida 33458
561-747-6336 Fax-747-1377



FPL

NORTH

TURKEY POINT EXPANSION PROJECT

TEST COOLING BERMS' ON-SITE MITIGATION PROPOSAL

0 100' 200' 400'

SCALE 1"= 200'

Cotleur Hearing
1934 Commerce Lane
Suite 1
Jupiter, Florida 33458
561-747-6336 Fax-747-1377

ATTACHMENT 3FDEP-4

MITIGATION BANK WETLAND EVALUATION MATRIX
AREA D

Mitigation Bank Wetland Function -- Evaluation Matrix

Turkey Point Expansion

Scoring conducted by: Bill L. Maus & Karl Bullock

W.A.T.E.R. - Wetland Assessment Technique for Environmental Reviews

Based on WBI, WQI, WRAP, HGM and 4th Priority Project List (PPL) with technical advise from EPA, FDEP, ACOE, NMFS, USF & W, SFWMD & Dade County (W.A.T.E.R. created by: Bill L. Maus)

Data Collected on: OCT. 22,2003

Enhancement Mitigation: Wetlands D-north and D-middle

Parameter/ Function	Scoring Criteria	Ratings	Polygon Wetland D north - West of Patrol Rd. Pre-	Polygon Wetland D North- West of Patrol Rd. Post-	Polygon Wetland D Middle-West of Patrol Rd. Pre-	Polygon Wetland D Middle-West of Patrol Rd. Post-	Polygon	Polygon
1. Fish & Wildlife Functions: Apply to freshwater, saltwater, brackish and mitigation systems								
	7 or more species commonly observed	3						
a. Waterfowl, wading birds, wetland dependent, or aquatic	3-6 species commonly observed	2	3	3	3	3		
birds of prey.	1-2 species commonly observed	1						
(Mit. Bank - High specie count w/ low pop. #'s score 1	0 species commonly observed	0						
	7 or more species commonly observed	3						
b. Fish	3-6 species commonly observed	2	3	3	3	3		
(Mit. Bank - High specie count w/ low pop. #'s score 1	1-2 species commonly observed	1						
Restoration that causes 12% pop. Increases-higher score)	0 species commonly observed	0						
	Top predator (carnivore) &/or large mammals	3						
c. Mammals	Medium sized mammals , (adult weight > 6 ibs.)	2	2	2	2	2		
(Mit. Bank - High specie count w/ low pop. #'s score 1	Small animals (rodents, etc.) , (adult weight < 6 lbs.)	1						
Restoration that causes 12% pop. Increases-higher score)	0 species present	0						
	7 or more species commonly observed	3						
d. Aquatic macroinvertebrates, amphibians	3-6 species commonly observed	2	3	3	3	3		
(Mit. Bank - High specie count w/ low pop. #'s score 1	1-2 species commonly observed	1						
Restoration that causes 12% pop. Increases-higher score)	0 species commonly observed	0						
	Large species observed	3						
e. Aquatic reptiles	Aquatic turtles	2	3	3	3	3		
(Mit. Bank - High specie count w/ low pop. #'s score 1	Snakes & lizards	1						
Restoration that causes 12% pop. Increases-higher score)	No evidence of species present	0						

Mitigation Bank Wetland Function -- Evaluation Matrix

Turkey Point Expansion

Scoring conducted by: Bill L. Maus & Karl Bullock

W.A.T.E.R. - Wetland Assessment Technique for Environmental Reviews

Based on WBI, WQI, WRAP, HGM and 4th Priority Project List (PPL) with technical advise from EPA, FDEP, ACOE, NMFS, USF & W, SFWMD & Dade County (W.A.T.E.R. created by: Bill L. Maus)

Data Collected on: OCT. 22,2003

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Parameter/ Function	Scoring Criteria	Ratings	Polygon Wetland D north - West of Patrol Rd. Pre-	Polygon Wetland D North- West of Patrol Rd. Post-	Polygon Wetland D Middle-West of Patrol Rd. Pre-	Polygon Wetland D Middle-West of Patrol Rd. Post-	Polygon	Polygon
2. *Vegetative Functions* *Apply to freshwater, saltwater, brackish and mitigation systems*								
a. Overstory/shrub canopy	Desirable trees/shrub healthy & providing appropriate habitat (seedlings present) & no inappropriate species	3	2.5	3	2.5	3		
	Desirable trees/shrubs exhibit signs of stress (no seedlings) few inappropriate species present	2						
	Inappropriate trees/shrubs shading or overcoming desirable tree/shrubs	1						
	Very little or no desirable tree/shrubs present (evidence suggests there should be)	0						
b. Vegetative ground cover	Assessment area exhibits <2% inappropriate herbaceous ground cover for specific wetland systems and groundcover is present	3	2.5	3	2.5	3		
	Assessment area contains >2% but <30% inappropriate herbaceous groundcover, or lack of groundcover >2% but < 30%	2						
	Assessment area contains >30% to <70% inappropriate herbaceous groundcover, or lack of ground cover >30% to <70%	1						
	Assessment area >70% inappropriate herbaceous groundcover or lack of groundcover >70%	0						
c. Periphyton mat coverage	Periphyton (Blue-green algae) present with average mat thickness >1 1/4 in. (measure active & dead layer)	3	1.5	2	1	2		
	Periphyton (Blue-green algae) present with average mat thickness between 3/4 in. to 1 1/4 in. (active & dead layer)	2						
	Periphyton (Blue-green algae) present with average mat thickness between 1/4 in. to 3/4 in. (active & dead layer)	1						
	Periphyton (Blue-green algae) not present or if pressent with average thickness of 0.0 to 1/4 in. (active & dead layer)	0						
d. Category 1 and Category 2 exotic plants or (non-native) species	< (or = to) 1 % exotic plant cover	3	3	3	3	3		
	>1 % to 10 % exotic plant cover	2						
	>10 % to 65 % exotic plant cover	1						
	> 65 % exotic plant cover	0						
e. Habitat diversity (vegetative) *(within assessment area)*	>3 native species communities on site within assesssment area	3	2	2	2	2		
	2 or 3 native specie communities on site within assessment area	2						
	1 native species community with 75 % to 90 % coverage within assessment area	1						
	1 native species community has > 90 % coverage within assessment area	0						
f. Biological diversity within 3000 feet *(approximately 1/2 mile from edge of assessment area)*	> 3 alternative habitats available (including upland)	3	3	3	3	3		
	2 to 3 alternative habitats	2						
	1 alternative habitat	1						
	Same habitat type, or inappropriate / impacted	0						

Mitigation Bank Wetland Function -- Evaluation Matrix

Turkey Point Expansion **Scoring conducted by: Bill L. Maus & Karl Bullock**

W.A.T.E.R. - Wetland Assessment Technique for Environmental Reviews

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Data Collected on: OCT. 22,2003

Enhancement Mitigation: Wetlands D-north and D-middle

Parameter/ Function	Scoring Criteria	Ratings	Polygon Wetland D north - West of Patrol Rd. Pre-	Polygon Wetland D North- West of Patrol Rd. Post-	Polygon Wetland D Middle-West of Patrol Rd. Pre-	Polygon Wetland D Middle-West of Patrol Rd. Post-	Polygon	Polygon
3. Hydrologic Functions								
a. Surface water hydrology / sheet flow *Apply to freshwater, saltwater, brackish and mitigation systems*	Major connection *(Flowing water/ river or floodplain/ uniform flow through natural systems)*	3	1	1.5	1	1.5		
	Moderate connection *(Natural restriction of flow or Flowing water due to hydrologic engineering)*	2						
	Minor connection *(Runoff collection point, or uneven flow due to berms, ditches, roadways etc,)*	1						
	Hydrologically isolated, no net lateral movement	0						
b. Hydroperiod (normal year) fresh systems	> 8 months inundated with no reversals & every year drydown	3						
	>5 months < 8 months or >5 years continuous inundation (look for strong water stains on persistent vegetation)	2						
	>1 month < 5 months, with possible reversals (look for soft or less distinct water stains on persistent vegetation)	1						
	< 4 weeks cumulative annual inundation or < 2 weeks continuous inundation	0						
b-1 Alternate to b. for Short Hydroperiod (normal year) fresh systems:	>10 weeks of continuous inundation including soil saturation	3						
	> 6 weeks but <10 weeks of continuous inundation including soil saturation	2						
	>2 weeks but <6 weeks of inudation, including soil saturation	1						
	<2 weeks of continuos inundation	0						
b-2 Alternate to b. for Saltwater, brackish (tidal) systems	Inundated by >90% high tides	3	2.5	3	2	3		
	Inundated by "spring" high tides (bi-monthly)	2						
	Inundated by "extreme high" tides only (biannually)	1						
	Inundated by storm surges only	0						
b-3 Alternate to b. for High Marsh (Juncus-Distichlis)	Inundated by high "spring" tides (monthly) and flushed by fresh water sheetflow every 10 days average	3						
	Inundated by high "spring" tides (monthly) and flushed by fresh water sheetflow every 30 days on the average	2						
	Inundated by high "spring" tides (monthly)and exposed to rain only	1						
	Inundated by >50% high tides and exposed to rain only	0						
b-4 Alternate to b. for Riverine systems	Inundated by high tides (daily) and/or recieves and maintains fresh water at least into first half of dry season	3						
	Inundated by high tides (daily) and/or recieves and maintains fresh water during rainy season only	2						
	Inundated by high tides (daily) and/or recieves fresh water but does not maintain (reversal) during rainy season	1						
	Inundated by spring tides (bi-monthly) and/or experiences frequent reversals of fresh water (flashy)	0						

Mitigation Bank Wetland Function -- Evaluation Matrix

Turkey Point Expansion

Scoring conducted by: Bill L. Maus & Karl Bullock

W.A.T.E.R. - Wetland Assessment Technique for Environmental Reviews

Based on WBI, WQI, WRAP, HGM and 4th Priority Project List (PPL) with technical advise from EPA, FDEP, ACOE, NMFS, USF & W, SFWMD & Dade County (W.A.T.E.R. created by: Bill L. Maus)

Data Collected on: OCT. 22,2003

Enhancement Mitigation: Wetlands D-north and D-middle

Parameter/ Function	Scoring Criteria	Ratings	Polygon Wetland D north - West of Patrol Rd. Pre-	Polygon Wetland D North- West of Patrol Rd. Post-	Polygon Wetland D Middle-West of Patrol Rd. Pre-	Polygon Wetland D Middle-West of Patrol Rd. Post-	Polygon	Polygon
3. Hydrologic Functions continued								
c. Hydropattern (fresh system)	>1 ft. water depth for at least 2.5 months and <6 in. for >1 month (measure water mark/ lichen line), or water depth ideal for specific wetland system.	3						
	>6 in to 1 ft. for at least 2.5 months (measure water mark/ lichen line) or water depth borderline over or under for specific wetland system	2						
	<6 in. for at least 2.5 months (measure water mark/ lichen line) or water depth incorrect for specific wetland system	1						
	<6 in. in association with either canals, ditches, swales, culverts, pumps, and/or wellfields, or these factors cause water depth to be too deep for specific system.	0						
c-1 Alternate to c. for Saltwater, brackish (tidal) systems	>1 ft. water depth <2 ft. on 90% high tides	3	2	2	2	2		
	> 6 in. water depth <1 ft. on >50% high tides	2						
	< 6 in. water depth , but > than saturated	1						
	Saturated by saline water table only	0						
c-2 Alternate to c. for High Marsh (Juncus-Distichlis)	>10 in. water depth <2 ft. on regular basis during growing season	3						
	>5 in. to 10in. water depth on regular basis during growing season	2						
	>1 in. to 5 in. water depth on regular basis during growing season	1						
	>0.0 in. to 1 in. water depth sporadically during growing season	0						
c-3 Alternate to c. for Riverine systems	>2 ft. water depth (main channel) <6 ft. for 8 months	3						
	>2 ft. water depth (main channel) <4 ft. for 6 months	2						
	>1 ft. water depth (main channel) <2.5 ft. for 4 months	1						
	<1 ft. water depth, but dry for >4 weeks (dry season)	0						

Mitigation Bank Wetland Function -- Evaluation Matrix

Turkey Point Expansion

Scoring conducted by: Bill L. Maus & Karl Bullock

W.A.T.E.R. - Wetland Assessment Technique for Environmental Reviews

Based on WBI, WQI, WRAP, HGM and 4th Priority Project List (PPL) with technical advise from EPA, FDEP, ACOE, NMFS, USF & W, SFWMD & Dade County (W.A.T.E.R. created by: Bill L. Maus)

Data Collected on: OCT. 22,2003

Enhancement Mitigation: Wetlands D-north and D-middle

Parameter/ Function	Scoring Criteria	Ratings	Polygon Wetland D north - West of Patrol Rd. Pre-	Polygon Wetland D North- West of Patrol Rd. Post-	Polygon Wetland D Middle-West of Patrol Rd. Pre-	Polygon Wetland D Middle-West of Patrol Rd. Post-	Polygon	Polygon
3. Hydrologic Functions continued								
d. Water Quality	No indication of poor water quality (lab testing required, all values within acceptable range)	3	1.5	2	1	2		
	No visual indicators of poor water quality observed (1 value just over or under acceptable range)	2						
	Visual indicators of poor water quality questionable (2 values over or under acceptable range)	1						
	Visual indicators of poor water quailty observed or lab verified (values are out of acceptable range)	0						
e. Intactness of historic topography (soil disturbance)	Unaltered	3	3	3	3	3		
	Slightly altered soil disturbance, < 10% of assessment area	2						
	Moderately altered soil disturbance, < 25% of assessment area	1						
	Extremely altered soil disturbance, may exceed 50% of assessment area	0						
f. Soils, organic (fresh systems)	Organic soil classified hydric soil >12 in. or any thickness over bedrock/caprock with perched water table and either condition covering >90% of surface area	3						
	Organic soil classified hydric soil >6 in. but <12 in. and covering >90% of surface area	2						
	Organic soil classified hydric soil >1 in. but <6 in. and covering >50% but <90% of surface area	1						
	Orgaric soil classified non-hydric soil <1 in. for >50% of surface area	0						
f-1 Alternate to f. for *Freshwater, saltwater systems*	Sandy soil classified hydric soil with distinct mottling and concretions present in greater than 40% of horizon.	3						
	Sandy soil classified hydric soil with mottling and concretions present in > 20% but < 40% of horizon.	2						
	Sandy soil classified hydric soil with light or sparse mottling and concretions < 2 mm diameter or < 20% of horizon.	1						
	Sandy soil exhibits strong evidence of disturbance or mechanical manipulations or is fill material.	0						
f-2 Alternate to f. for *Freshwater, saltwater, brackish (tidal) systems*	Calcareous loam >12 in. and >90 % of surface area	3	3	3	3	3		
	Calcareous loam >6 in. to <12 in. and >90% of surface area	2						
	Calcareous loam >1 in. to <6 in. and covering >50% but <90% of surface area	1						
	Calcareous loam <1 in. for >50% of surface area	0						

Mitigation Bank Wetland Function -- Evaluation Matrix

Turkey Point Expansion

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W.A.T.E.R. - Wetland Assessment Technique for Environmental Reviews

Based on WBI, WQI, WRAP, HGM and 4th Priority Project List (PPL) with technical advise from EPA, FDEP, ACOE, NMFS, USF & W, SFWMD & Dade County (W.A.T.E.R. created by: Bill L. Maus)

Data Collected on: OCT. 22,2003

Enhancement Mitigation: Wetlands D-north and D-middle

Parameter/ Function	Scoring Criteria	Ratings	Polygon Wetland D north - West of Patrol Rd. Pre-	Polygon Wetland D North- West of Patrol Rd. Post-	Polygon Wetland D Middle-West of Patrol Rd. Pre-	Polygon Wetland D Middle-West of Patrol Rd. Post-	Polygon	Polygon
4. Salinity Parameters *Apply to freshwater, saltwater, brackish, hypersaline and mitigation systems* - ***Choose 1***								
a. Optimum salinity for fresh systems during growing season based on mean high salinity for a normal year. *Apply to freshwater systems within 5 miles of the coast*	<2 parts per thousand (ppt)	3						
	2 to 3 parts per thousand (ppt)	2						
	4 to 5 parts per thousand (ppt)	1						
	>5 parts per thousand (ppt)	0						
a-1. Alternate to a. Optimum salinity for brackish systems during growing season based on mean high salinity for a normal year. *Apply to brackish (tidal) systems only*	6 to 8 parts per thousand (ppt)	3						
	9 to 13 parts per thousand (ppt)	2						
	14 to 16 parts per thousand (ppt)	1						
	>16 parts per thousand (ppt)	0						
a-2. Alternate to a. Optimum salinity for saline systems during growing season based on mean high salinity for a normal year. *Apply to saline marsh (tidal) systems only*	17 to 19 parts per thousand (ppt)	3						
	20 to 22 parts per thousand (ppt)	2	1	2	1	2		
	23 to 25 parts per thousand (ppt)	1						
	>25 parts per thousand (ppt)	0						
a-3. Alternate to a. Optimum salinity for hypersaline systems during growing season based on mean high salinity for a normal year. *Apply to hypersaline (tidal) systems only*	26 to 41 parts per thousand (ppt)	3						
	42 to 46 parts per thousand (ppt)	2						
	47 to 51 parts per thousand (ppt)	1						
	>51 parts per thousand (ppt)	0						
a-4 Alternate to a. Optimum salinity for riverine/tidal creek system during growing season based on mean high slainity for a normal year. *Apply to riverine systems only*	bottom (lower) third between 12 to 25 ppt middle third between 5 to 11 ppt. upper (top) third betweem 0 to 4 ppt.	3						
	bottom (lower) third between 25 to 32 ppt middle third between 6 to 24 ppt. upper (top) third betweem 0 to 5 ppt.	2						
	bottom (lower) third between 30 to 40 ppt middle third between 8 to 29 ppt. upper (top) third betweem 0 to 7 ppt.	1						
	bottom (lower) third between 35 to 50 ppt middle third between 10 to 34 ppt. upper (top) third betweem 0 to 9 ppt.	0						
	Cumulative Score (SC)		42.5	46.5	41.0	46.5		
	Maximum Possible Score (MPS)		54.00	54.00	54.00	54.00		
	W.A.T.E.R. = Cumulative Score/Maximum Possible Score		**0.79**	**0.86**	**0.76**	**0.86**		

W.A.T.E.R. created by: Bill L. Maus
11/1/1995

ATTACHMENT 3FDEP-5

MITIGATION BANK WETLAND EVALUATION MATRIX
AREAS H AND E

Mitigation Bank Wetland Function -- Evaluation Matrix

Turkey Point Expansion

W.A.T.E.R. - Wetland Assessment Technique for Environmental Reviews

Based on WBI, WQI, WRAP, HGM and 4th Priority Project List (PPL) with technical advise from EPA, FDEP, ACOE, NMFS, USF & W, SFWMD & Dade County (W.A.T.E.R. created by: Bill L. Maus)

Data Collected on: OCT. 22,2003 **Project Wetland H and E Impacts:**

Parameter/ Function	Scoring Criteria	Ratings	Polygon Wetland H 'east' Pre-	Polygon Wetland H 'east' 2nd impact-	Polygon Wetland E Pre-	Polygon Wetland E Post-
1. Fish & Wildlife Functions *Apply to freshwater, saltwater, brackish and mitigation systems*						
a. Waterfowl, wading birds, wetland dependent, or aquatic birds of prey. (Mit. Bank - High specie count w/ low pop. #'s score 1	7 or more species commonly observed	3	3	3	3	0
	3-6 species commonly observed	2				
	1-2 species commonly observed	1				
	0 species commonly observed	0				
b. Fish (Mit. Bank - High specie count w/ low pop. #'s score 1 Restoration that causes 12% pop. Increases-higher score)	7 or more species commonly observed	3	3	3	3	0
	3-6 species commonly observed	2				
	1-2 species commonly observed	1				
	0 species commonly observed	0				
c. Mammals (Mit. Bank - High specie count w/ low pop. #'s score 1 Restoration that causes 12% pop. Increases-higher score)	Top predator (carnivore) &/or large mammals	3	2	2	2	0
	Medium sized mammals , (adult weight > 6 ibs.)	2				
	Small animals (rodents, etc.) , (adult weight < 6 lbs.)	1				
	0 species present	0				
d. Aquatic macroinvertebrates, amphibians (Mit. Bank - High specie count w/ low pop. #'s score 1 Restoration that causes 12% pop. Increases-higher score)	7 or more species commonly observed	3	3	3	3	0
	3-6 species commonly observed	2				
	1-2 species commonly observed	1				
	0 species commonly observed	0				
e. Aquatic reptiles (Mit. Bank - High specie count w/ low pop. #'s score 1 Restoration that causes 12% pop. Increases-higher score)	Large species observed	3	3	3	3	0
	Aquatic turtles	2				
	Snakes & lizards	1				
	No evidence of species present	0				

Mitigation Bank Wetland Function -- Evaluation Matrix

Turkey Point Expansion

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Data Collected on: OCT. 22,2003 **Project Wetland H and E Impacts:**

Parameter/ Function	Scoring Criteria	Ratings	Polygon Wetland H 'east' Pre-	Polygon Wetland H 'east' 2nd impact-	Polygon Wetland E Pre-	Polygon Wetland E Post-
2. Vegetative Functions *Apply to freshwater, saltwater, brackish and mitigation systems*						
a. Overstory/shrub canopy	Desirable trees/shrub healthy & providing appropriate habitat (seedlings present) & no inappropriate species	3	2.5	2	3	0
	Desirable trees/shrubs exhibit signs of stress (no seedlings) few inappropriate species present	2				
	Inappropriate trees/shrubs shading or overcoming desirable tree/shrubs	1				
	Very little or no desirable tree/shrubs present (evidence suggests there should be)	0				
b. Vegetative ground cover	Assessment area exhibits <2% inappropriate herbaceous ground cover for specific wetland systems and groundcover is present	3	2.5	2.5	2.5	0
	Assessment area contains >2% but <30% inappropriate herbaceous groundcover, or lack of groundcover >2% but < 30%	2				
	Assessment area contains >30% to <70% inappropriate herbaceous groundcover, or lack of ground cover >30% to <70%	1				
	Assessment area >70% inappropriate herbaceous groundcover or lack of groundcover >70%	0				
c. Periphyton mat coverage	Periphyton (Blue-green algae) present with average mat thickness >1 1/4 in. (measure active & dead layer)	3	2	1.5	1	0
	Periphyton (Blue-green algae) present with average mat thickness between 3/4 in. to 1 1/4 in. (active & dead layer)	2				
	Periphyton (Blue-green algae) present with average mat thickness between 1/4 in. to 3/4 in. (active & dead layer)	1				
	Periphyton (Blue-green algae) not present or if pressent with average thickness of 0.0 to 1/4 in. (active & dead layer)	0				
d. Category 1 and Category 2 exotic plants or (non-native) species	< (or = to) 1 % exotic plant cover	3	3	3	3	0
	>1 % to 10 % exotic plant cover	2				
	>10 % to 65 % exotic plant cover	1				
	> 65 % exotic plant cover	0				
e. Habitat diversity (vegetative) *(within assessment area)*	>3 native species communities on site within assesssment area	3	2	2	2	0
	2 or 3 native specie communities on site within assessment area	2				
	1 native species community with 75 % to 90 % coverage within assessment area	1				
	1 native species community has > 90 % coverage within assessment area	0				
f. Biological diversity within 3000 feet *(approximately 1/2 mile from edge of assessment area)*	> 3 alternative habitats available (including upland)	3	3	3	3	0
	2 to 3 alternative habitats	2				
	1 alternative habitat	1				
	Same habitat type, or inappropriate / impacted	0				

Mitigation Bank Wetland Function -- Evaluation Matrix

Turkey Point Expansion

W.A.T.E.R. - Wetland Assessment Technique for Environmental Reviews

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Data Collected on: OCT. 22,2003 Project Wetland H and E Impacts:

Parameter/ Function	Scoring Criteria	Ratings	Polygon Wetland H 'east' Pre-	Polygon Wetland H 'east' 2nd impact-	Polygon Wetland E Pre-	Polygon Wetland E Post-
3. Hydrologic Functions						
a. Surface water hydrology / sheet flow *Apply to freshwater, saltwater, brackish and mitigation systems*	Major connection *(Flowing water/ river or floodplain/ uniform flow through natural systems)*	3	2.5	2	1	0
	Moderate connection *(Natural restriction of flow or Flowing water due to hydrologic engineering)*	2				
	Minor connection *(Runoff collection point, or uneven flow due to berms, ditches, roadways etc,)*	1				
	Hydrologically isolated, no net lateral movement	0				
b. Hydroperiod (normal year) fresh systems	> 8 months inundated with no reversals & every year drydown	3				
	>5 months < 8 months or >5 years continuous inundation (look for strong water stains on persistent vegetation)	2				
	>1 month < 5 months, with possible reversals (look for soft or less distinct water stains on persistent vegetation)	1				
	< 4 weeks cumulative annual inundation or < 2 weeks continuous inundation	0				
b-1 Alternate to b. for Short Hydroperiod (normal year) fresh systems:	>10 weeks of continuous inundation including soil saturation	3				
	> 6 weeks but <10 weeks of continuous inundation including soil saturation	2				
	>2 weeks but <6 weeks of inudation, including soil saturation	1				
	<2 weeks of continuos inundation	0				
b-2 Alternate to b. for Saltwater, brackish (tidal) systems	Inundated by >90% high tides		3	3	2	0
	Inundated by "spring" high tides (bi-monthly)	2				
	Inundated by "extreme high" tides only (biannually)	1				
	Inundated by storm surges only	0				
b-3 Alternate to b. for High Marsh (Juncus-Distichlis)	Inundated by high "spring" tides (monthly) and flushed by fresh water sheetflow every 10 days average	3				
	Inundated by high "spring" tides (monthly) and flushed by fresh water sheetflow every 30 days on the average	2				
	Inundated by high "spring" tides (monthly)and exposed to rain only	1				
	Inundated by >50% high tides and exposed to rain only	0				
b-4 Alternate to b. for Riverine systems	Inundated by high tides (daily) and/or recieves and maintains fresh water at least into first half of dry season	3				
	Inundated by high tides (daily) and/or recieves and maintains fresh water during rainy season only	2				
	Inundated by high tides (daily) and/or recieves fresh water but does not maintain (reversal) during rainy season	1				
	Inundated by spring tides (bi-monthly) and/or experiences frequent reversals of fresh water (flashy)	0				

Mitigation Bank Wetland Function -- Evaluation Matrix

Turkey Point Expansion

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Data Collected on: OCT. 22,2003 Project Wetland H and E Impacts:

Parameter/ Function	Scoring Criteria	Ratings	Polygon Wetland H 'east' Pre-	Polygon Wetland H 'east' 2nd impact-	Polygon Wetland E Pre-	Polygon Wetland E Post-
3. Hydrologic Functions continued						
c. Hydropattern (fresh system)	>1 ft. water depth for at least 2.5 months and <6 in. for >1 month (measure water mark/ lichen line), or water depth ideal for specific wetland system.	3				
	>6 in to 1 ft. for at least 2.5 months (measure water mark/ lichen line) or water depth borderline over or under for specific wetland system	2				
	<6 in. for at least 2.5 months (measure water mark/ lichen line) or water depth incorrect for specific wetland system	1				
	<6 in. in association with either canals, ditches, swales, culverts, pumps, and/or wellfields, or these factors cause water depth to be too deep for specific system.	0				
c-1 Alternate to c. for Saltwater, brackish (tidal) systems	>1 ft. water depth <2 ft. on 90% high tides	3	2.5	2.5	2	0
	> 6 in. water depth <1 ft. on >50% high tides	2				
	< 6 in. water depth , but > than saturated	1				
	Saturated by saline water table only	0				
c-2 Alternate to c. for High Marsh (Juncus-Distichlis)	>10 in. water depth <2 ft. on regular basis during growing season	3				
	>5 In. to 10in. water depth on regular basis during growing season	2				
	>1 in. to 5 in. water depth on regular basis during growing season	1				
	>0.0 in. to 1 in. water depth sporadically during growing season	0				
c-3 Alternate to c. for Riverine systems	>2 ft. water depth (main channel) <6 ft. for 8 months	3				
	>2 ft. water depth (main channel) <4 ft. for 6 months	2				
	>1 ft. water depth (main channel) <2.5 ft. for 4 months	1				
	<1 ft. water depth, but dry for >4 weeks (dry season)	0				

Mitigation Bank Wetland Function -- Evaluation Matrix

Turkey Point Expansion

W.A.T.E.R. - Wetland Assessment Technique for Environmental Reviews

Based on WBI, WQI, WRAP, HGM and 4th Priority Project List (PPL) with technical advise from EPA, FDEP, ACOE, NMFS, USF & W, SFWMD & Dade County (W.A.T.E.R. created by: Bill L. Maus)

Data Collected on: OCT. 22,2003 **Project Wetland H and E Impacts:**

Parameter/ Function	Scoring Criteria	Ratings	Polygon Wetland H 'east' Pre-	Polygon Wetland H 'east' 2nd impact-	Polygon Wetland E Pre-	Polygon Wetland E Post-
3. Hydrologic Functions continued						
d. Water Quality	No indication of poor water quality (lab testing required, all values within acceptable range)	3	2	2	1	0
	No visual indicators of poor water quality observed (1 value just over or under acceptable range)	2				
	Visual indicators of poor water quality questionable (2 values over or under acceptable range)	1				
	Visual indicators of poor water quaiity observed or lab verified (values are out of acceptable range)	0				
e. Intactness of historic topography (soil disturbance)	Unaltered	3	3	3	3	0
	Slightly altered soil disturbance, < 10% of assessment area	2				
	Moderately altered soil disturbance, < 25% of assessment area	1				
	Extremely altered soil disturbance, may exceed 50% of assessment area	0				
f. Soils, organic (fresh systems)	Organic soil classified hydric soil >12 in. or any thickness over bedrock/caprock with perched water table and either condition covering >90% of surface area	3				
	Organic soil classified hydric soil >6 in. but <12 in. and covering >90% of surface area	2				
	Organic soil classified hydric soil >1 in. but <6 in. and covering >50% but <90% of surface area	1				
	Organic soil classified non-hydric soil <1 in. for >50% of surface area	0				
f-1 Alternate to f. for *Freshwater, saltwater systems*	Sandy soil classified hydric soil with distinct mottling and concretions present in greater than 40% of horizon.	3				
	Sandy soil classified hydric soil with mottling and concretions present in > 20% but < 40% of horizon.	2				
	Sandy soil classified hydric soil with light or sparse mottling and concretions < 2 mm diameter or < 20% of horizon.	1				
	Sandy soil exhibits strong evidence of disturbance or mechanical manipulations or is fill material.	0				
f-2 Alternate to f. for *Freshwater, saltwater, brackish (tidal) systems*	Calcareous loam >12 in. and >90 % of surface area	3	3	3	3	0
	Calcareous loam >6 in. to <12 in. and >90% of surface area	2				
	Calcareous loam >1 in. to <6 in. and covering >50% but <90% of surface area	1				
	Calcareous loam <1 in. for >50% of surface area	0				

Mitigation Bank Wetland Function -- Evaluation Matrix

Turkey Point Expansion

W.A.T.E.R. - Wetland Assessment Technique for Environmental Reviews

Data Collected on: OCT. 22,2003 Project Wetland H and E Impacts:

Based on WBI, WQI, WRAP, HGM and 4th Priority Project List (PPL) with technical advise from EPA, FDEP, ACOE, NMFS, USF & W, SFWMD & Dade County (W.A.T.E.R. created by: Bill L. Maus)

Parameter/ Function	Scoring Criteria	Ratings	Polygon Wetland H 'east' Pre-	Polygon Wetland H 'east' 2nd impact-	Polygon Wetland E Pre-	Polygon Wetland E Post-
4. Salinity Parameters *Apply to freshwater, saltwater, brackish, hypersaline and mitigation systems -* ***Choose 1***						
a. Optimum salinity for fresh systems during growing season based on mean high salinity for a normal year. *Apply to freshwater systems within 5 miles of the coast*	<2 parts per thousand (ppt)	3				
	2 to 3 parts per thousand (ppt)	2				
	4 to 5 parts per thousand (ppt)	1				
	>5 parts per thousand (ppt)	0				
a-1. Alternate to a. Optimum salinity for brackish systems during growing season based on mean high salinity for a normal year. *Apply to brackish (tidal) systems only*	6 to 8 parts per thousand (ppt)	3				
	9 to 13 parts per thousand (ppt)	2				
	14 to 16 parts per thousand (ppt)	1				
	>16 parts per thousand (ppt)	0				
a-2. Alternate to a. Optimum salinity for saline systems during growing season based on mean high salinity for a normal year. *Apply to saline marsh (tidal) systems only*	17 to 19 parts per thousand (ppt)	3				
	20 to 22 parts per thousand (ppt)	2	3	2.5	1	0
	23 to 25 parts per thousand (ppt)	1				
	>25 parts per thousand (ppt)	0				
a-3. Alternate to a. Optimum salinity for hypersaline systems during growing season based on mean high salinity for a normal year. *Apply to hypersaline (tidal) systems only*	26 to 41 parts per thousand (ppt)	3				
	42 to 46 parts per thousand (ppt)	2				
	47 to 51 parts per thousand (ppt)	1				
	>51 parts per thousand (ppt)	0				
a-4 Alternate to a. Optimum salinity for riverine/tidal creek system during growing season based on mean high slainity for a normal year. *Apply to riverine systems only*	bottom (lower) third between 12 to 25 ppt middle third between 5 to 11 ppt. upper (top) third betweem 0 to 4 ppt.	3				
	bottom (lower) third between 25 to 32 ppt middle third between 6 to 24 ppt. upper (top) third betweem 0 to 5 ppt.	2				
	bottom (lower) third between 30 to 40 ppt middle third between 8 to 29 ppt. upper (top) third betweem 0 to 7 ppt.	1				
	bottom (lower) third between 35 to 50 ppt middle third between 10 to 34 ppt. upper (top) third betweem 0 to 9 ppt.	0				
	Cumulative Score (SC)		48.0	45.0	41.5	0.0
	Maximum Possible Score (MPS)		54.00	54.00	54.00	54.00
	W.A.T.E.R. = Cumulative Score/Maximum Possible Score		**0.89**	**0.83**	**0.77**	**0**

W.A.T.E.R. created by: Bill L. Maus

11/1/1995

ATTACHMENT 3FDEP-8

EMB COMMITMENT LETTER

EVERGLADES
MITIGATION BANK

January 26, 2004

M_____
Florida Department of Environmental Protection
400 N. Congress Avenue
West Palm Beach, Florida 33416

Re: **Turkey Point Power Plant Expansion, Miami Dade County FL**

Dear M_____

Please be advised that the Everglades Mitigation Bank (the "EMB") is reserving 18.09 Saltwater credits to offset the unavoidable wetland impact for the above referenced project. Of the total credits required 8.94 will come from Phase I and 9.15 will come from Phase II.

Phase I of the EMB has a signed Mitigation Banking Instrument acknowledged by both FDEP and USACOE and sufficient credits are currently available on the EMB ledger to offset the proposed impacts. Phase II of the EMB was permitted by the FDEP on October 17, 2003 and will have sufficient credits available upon the posting of financial assurances with the FDEP.

If I can be of any further assistance, please do not hesitate to call me at 561-691-2244.

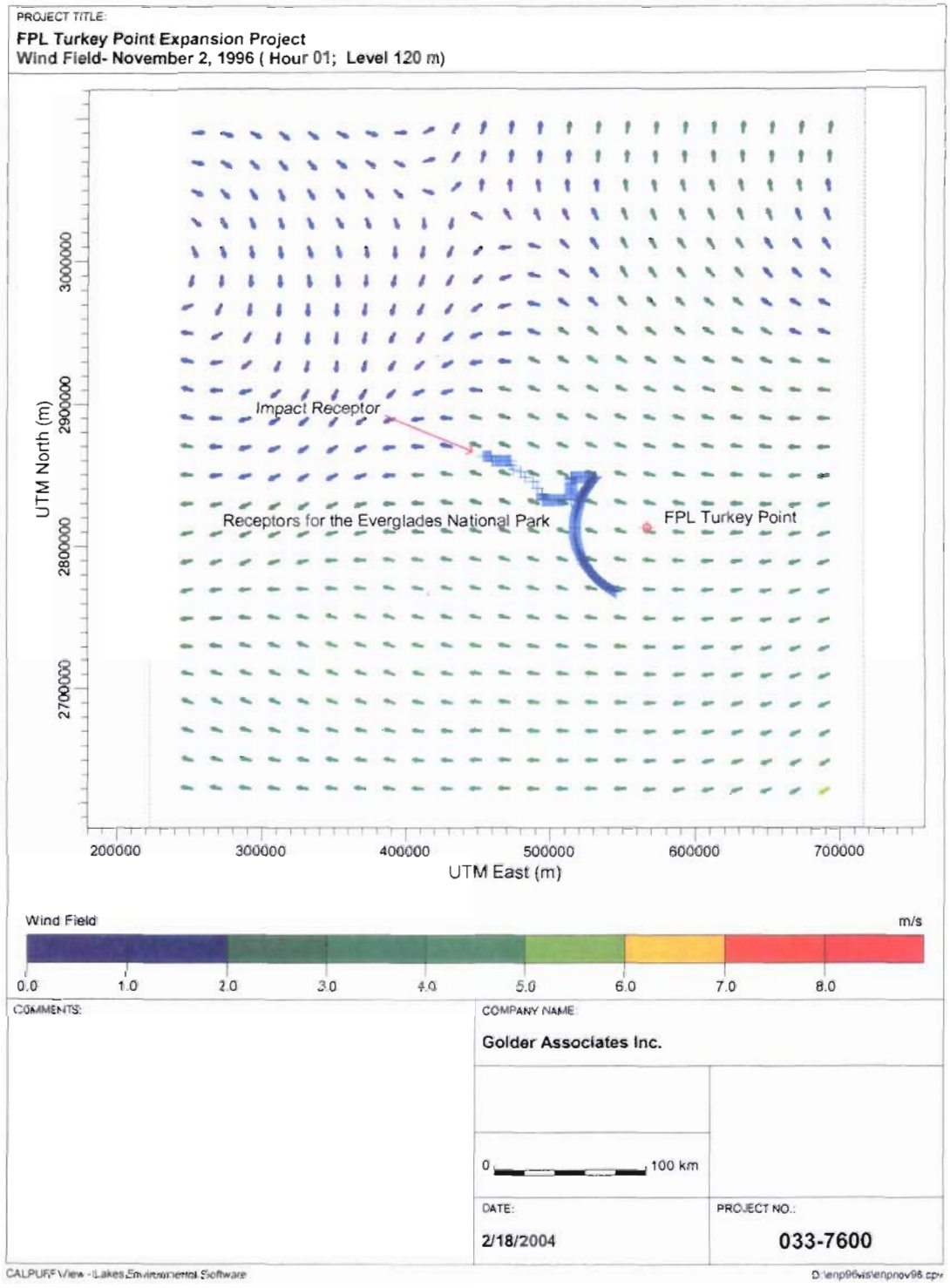
Sincerely,

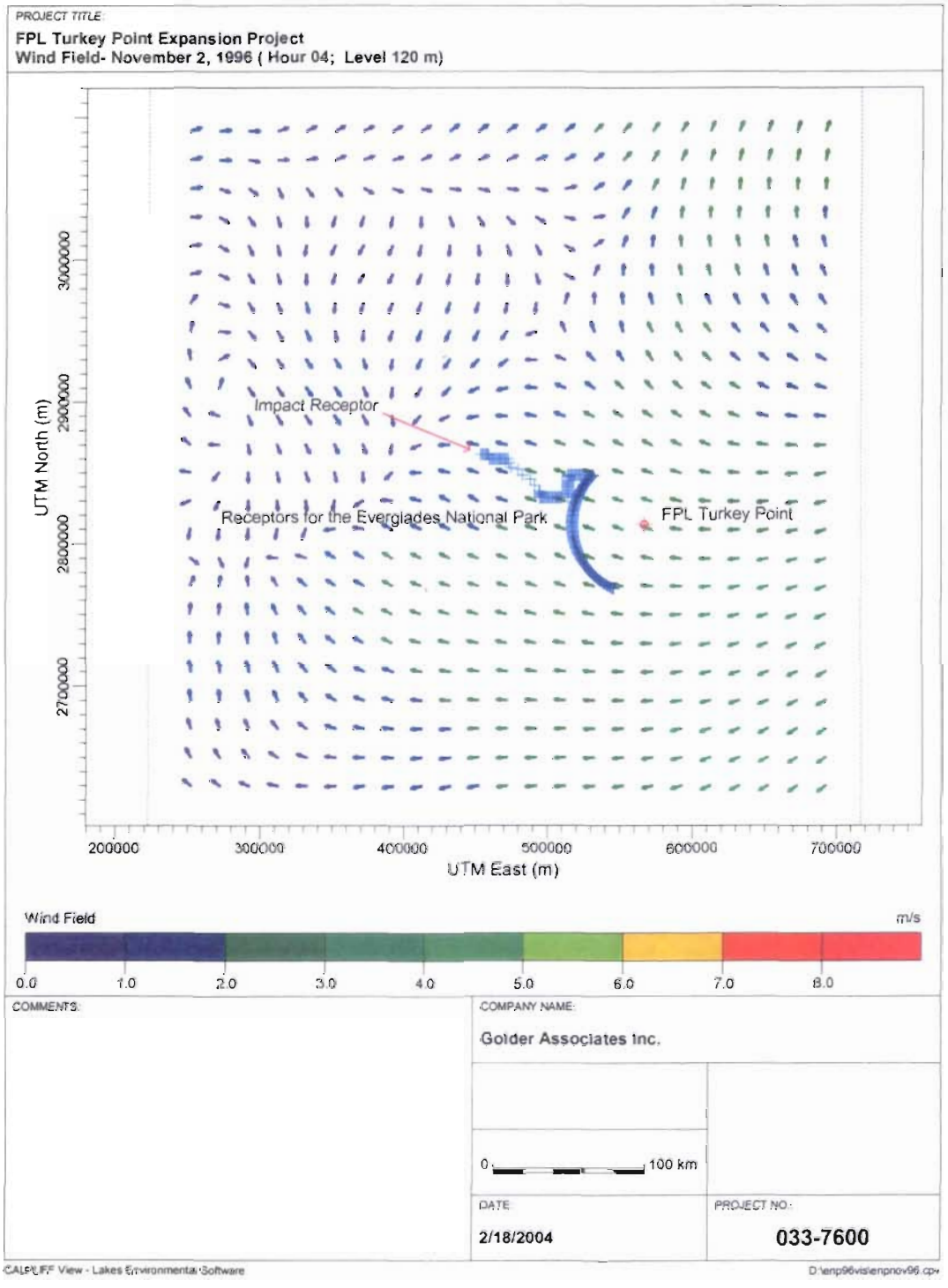
Stephen M. Collins
Asset Manager

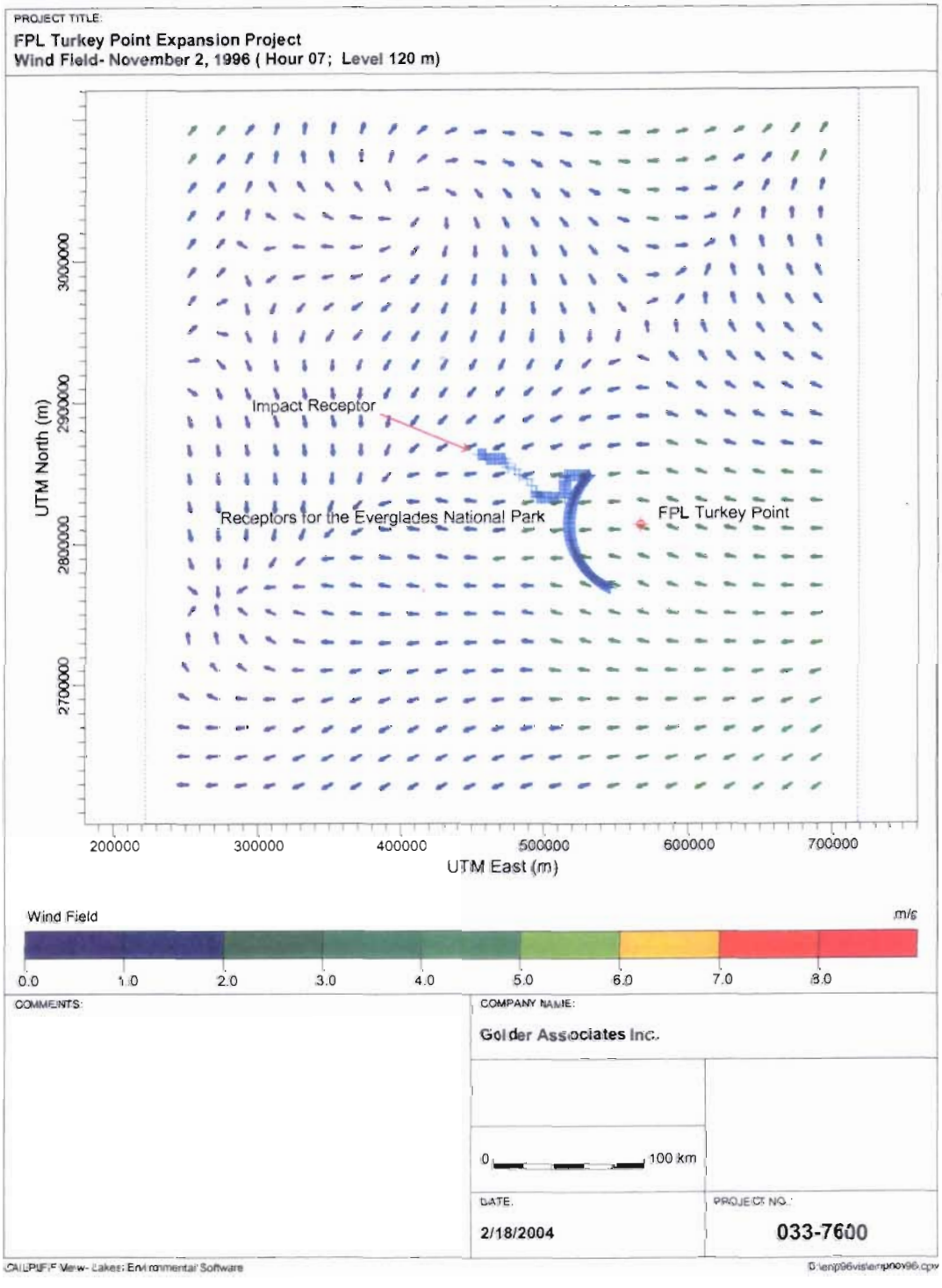
P.O. BOX 14000 JUNO BEACH FLORIDA 33408 561-691-2244

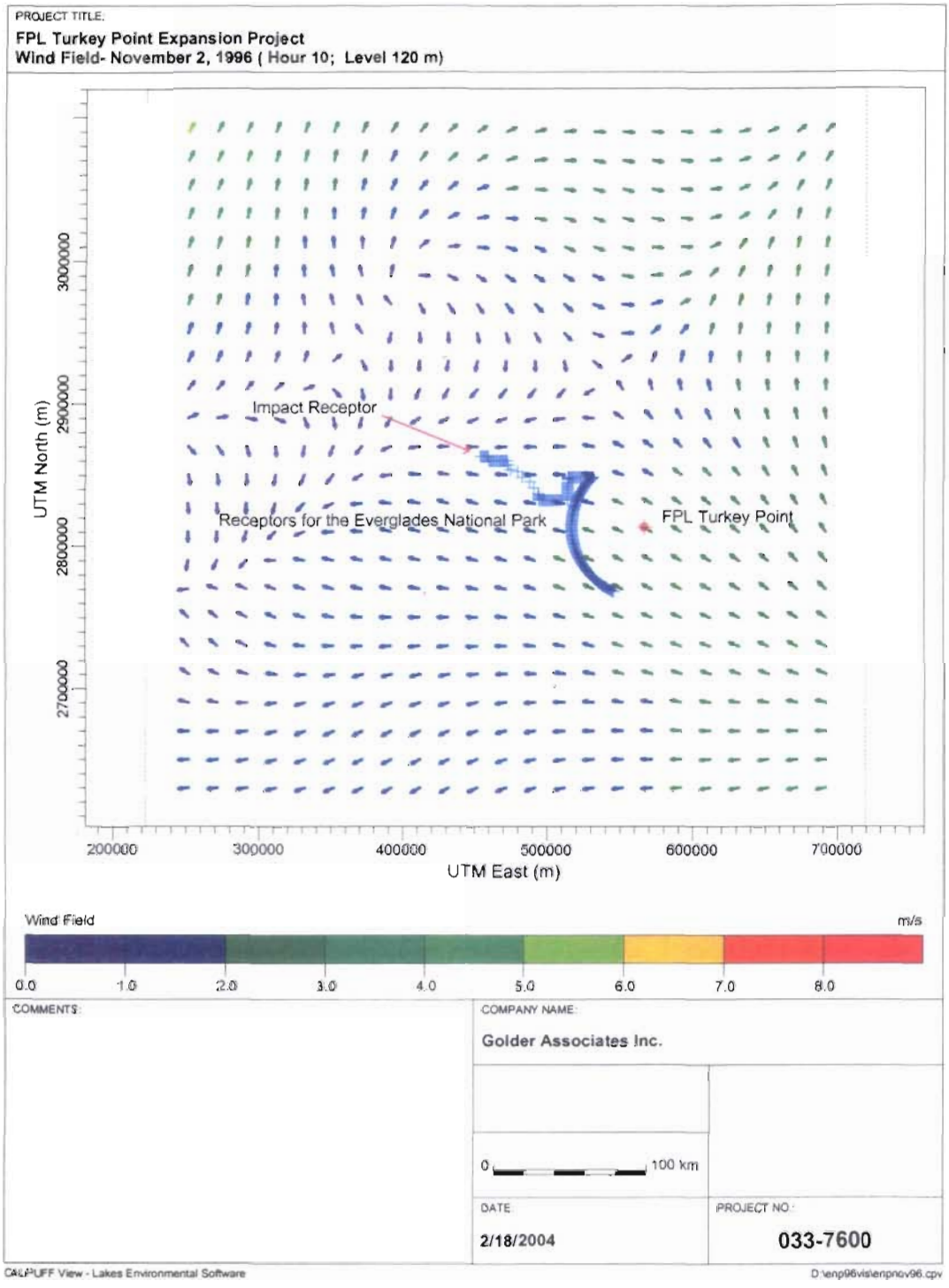
ATTACHMENT 4FDEP-18-1

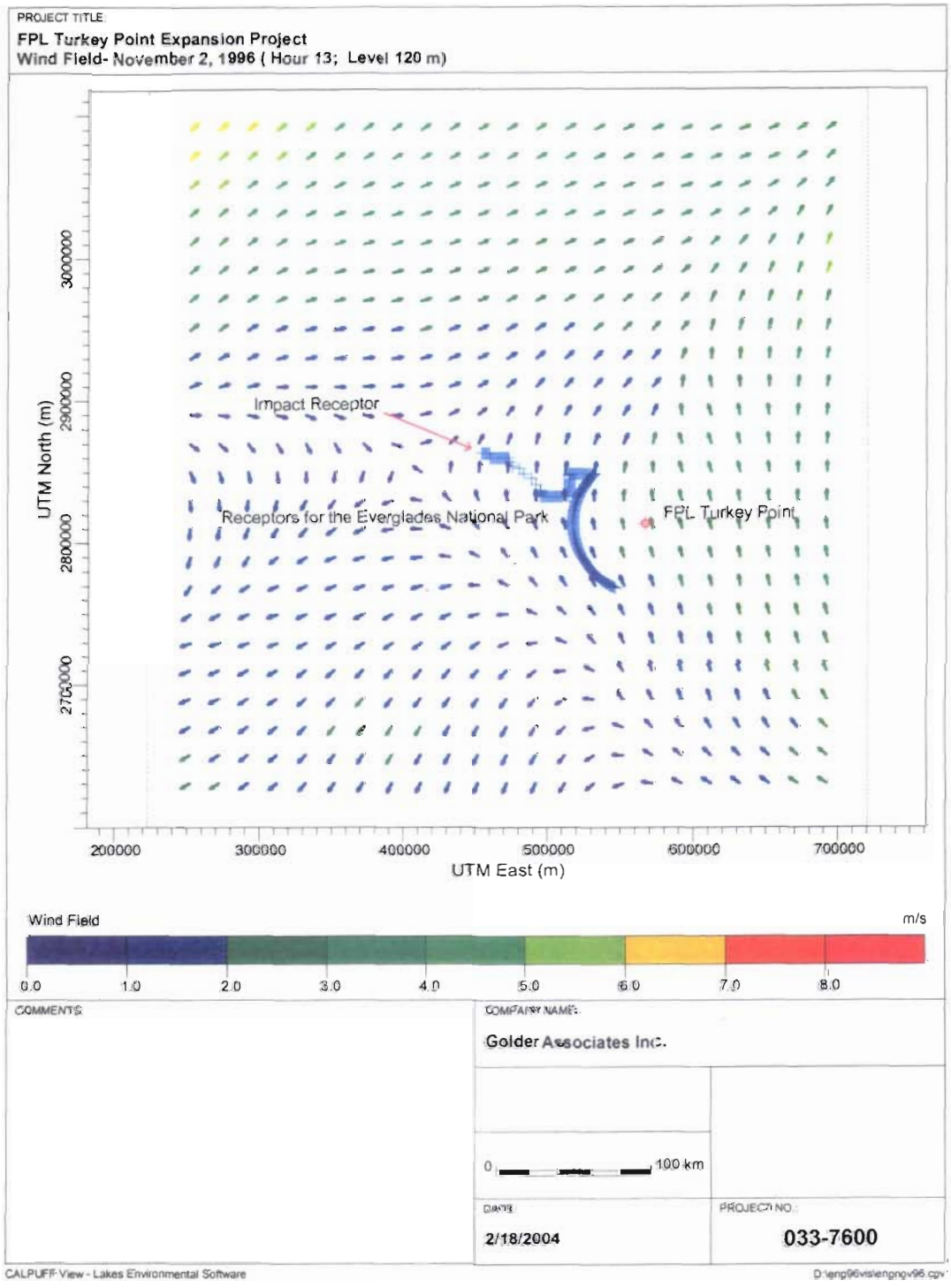
WINDFIELDS AT 120-METER LEVEL
OVER EVERGLADES NATIONAL PARK
FOR EVERY THIRD HOUR ON NOVEMBER 2, 1996
(Note: Class I receptors and Unit 5 location are identified on figures.)

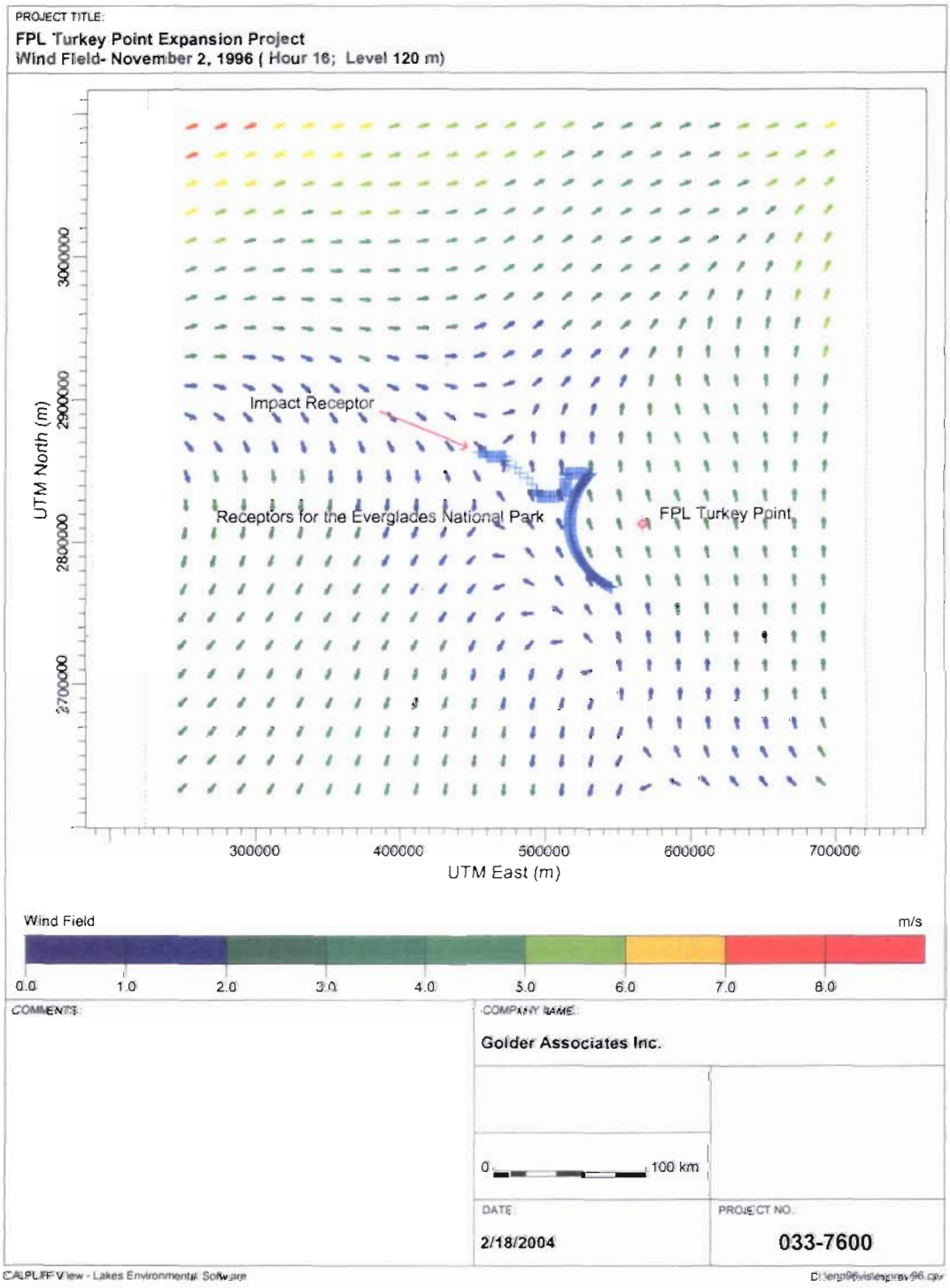

PROJECT TITLE:
FPL Turkey Point Expansion Project
Wind Field- November 2, 1996 (Hour 01; Level 120 m)
Impact Receptor
Receptors for the Everglades National Park
FPL Turkey Point
UTM North (m)
3000000
2900000
2800000
2700000
200000
300000
400000
500000
600000
700000
UTM East (m)
Wind Field
m/s
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
COMMENTS:
COMPANY NAME:
Golder Associates Inc.
0
100 km
DATE:
2/18/2004
PROJECT NO.:
033-7600
CALPUFF View - Lakes Environmental Software
D:\enp96vis\enpnov96.cpv

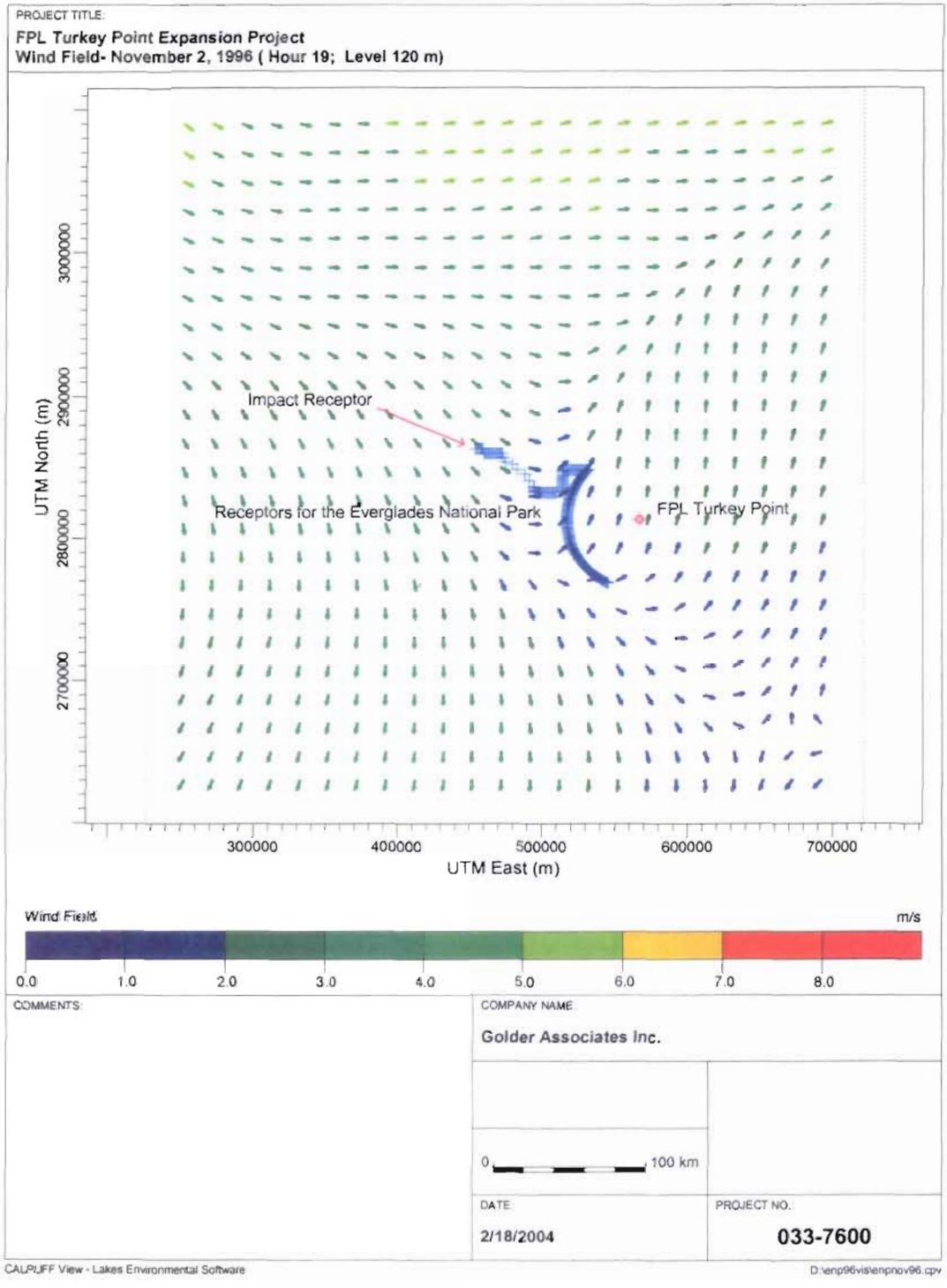

PROJECT TITLE:
FPL Turkey Point Expansion Project
Wind Field- November 2, 1996 (Hour 04; Level 120 m)
Impact Receptor
Receptors for the Everglades National Park
FPL Turkey Point
UTM North (m)
3000000
2900000
2800000
2700000
200000
300000
400000
500000
600000
700000
UTM East (m)
Wind Field
m/s
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
COMMENTS:
COMPANY NAME:
Golder Associates Inc.
0
100 km
DATE:
2/18/2004
PROJECT NO:
033-7600
CALPUFF View - Lakes Environmental Software
D:\enp96visienpnov96.cpv

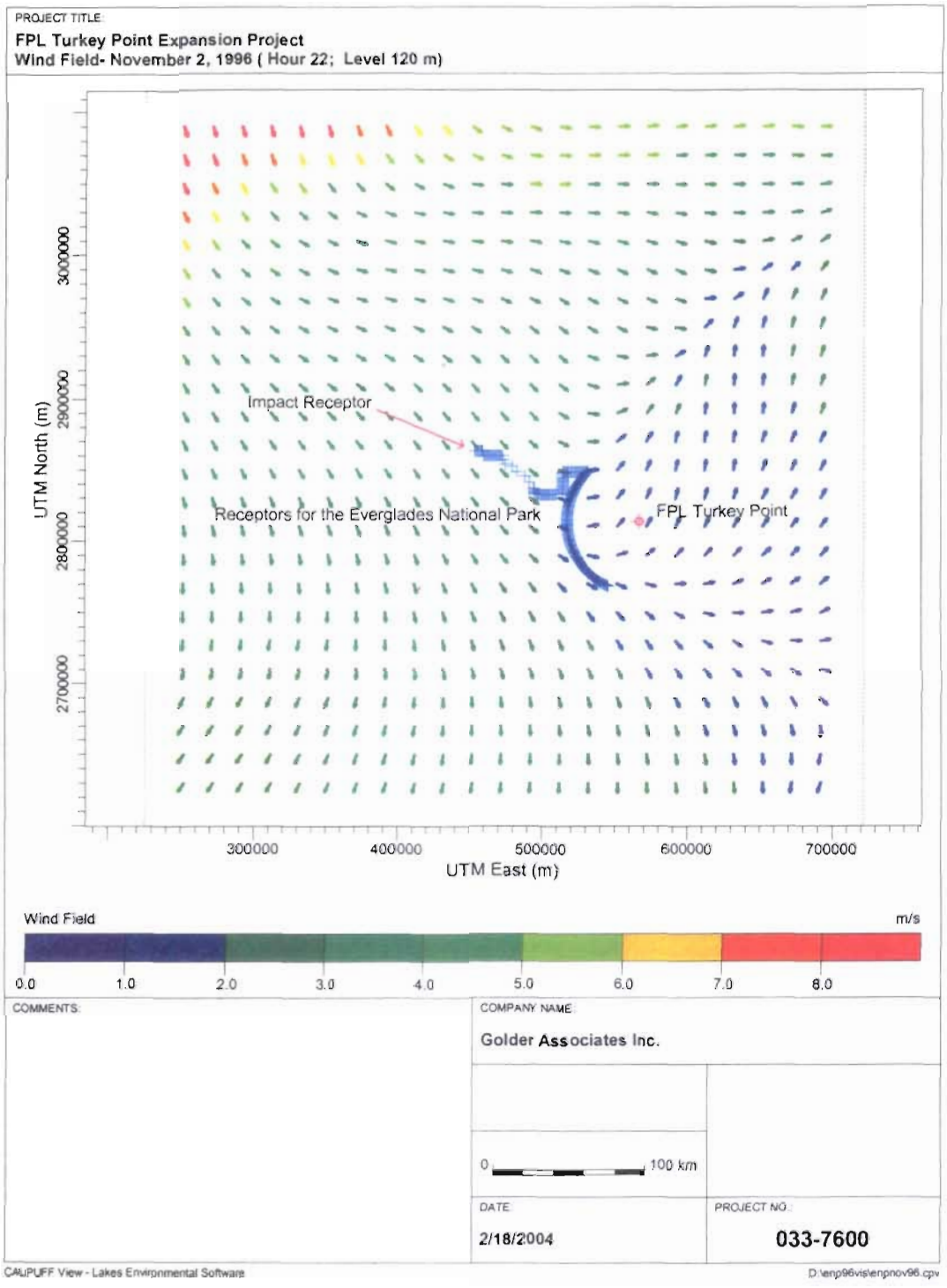

PROJECT TITLE:
FPL Turkey Point Expansion Project
Wind Field- November 2, 1996 (Hour 07; Level 120 m)
UTM North (m)
3000000
2900000
2800000
2700000
Impact Receptor
Receptors for the Everglades National Park
FPL Turkey Point
200000
300000
400000
500000
600000
700000
UTM East (m)
Wind Field
m/s
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
COMMENTS:
COMPANY NAME:
Golder Associates Inc.
0
100 km
DATE:
2/18/2004
PROJECT NO.:
033-7600
CALPUFF View- Lakes Environmental Software


PROJECT TITLE:
FPL Turkey Point Expansion Project
Wind Field- November 2, 1996 (Hour 10; Level 120 m)
Impact Receptor
Receptors for the Everglades National Park
FPL Turkey Point
UTM North (m)
3000000
2900000
2800000
2700000
200000
300000
400000
500000
600000
700000
UTM East (m)
Wind Field
m/s
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
COMMENTS:
COMPANY NAME:
Golder Associates Inc.
0
100 km
DATE:
2/18/2004
PROJECT NO.:
033-7600
CALPUFF View - Lakes Environmental Software
D:\enp96vis\enpnov96.cpv


PROJECT TITLE:
FPL Turkey Point Expansion Project
Wind Field- November 2, 1996 (Hour 13; Level 120 m)
Impact Receptor
Receptors for the Everglades National Park
FPL Turkey Point
UTM North (m)
3000000
2900000
2800000
2700000
200000
300000
400000
500000
600000
700000
UTM East (m)
Wind Field
m/s
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
COMMENTS:
COMPANY NAME:
Golder Associates Inc.
0
100 km
DATE:
2/18/2004
PROJECT NO.:
033-7600
CALPUFF View - Lakes Environmental Software
D:\eng96vis\engnov96.cpv

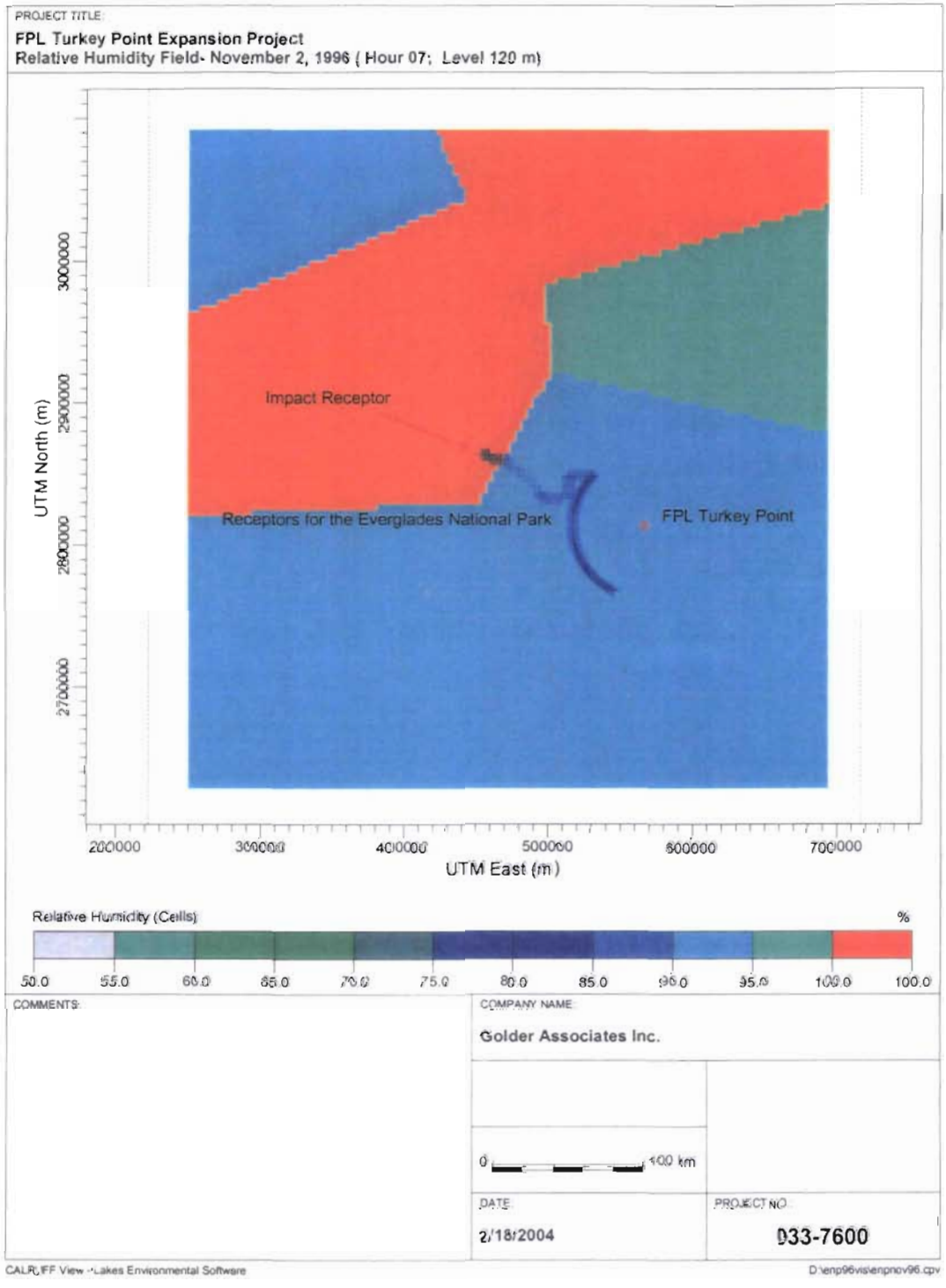

PROJECT TITLE:
FPL Turkey Point Expansion Project
Wind Field- November 2, 1996 (Hour 16; Level 120 m)
Impact Receptor
Receptors for the Everglades National Park
FPL Turkey Point
UTM North (m)
3000000
2900000
2800000
2700000
300000
400000
500000
600000
700000
UTM East (m)
Wind Field
m/s
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
COMMENTS:
COMPANY NAME:
Golder Associates Inc.
0
100 km
DATE:
2/18/2004
PROJECT NO.:
033-7600
CALPUFF View - Lakes Environmental Software


PROJECT TITLE:
FPL Turkey Point Expansion Project
Wind Field- November 2, 1996 (Hour 19; Level 120 m)
Impact Receptor
Receptors for the Everglades National Park
FPL Turkey Point
UTM North (m)
3000000
2900000
2800000
2700000
300000
400000
500000
600000
700000
UTM East (m)
Wind Field
m/s
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
COMMENTS:
COMPANY NAME:
Golder Associates Inc.
0
100 km
DATE:
2/18/2004
PROJECT NO.:
033-7600
CALPUFF View - Lakes Environmental Software
D:\enp96vis\enpnov96.cpv


PROJECT TITLE:
FPL Turkey Point Expansion Project
Wind Field- November 2, 1996 (Hour 22; Level 120 m)
Impact Receptor
Receptors for the Everglades National Park
FPL Turkey Point
UTM North (m)
3000000
2900000
2800000
2700000
300000
400000
500000
600000
700000
UTM East (m)
Wind Field
m/s
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
COMMENTS:
COMPANY NAME:
Golder Associates Inc.
0
100 km
DATE:
2/18/2004
PROJECT NO.:
033-7600
CALPUFF View - Lakes Environmental Software
D:\enp96vis\enpnov96.cpv

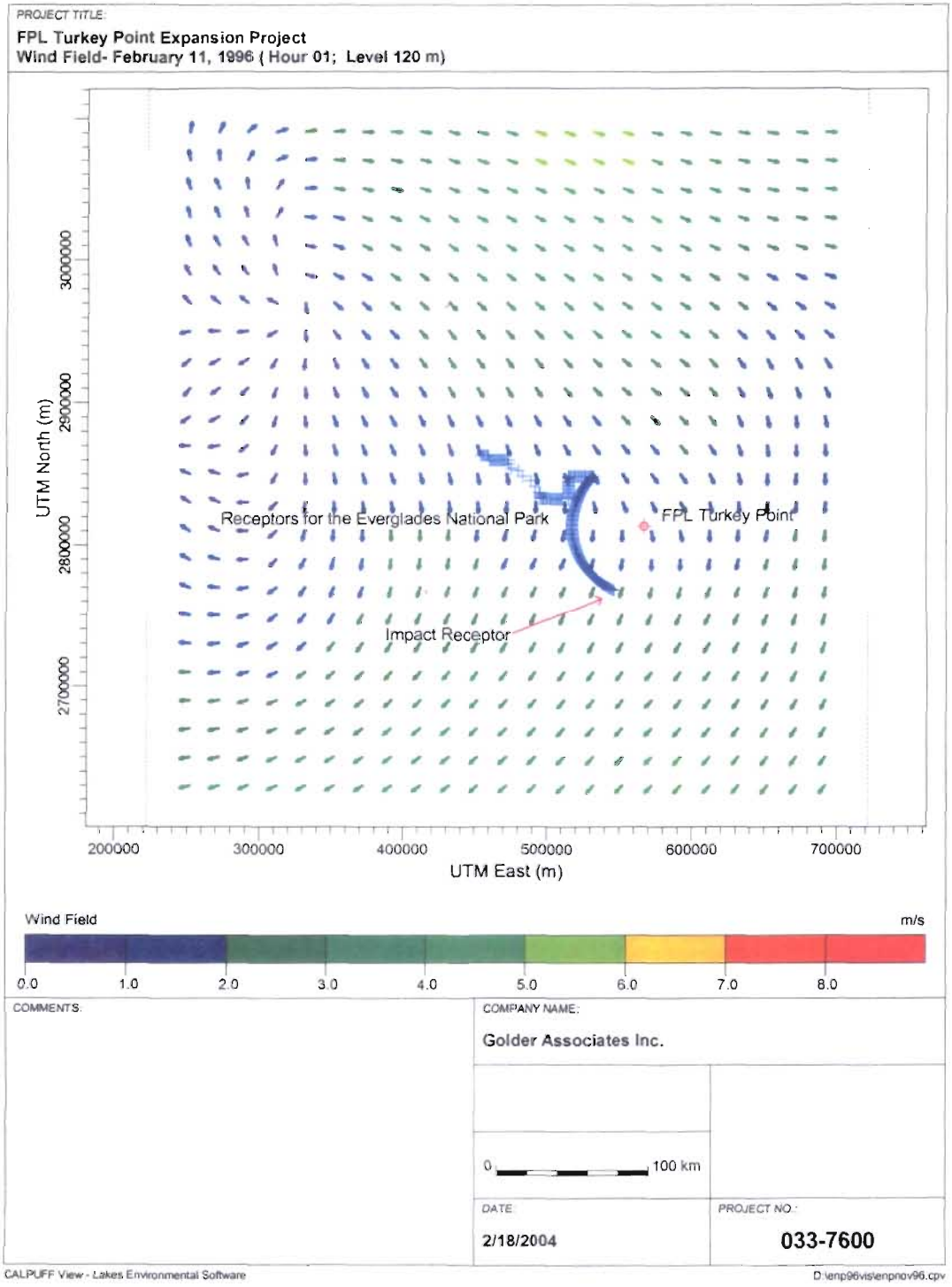
ATTACHMENT 4FDEP-18-2

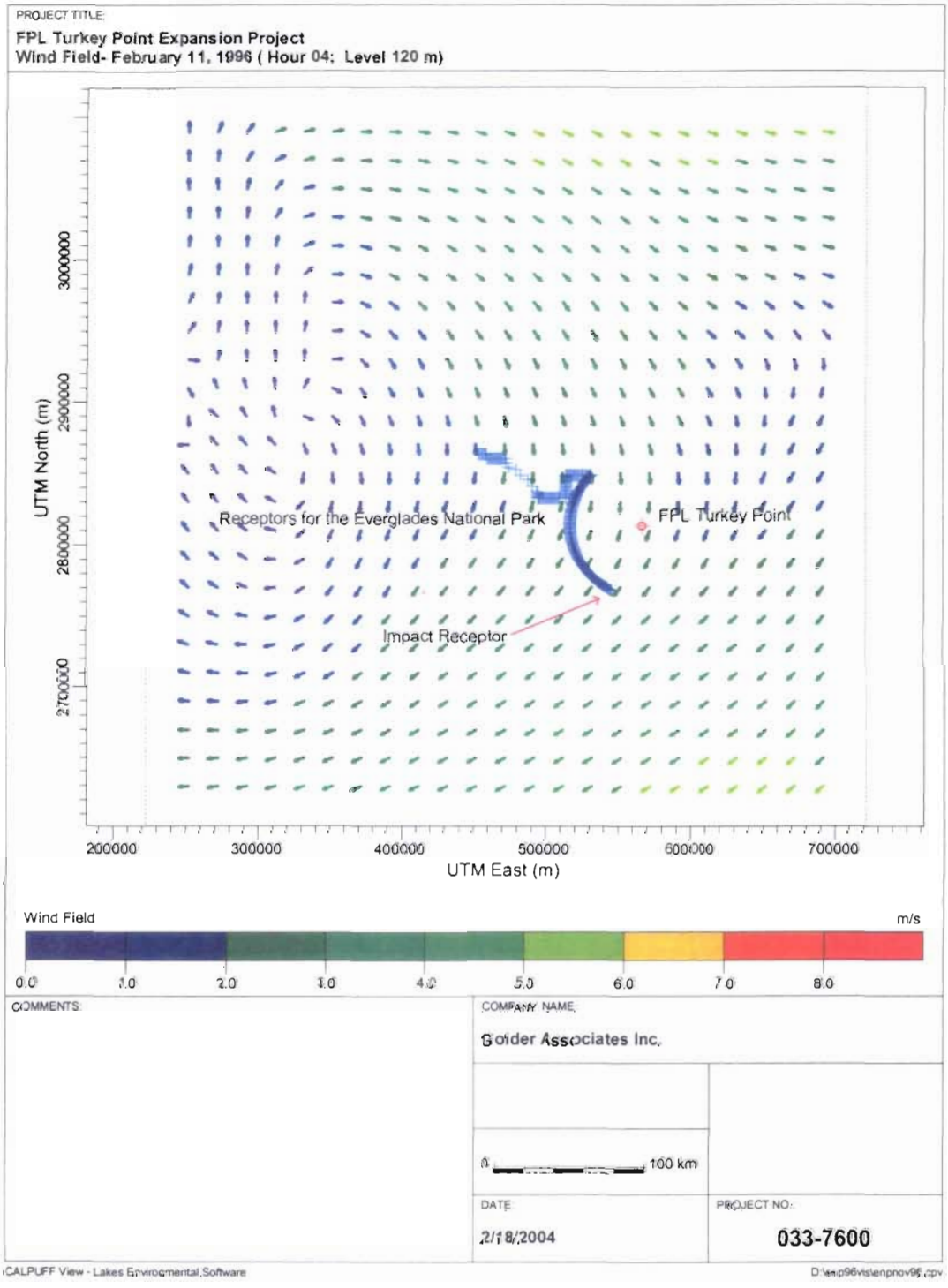
RELATIVE HUMIDITY AT 120-METER LEVEL
OVER THE EVERGLADES NATIONAL PARK
ON NOVEMBER 2, 1996, 7 A.M.
(NOTE: Class 1 receptors and Unit 5 location are identified in figures.)

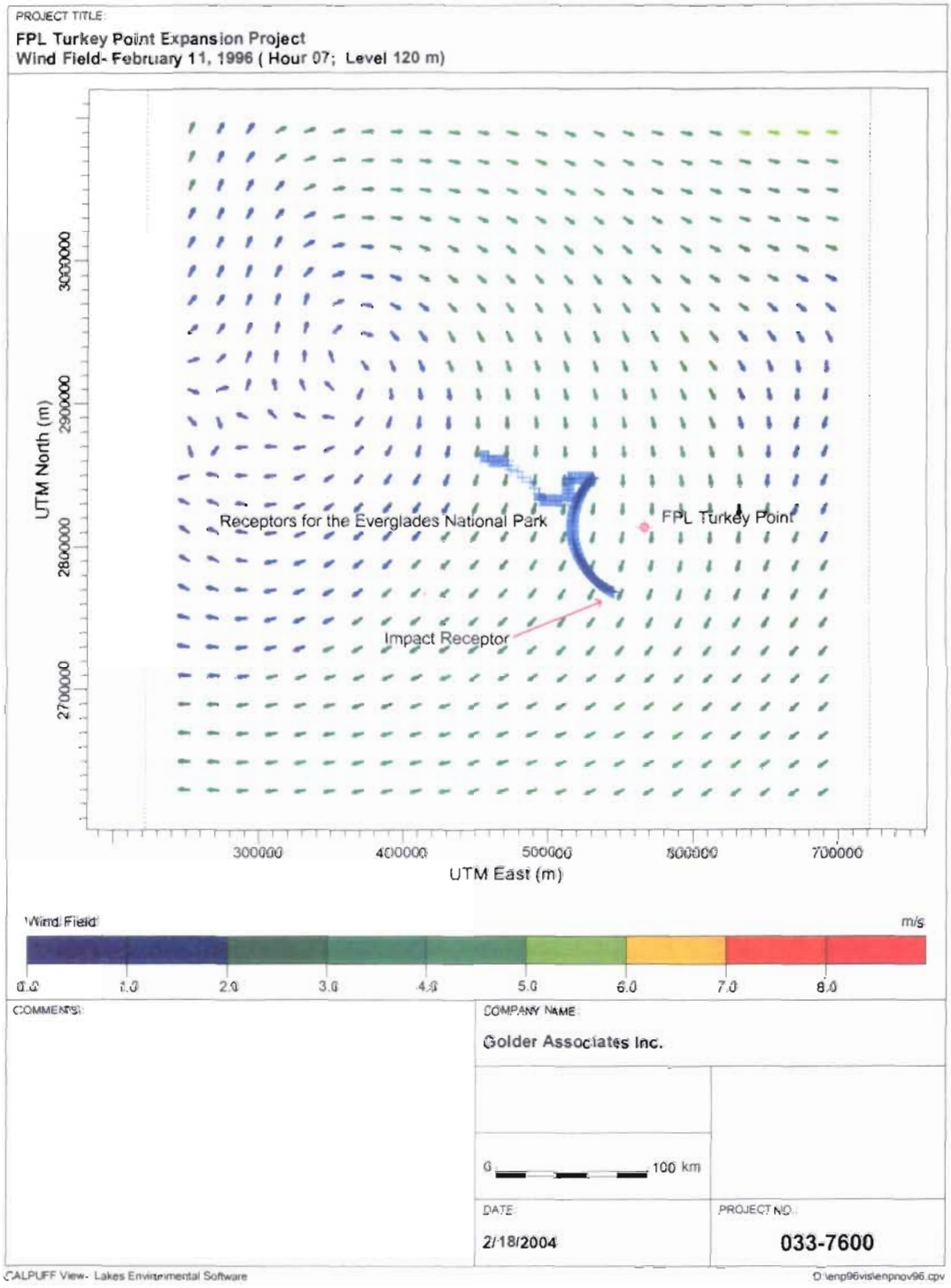

PROJECT TITLE:
FPL Turkey Point Expansion Project
Relative Humidity Field- November 2, 1996 (Hour 07; Level 120 m)
Impact Receptor
Receptors for the Everglades National Park
FPL Turkey Point
UTM North (m)
3000000
2900000
2800000
2700000
200000
300000
400000
500000
600000
700000
UTM East (m)
Relative Humidity (Cells)
%
50.0
55.0
60.0
65.0
70.0
75.0
80.0
85.0
90.0
95.0
100.0
COMMENTS:
COMPANY NAME:
Golder Associates Inc.
0
100 km
DATE:
2/18/2004
PROJECT NO.
033-7600
CALRUFF View - Lakes Environmental Software
D:\enp96vis\enpnov96.cpv

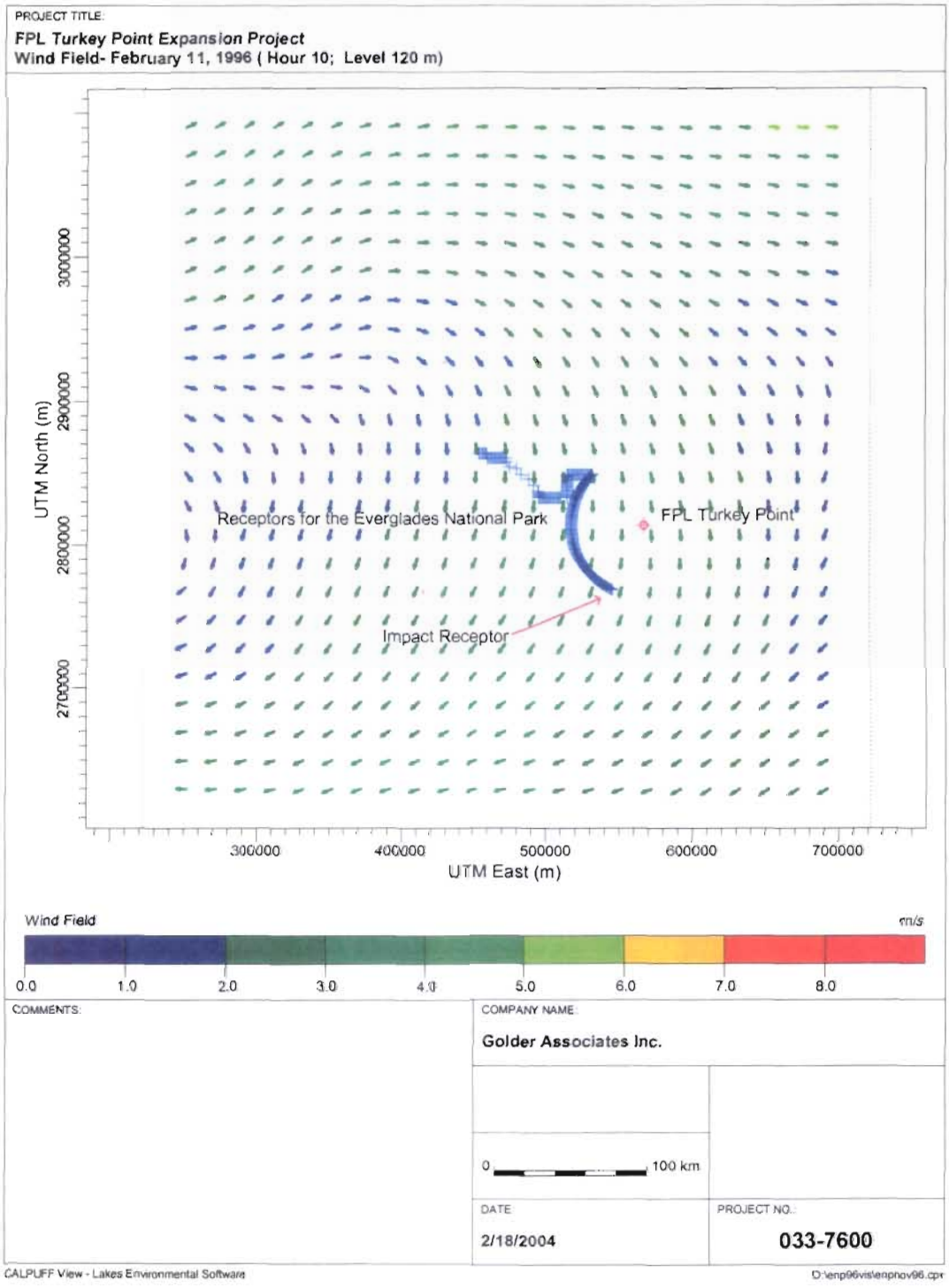
ATTACHMENT 4FDEP-18-3

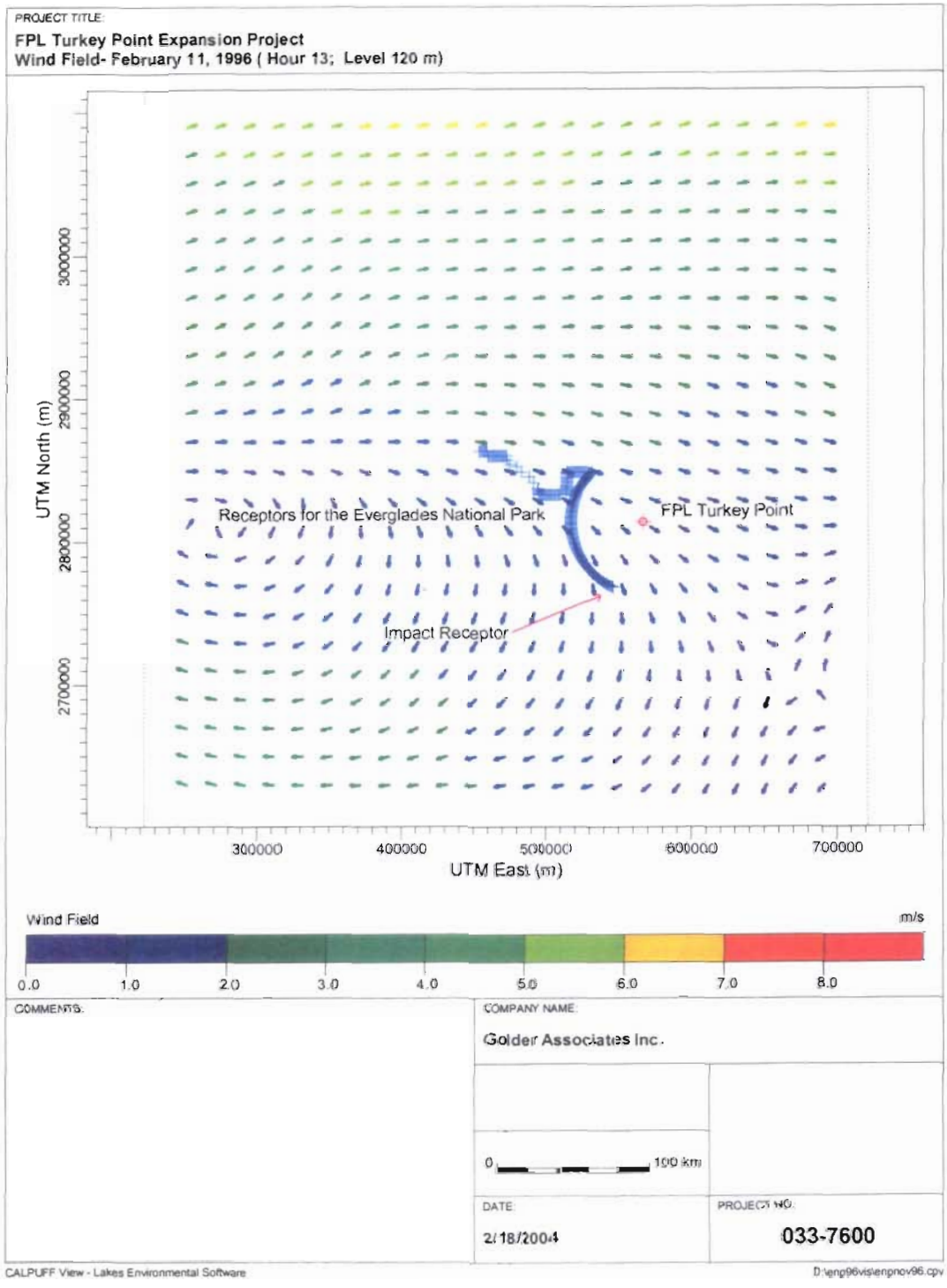
WINDFIELDS AT 120-METER LEVEL
OVER EVERGLADES NATIONAL PARK
FOR EVERY THIRD HOUR ON FEBRUARY 11, 1996
(NOTE: Class I receptors and Unit 5 location are identified on figures.)

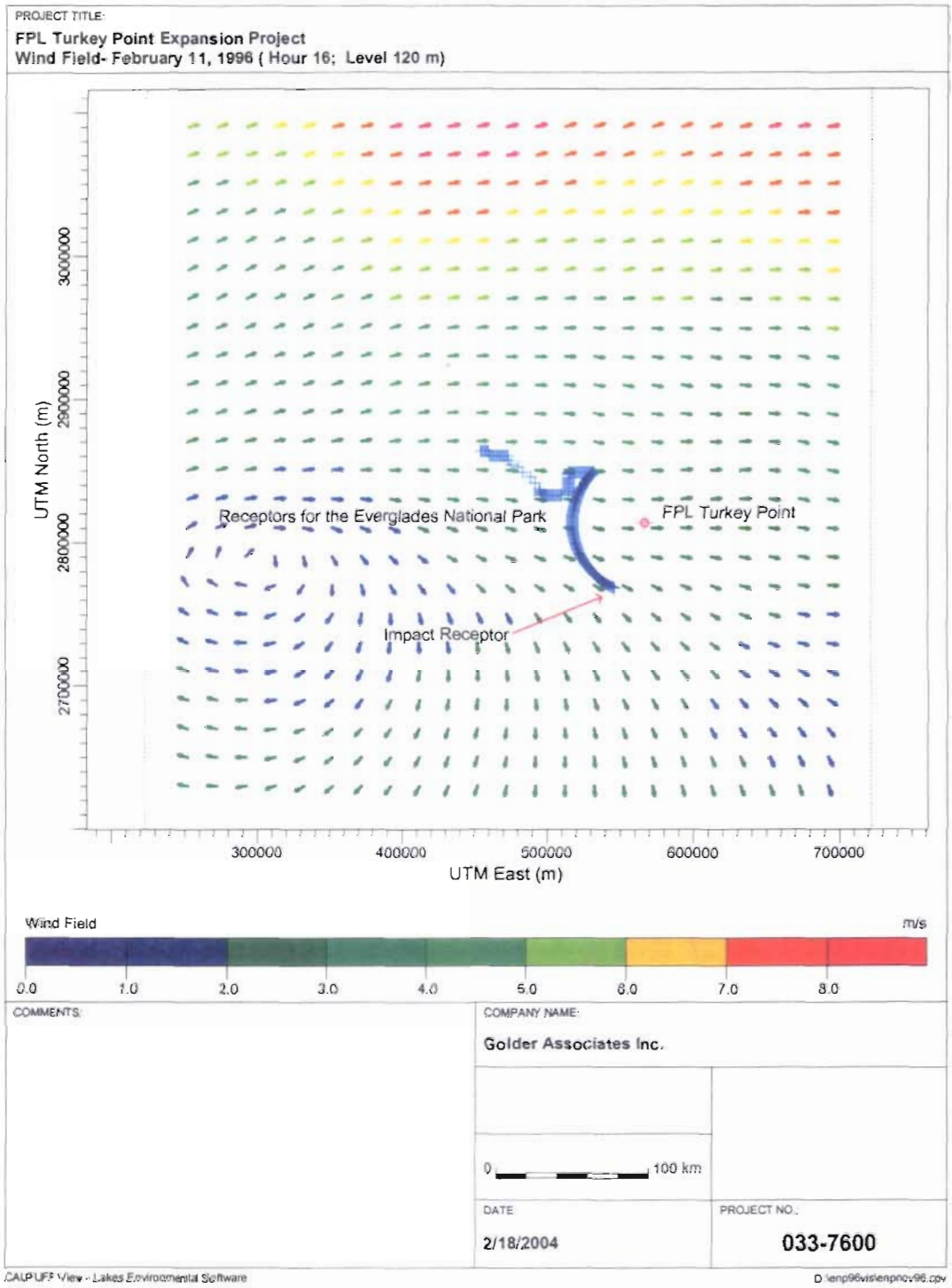

PROJECT TITLE:
FPL Turkey Point Expansion Project
Wind Field- February 11, 1996 (Hour 01; Level 120 m)
UTM North (m)
3000000
2900000
2800000
2700000
200000
300000
400000
500000
600000
700000
UTM East (m)
Receptors for the Everglades National Park
FPL Turkey Point
Impact Receptor
Wind Field
m/s
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
COMMENTS:
COMPANY NAME:
Golder Associates Inc.
0
100 km
DATE:
2/18/2004
PROJECT NO.:
033-7600
CALPUFF View - Lakes Environmental Software
D:\enp96vis\enpnov96.cpv

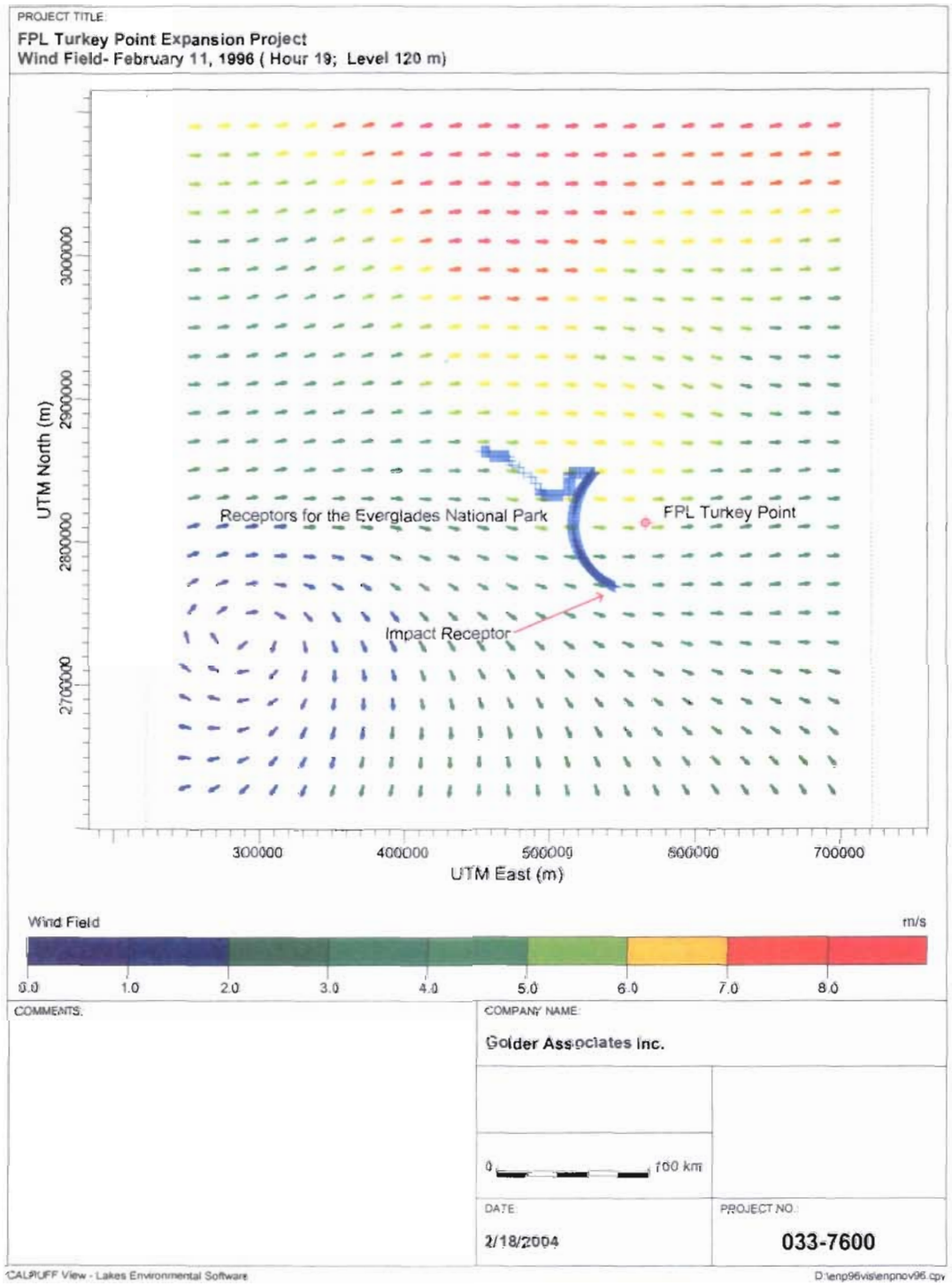

PROJECT TITLE:
FPL Turkey Point Expansion Project
Wind Field- February 11, 1996 (Hour 04; Level 120 m)
UTM North (m)
3000000
2900000
2800000
2700000
Receptors for the Everglades National Park
FPL Turkey Point
Impact Receptor
200000
300000
400000
500000
600000
700000
UTM East (m)
Wind Field
m/s
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
COMMENTS:
COMPANY NAME:
Golder Associates Inc.
0
100 km
DATE:
2/18/2004
PROJECT NO:
033-7600
CALPUFF View - Lakes Environmental Software
D:\emp96vis\enpnov96.cpv

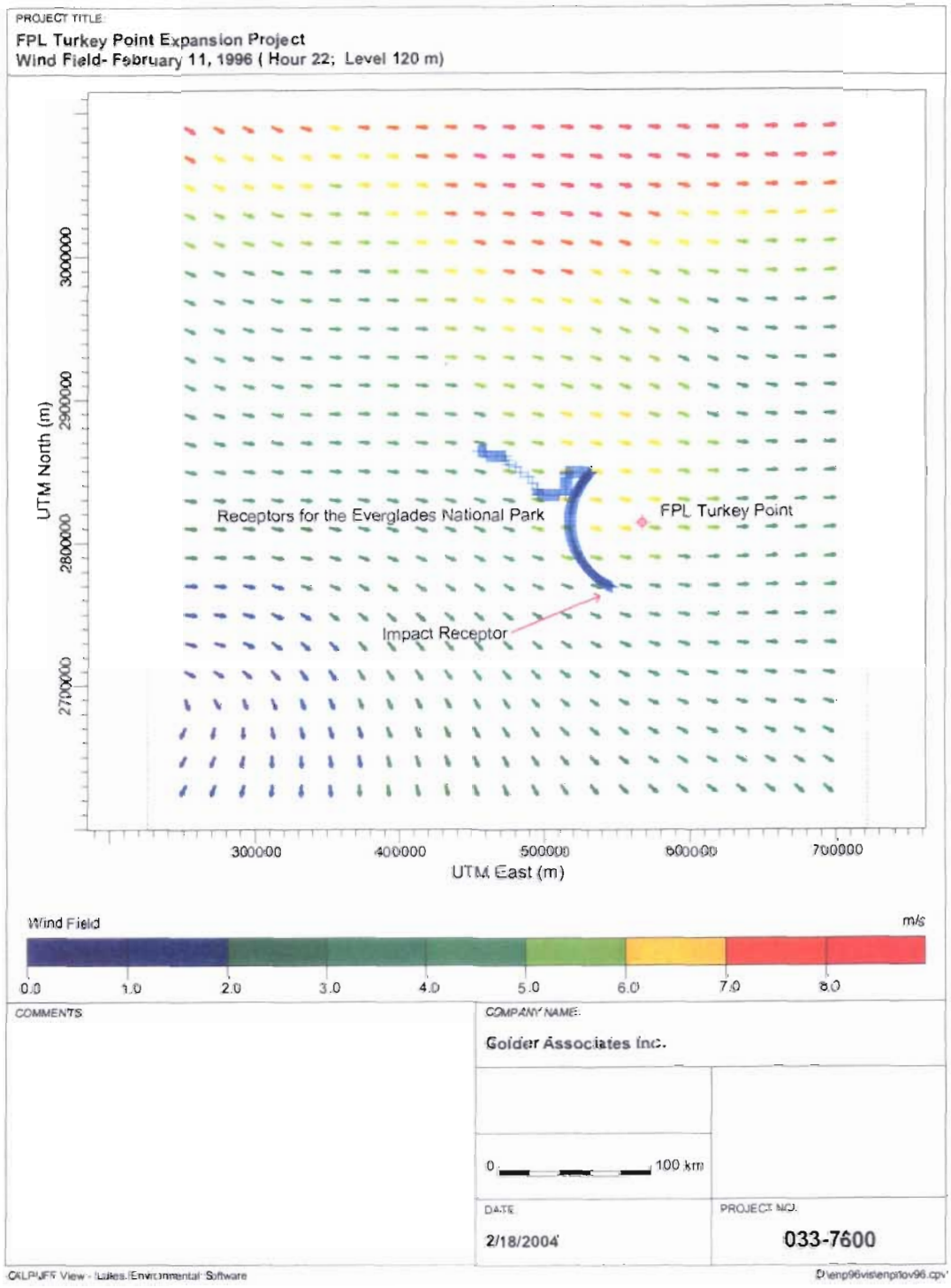

PROJECT TITLE:
FPL Turkey Point Expansion Project
Wind Field- February 11, 1996 (Hour 07; Level 120 m)
UTM North (m)
3000000
2900000
2800000
2700000
300000
400000
500000
600000
700000
UTM East (m)
Receptors for the Everglades National Park
FPL Turkey Point
Impact Receptor
Wind Field
m/s
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
COMMENTS:
COMPANY NAME:
Golder Associates Inc.
0
100 km
DATE:
2/18/2004
PROJECT NO:
033-7600
CALPUFF View- Lakes Environmental Software
D:\enp96vis\enpnov96.cpv


PROJECT TITLE:
FPL Turkey Point Expansion Project
Wind Field- February 11, 1996 (Hour 10; Level 120 m)
UTM North (m)
3000000
2900000
2800000
2700000
300000
400000
500000
600000
700000
UTM East (m)
Receptors for the Everglades National Park
FPL Turkey Point
Impact Receptor
Wind Field
m/s
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
COMMENTS:
COMPANY NAME:
Golder Associates Inc.
0
100 km
DATE:
2/18/2004
PROJECT NO.:
033-7600
CALPUFF View - Lakes Environmental Software
D:\enp96vis\enpnov96.cpr


PROJECT TITLE:
FPL Turkey Point Expansion Project
Wind Field- February 11, 1996 (Hour 13; Level 120 m)
UTM North (m)
3000000
2900000
2800000
2700000
Receptors for the Everglades National Park
FPL Turkey Point
Impact Receptor
300000
400000
500000
600000
700000
UTM East (m)
Wind Field
m/s
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
COMMENTS:
COMPANY NAME:
Golder Associates Inc.
0
100 km
DATE:
2/18/2004
PROJECT NO:
033-7600
CALPUFF View - Lakes Environmental Software
D:\enp96vis\enpnov96.cpv

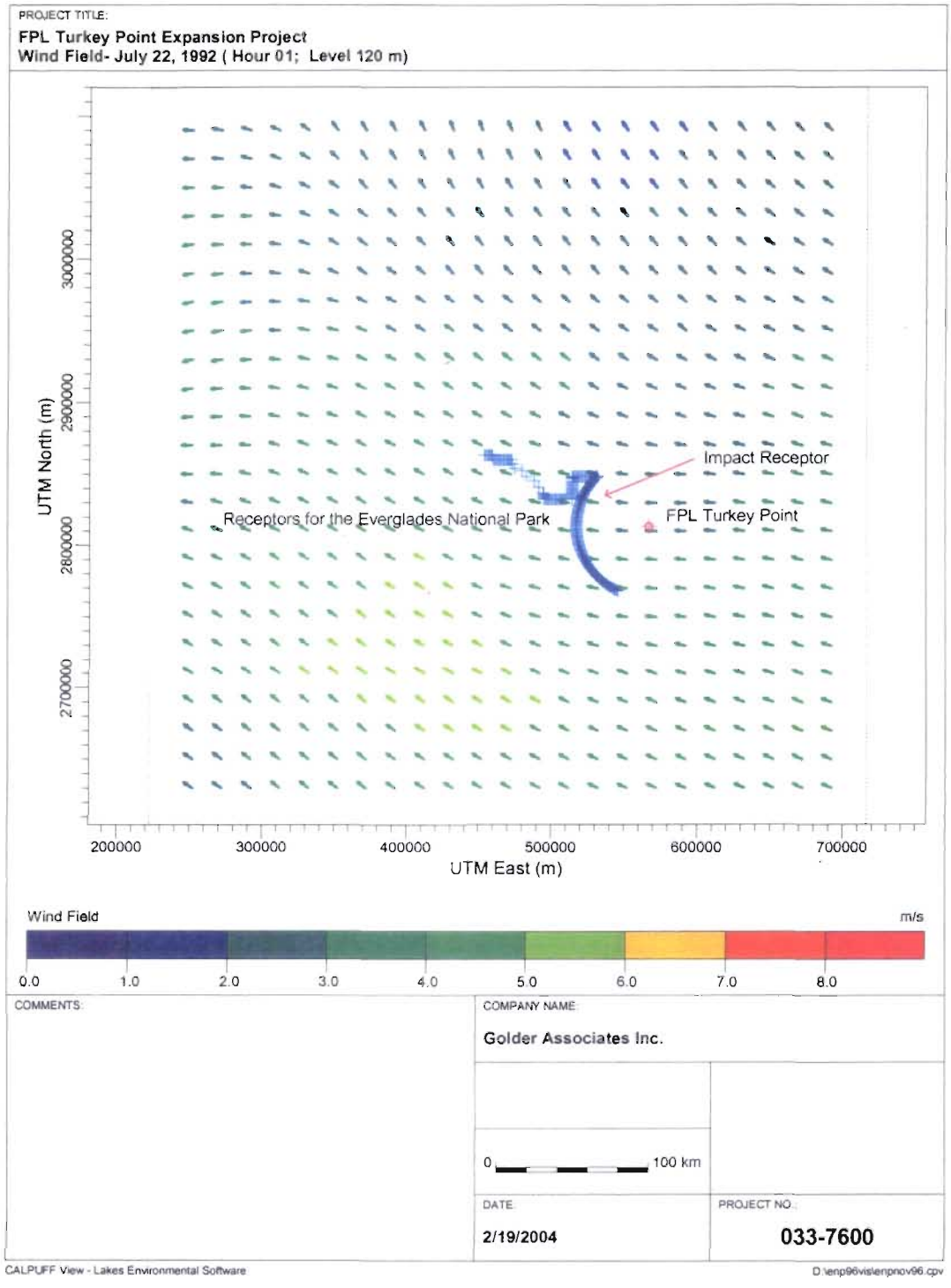

PROJECT TITLE:
FPL Turkey Point Expansion Project
Wind Field- February 11, 1996 (Hour 16; Level 120 m)
UTM North (m)
3000000
2900000
2800000
2700000
Receptors for the Everglades National Park
FPL Turkey Point
Impact Receptor
300000
400000
500000
600000
700000
UTM East (m)
Wind Field
m/s
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
COMMENTS:
COMPANY NAME:
Golder Associates Inc.
0
100 km
DATE
2/18/2004
PROJECT NO.:
033-7600
CALPUFF View - Lakes Environmental Software
D:\enp96vis\enpnov96.cpv

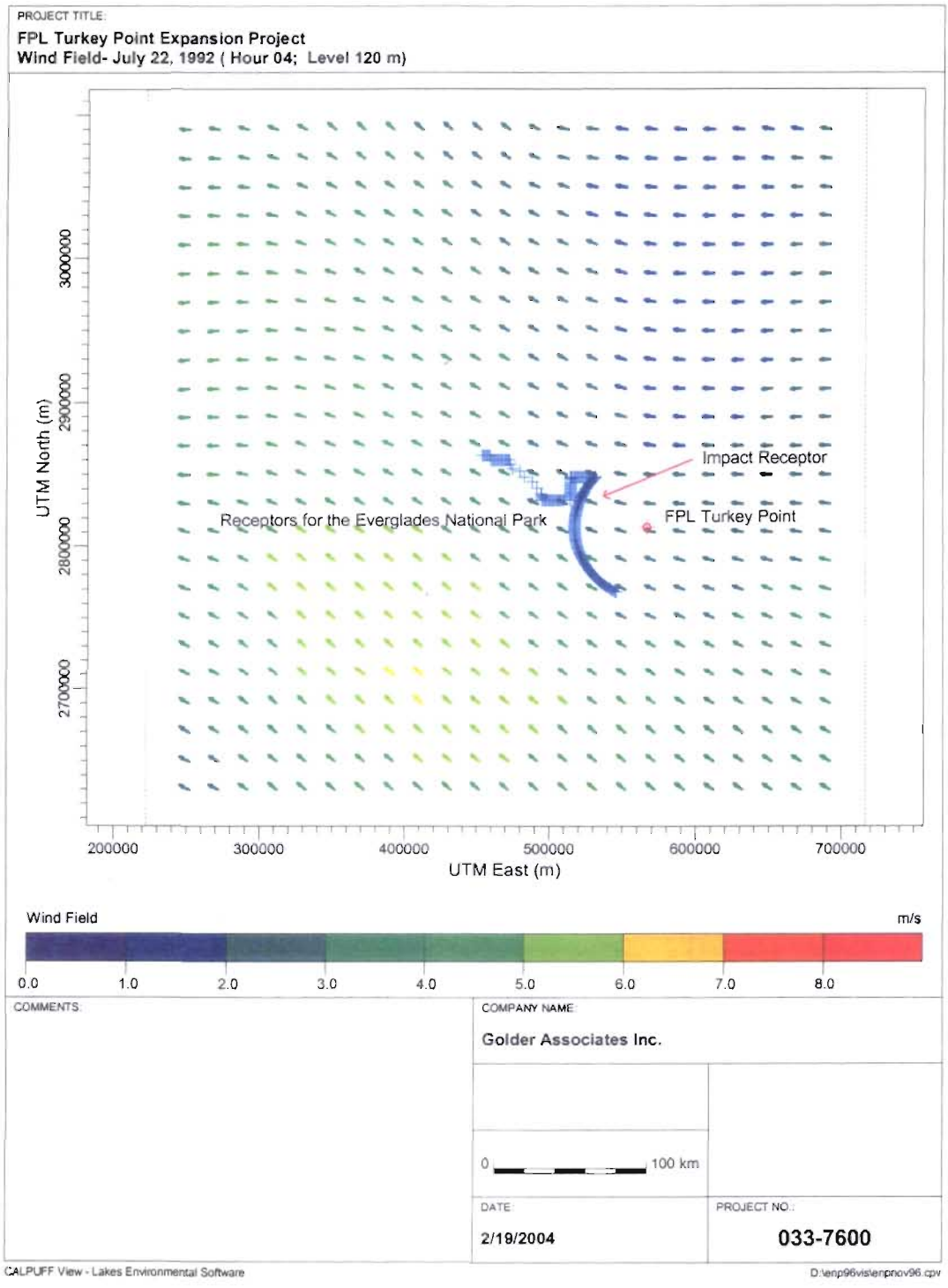

PROJECT TITLE:
FPL Turkey Point Expansion Project
Wind Field- February 11, 1996 (Hour 19; Level 120 m)
UTM North (m)
3000000
2900000
2800000
2700000
300000
400000
500000
600000
700000
UTM East (m)
Receptors for the Everglades National Park
FPL Turkey Point
Impact Receptor
Wind Field
m/s
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
COMMENTS:
COMPANY NAME:
Golder Associates Inc.
0
100 km
DATE:
2/18/2004
PROJECT NO.:
033-7600
CALPUFF View - Lakes Environmental Software
D:\enp96vis\enpnov96.cpv

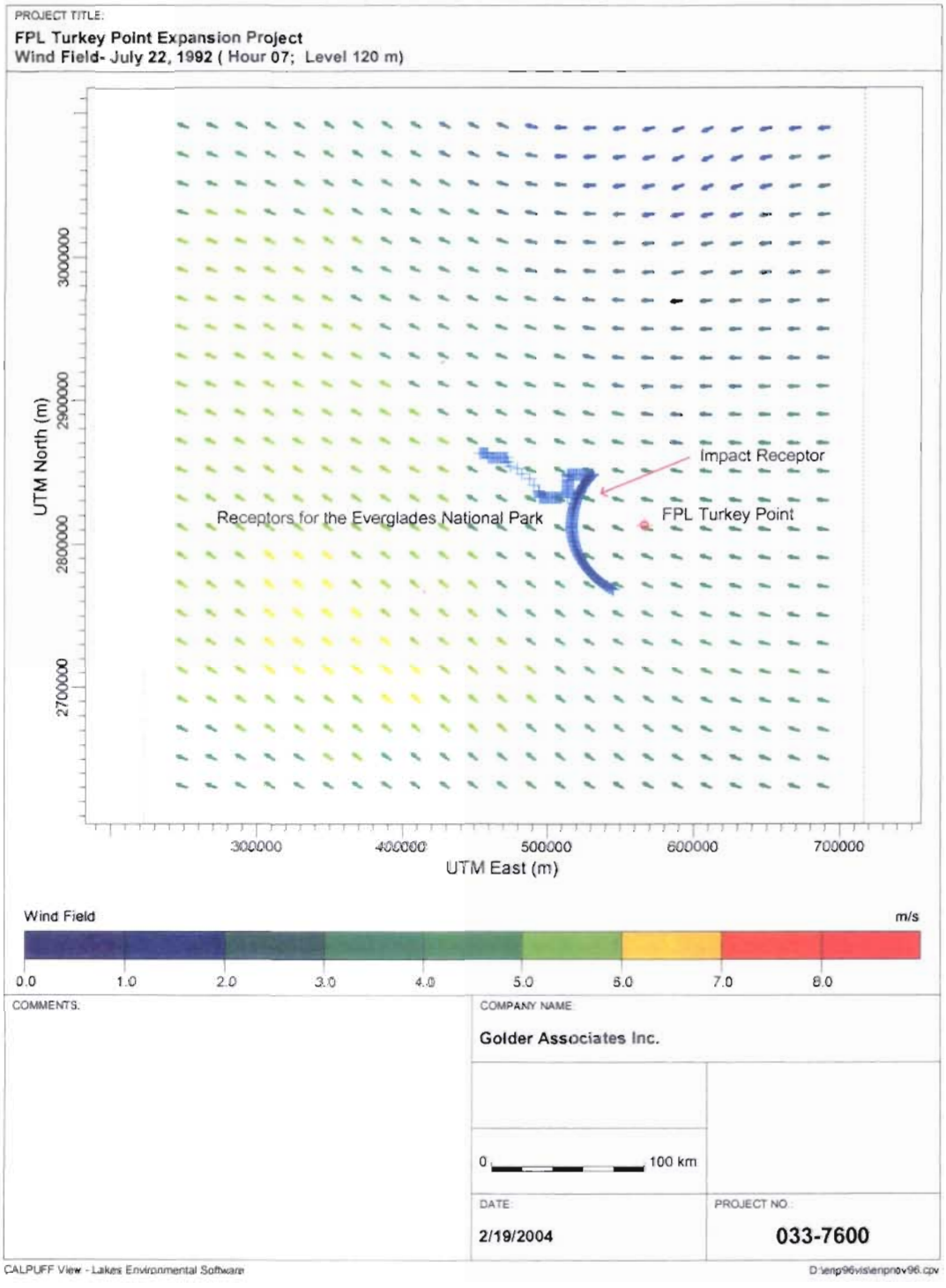

PROJECT TITLE:
FPL Turkey Point Expansion Project
Wind Field- February 11, 1996 (Hour 22; Level 120 m)
UTM North (m)
3000000
2900000
2800000
2700000
300000
400000
500000
600000
700000
UTM East (m)
Receptors for the Everglades National Park
FPL Turkey Point
Impact Receptor
Wind Field
m/s
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
COMMENTS:
COMPANY NAME:
Golder Associates Inc.
0
100 km
DATE:
2/18/2004
PROJECT NO:
033-7600
CALPUFF View - Lakes Environmental Software
D:\enp96visenpfov96.cpv

ATTACHMENT 4FDEP-18-4

WINDFIELDS AT 120-METER LEVEL
OVER EVERGLADES NATIONAL PARK
FOR EVERY THIRD HOUR ON JULY 22, 1992
(NOTE: Class I receptors and Unit 5 location are identified on figures.)


PROJECT TITLE:
FPL Turkey Point Expansion Project
Wind Field- July 22, 1992 (Hour 01; Level 120 m)
UTM North (m)
3000000
2900000
2800000
2700000
200000
300000
400000
500000
600000
700000
UTM East (m)
Impact Receptor
Receptors for the Everglades National Park
FPL Turkey Point
Wind Field
m/s
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
COMMENTS:
COMPANY NAME:
Golder Associates Inc.
0
100 km
DATE:
2/19/2004
PROJECT NO.:
033-7600
CALPUFF View - Lakes Environmental Software
D:\enp96vis\enpnov96.cpv


PROJECT TITLE:
FPL Turkey Point Expansion Project
Wind Field- July 22, 1992 (Hour 04; Level 120 m)
UTM North (m)
3000000
2900000
2800000
2700000
200000
300000
400000
500000
600000
700000
UTM East (m)
Impact Receptor
Receptors for the Everglades National Park
FPL Turkey Point
Wind Field
m/s
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
COMMENTS:
COMPANY NAME:
Golder Associates Inc.
0
100 km
DATE:
2/19/2004
PROJECT NO.:
033-7600
CALPUFF View - Lakes Environmental Software
D:\enp96vis\enpnov96.cpv


PROJECT TITLE:
FPL Turkey Point Expansion Project
Wind Field- July 22, 1992 (Hour 07; Level 120 m)
UTM North (m)
3000000
2900000
2800000
2700000
300000
400000
500000
600000
700000
UTM East (m)
Impact Receptor
Receptors for the Everglades National Park
FPL Turkey Point
Wind Field
m/s
0.0
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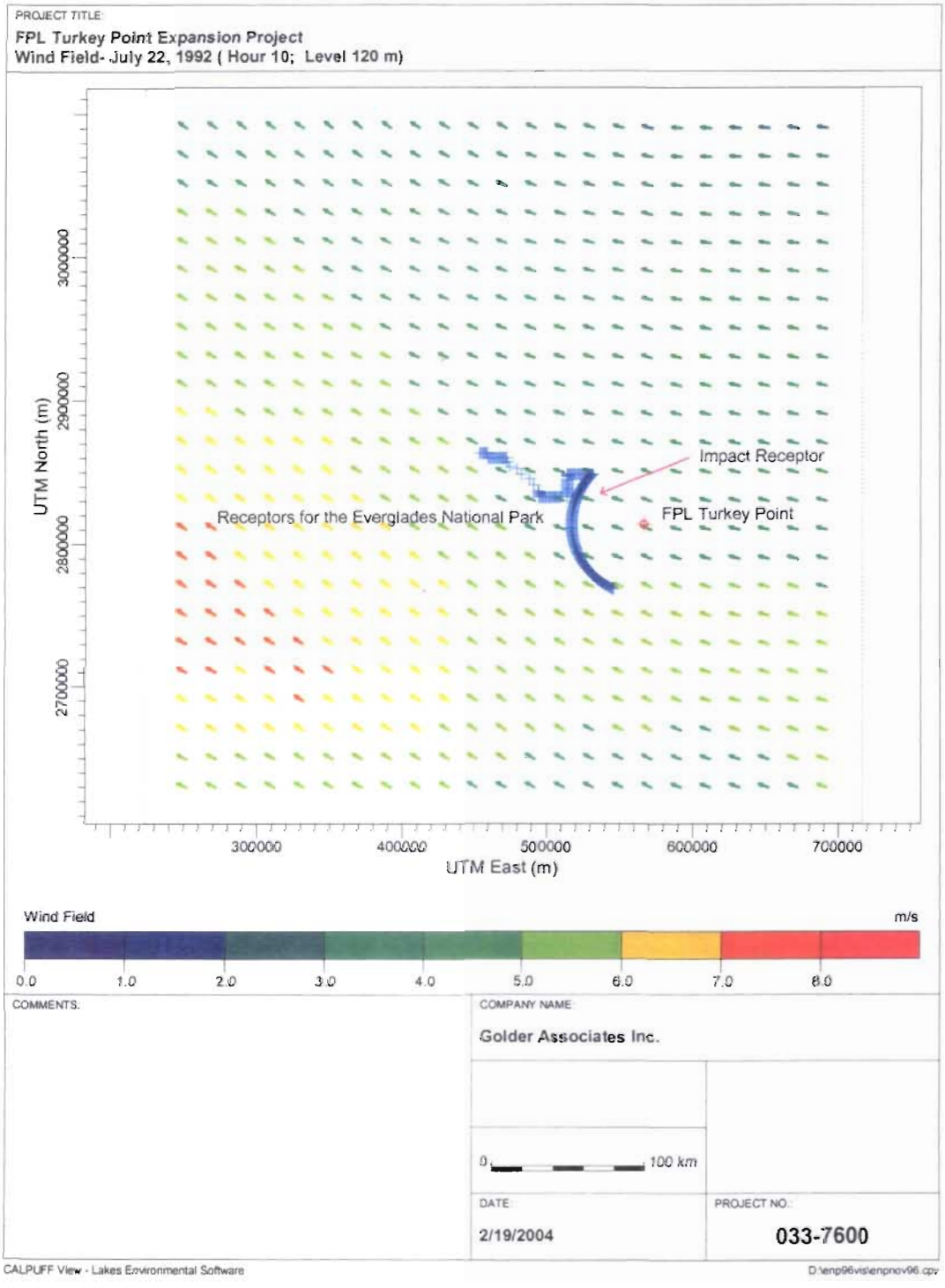
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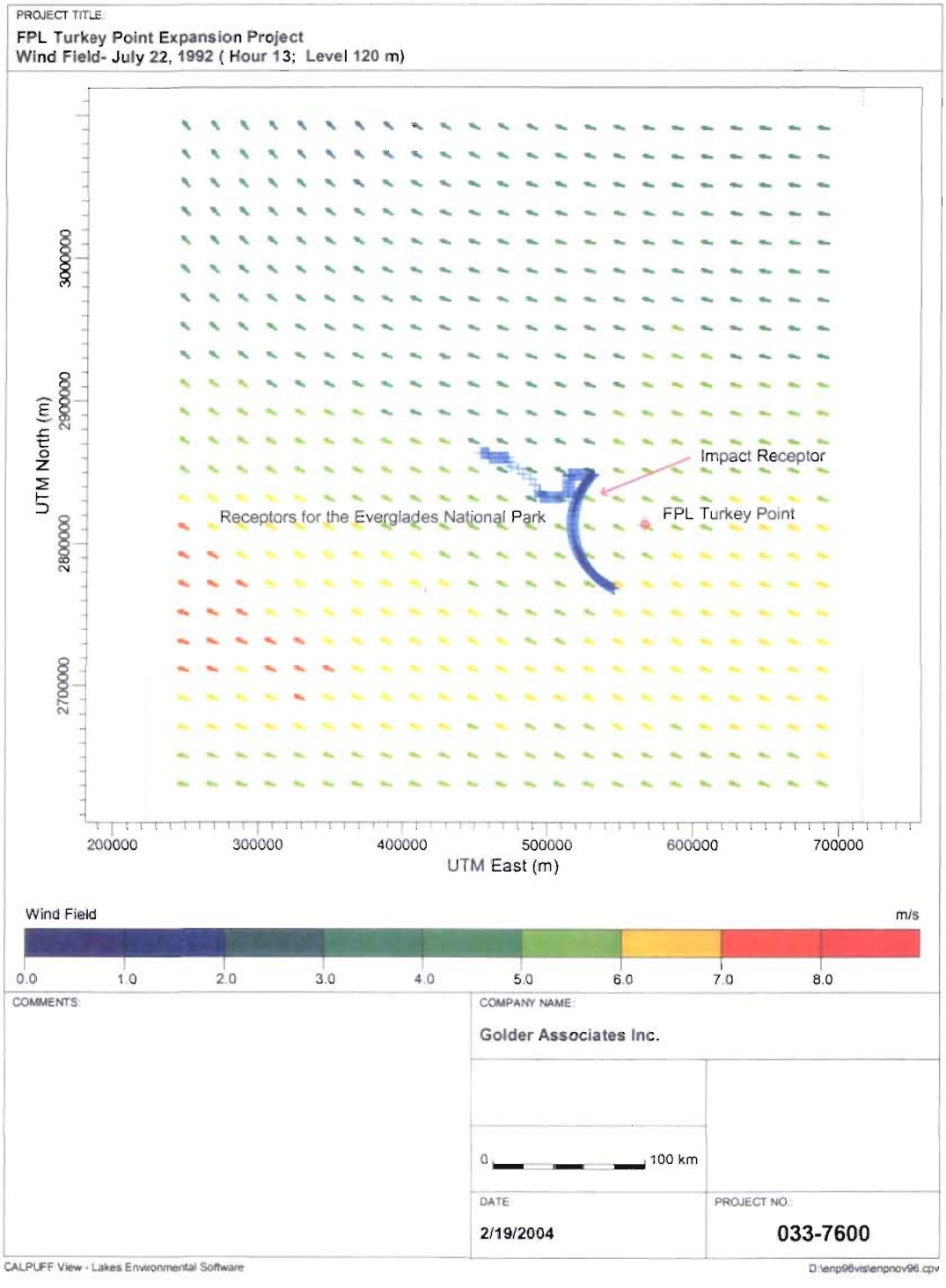
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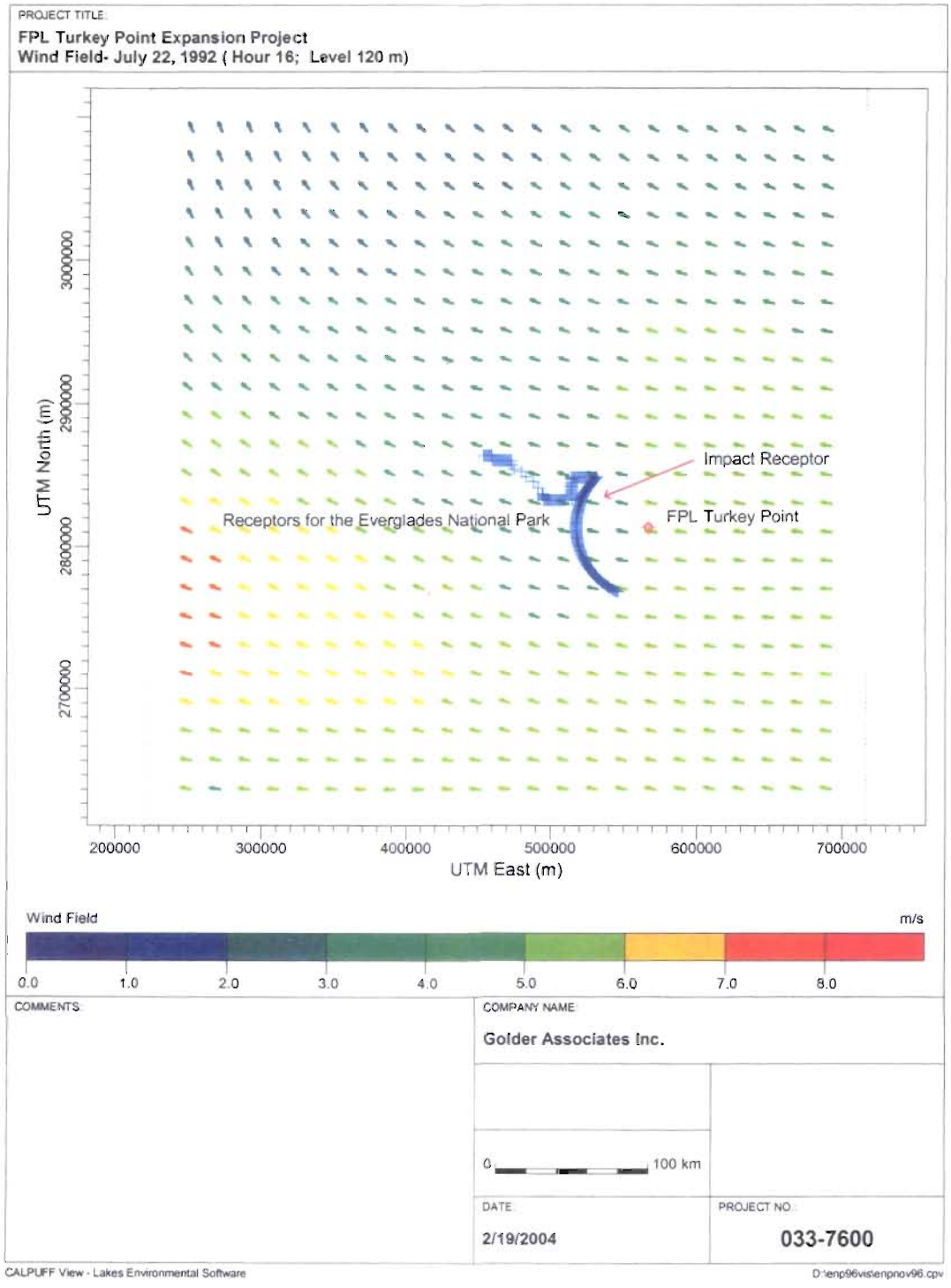
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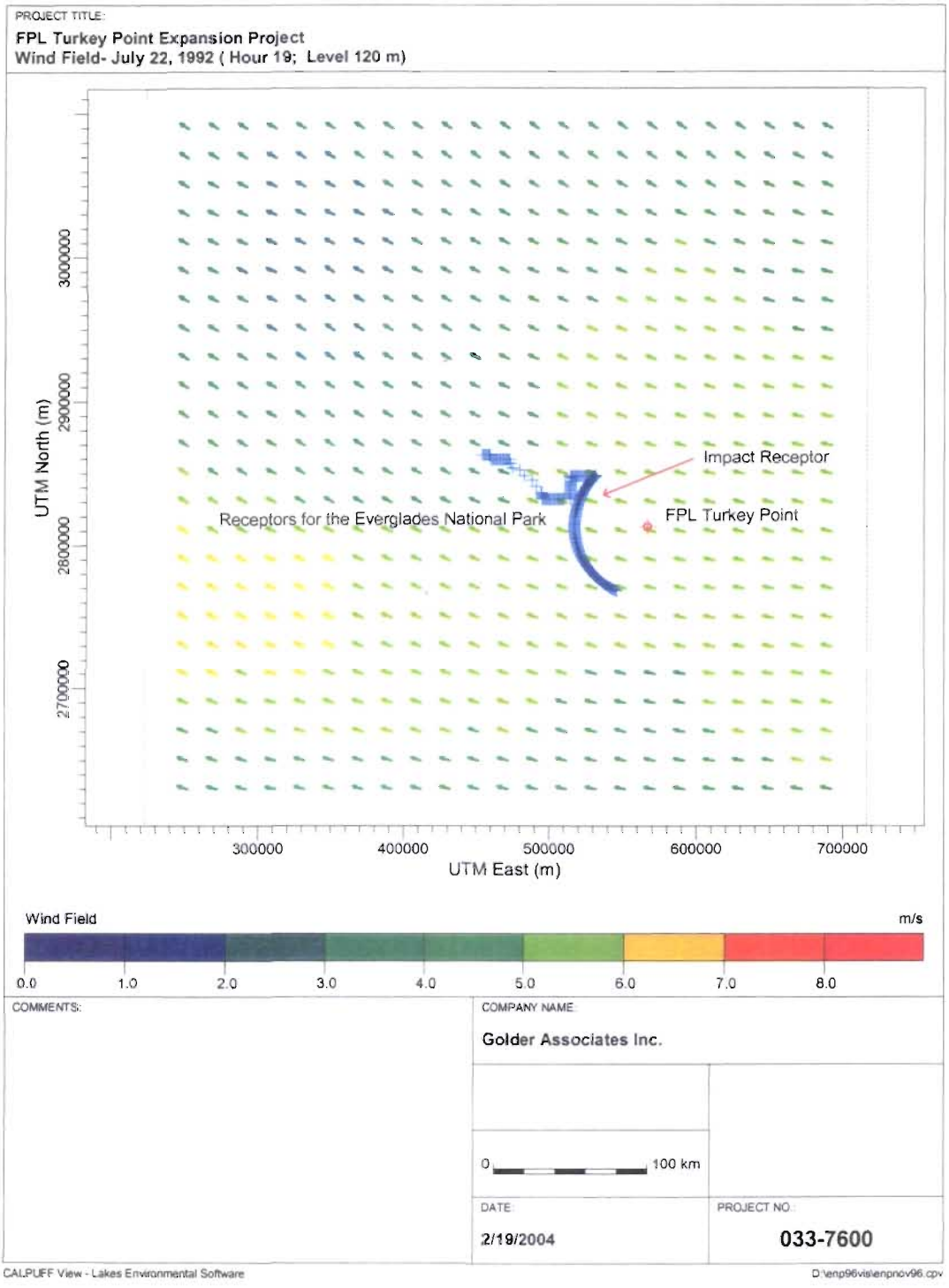
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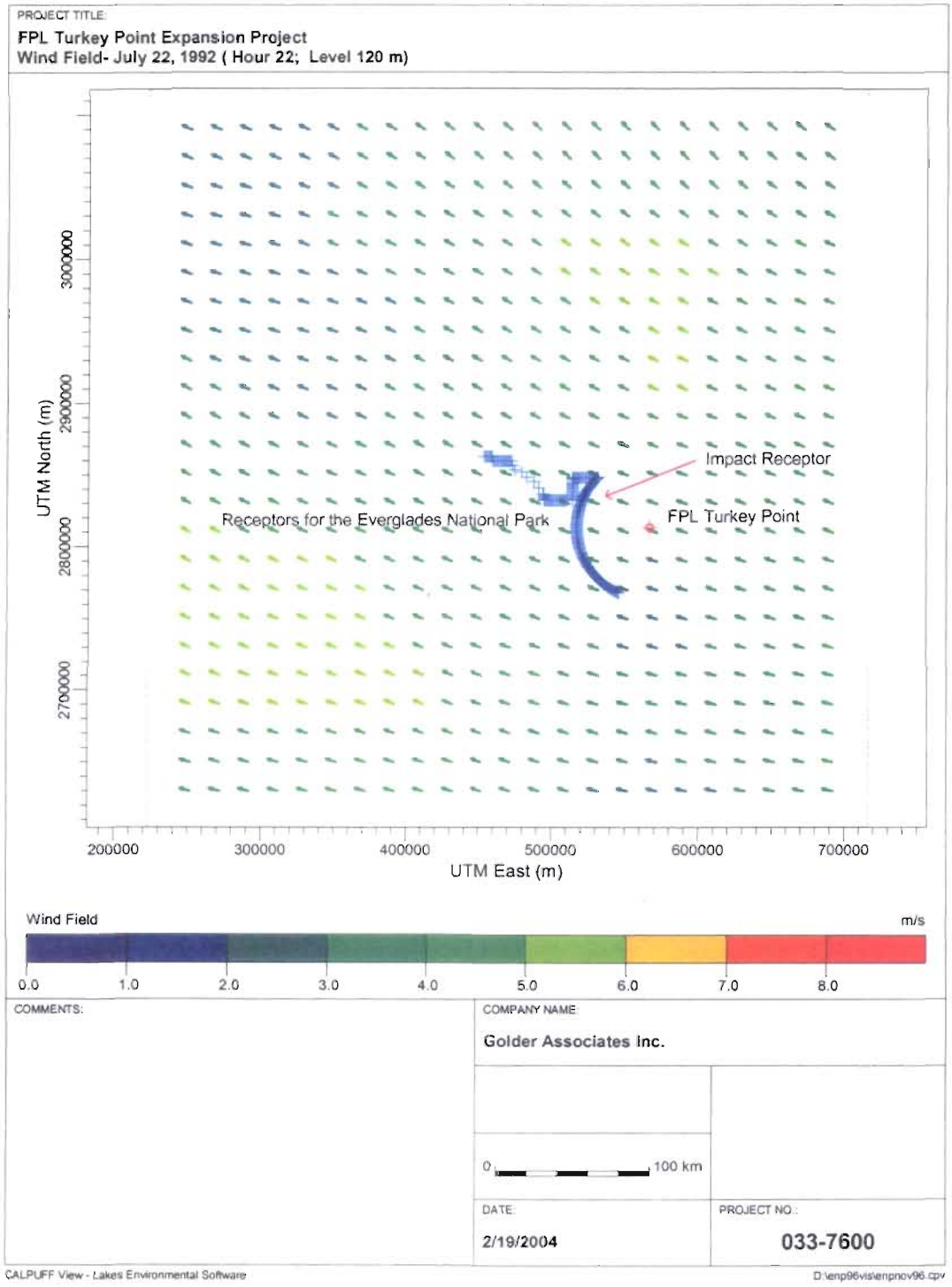
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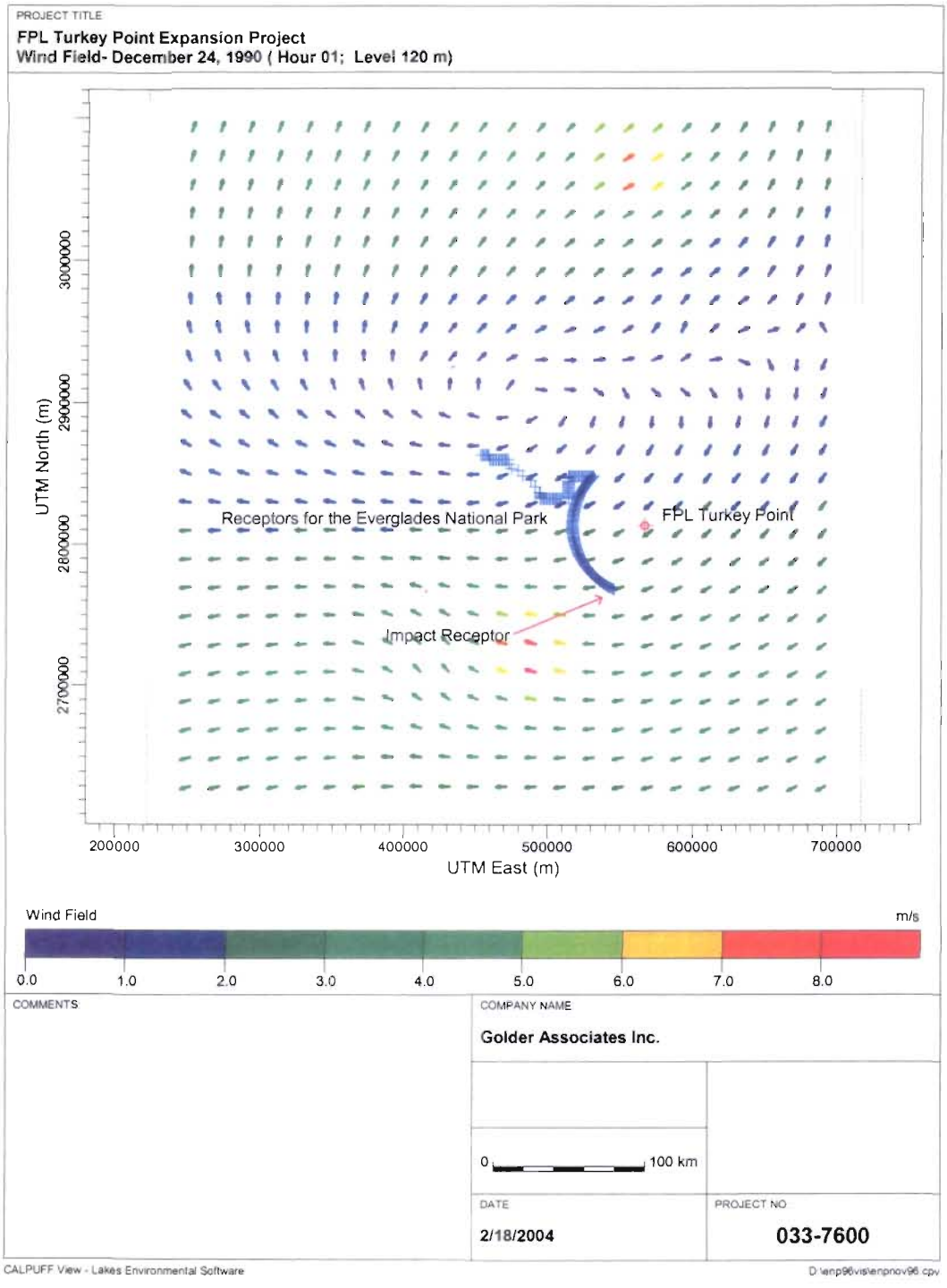
ATTACHMENT 4FDEP-18-5

WINDFIELDS AT 120-METER LEVEL
OVER EVERGLADES NATIONIAL PARK
FOR EVERY THIRD HOUR ON DECEMBER 24, 1990
(NOTE: Class I receptors and Unit 5 location are identified on figures.)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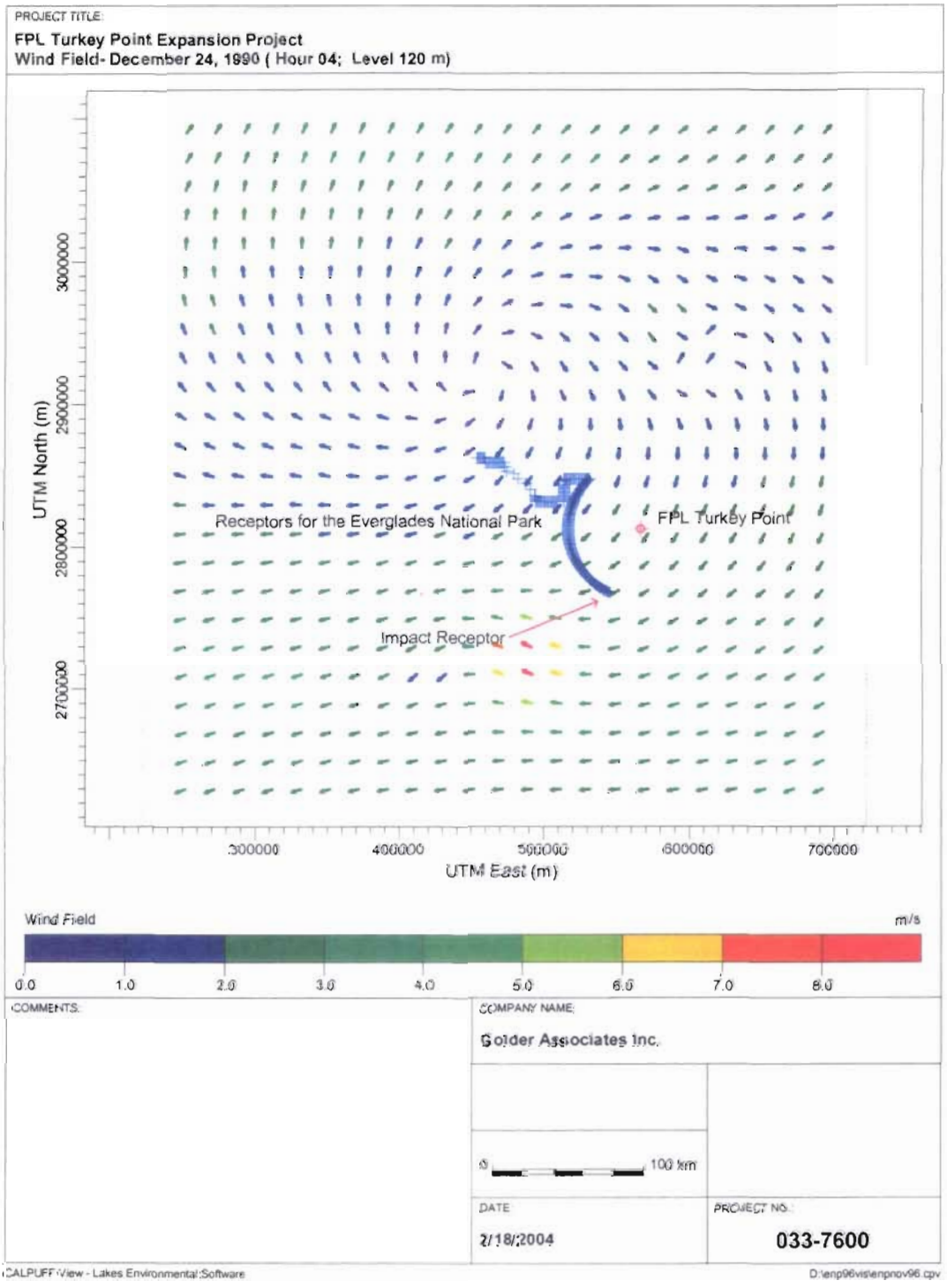
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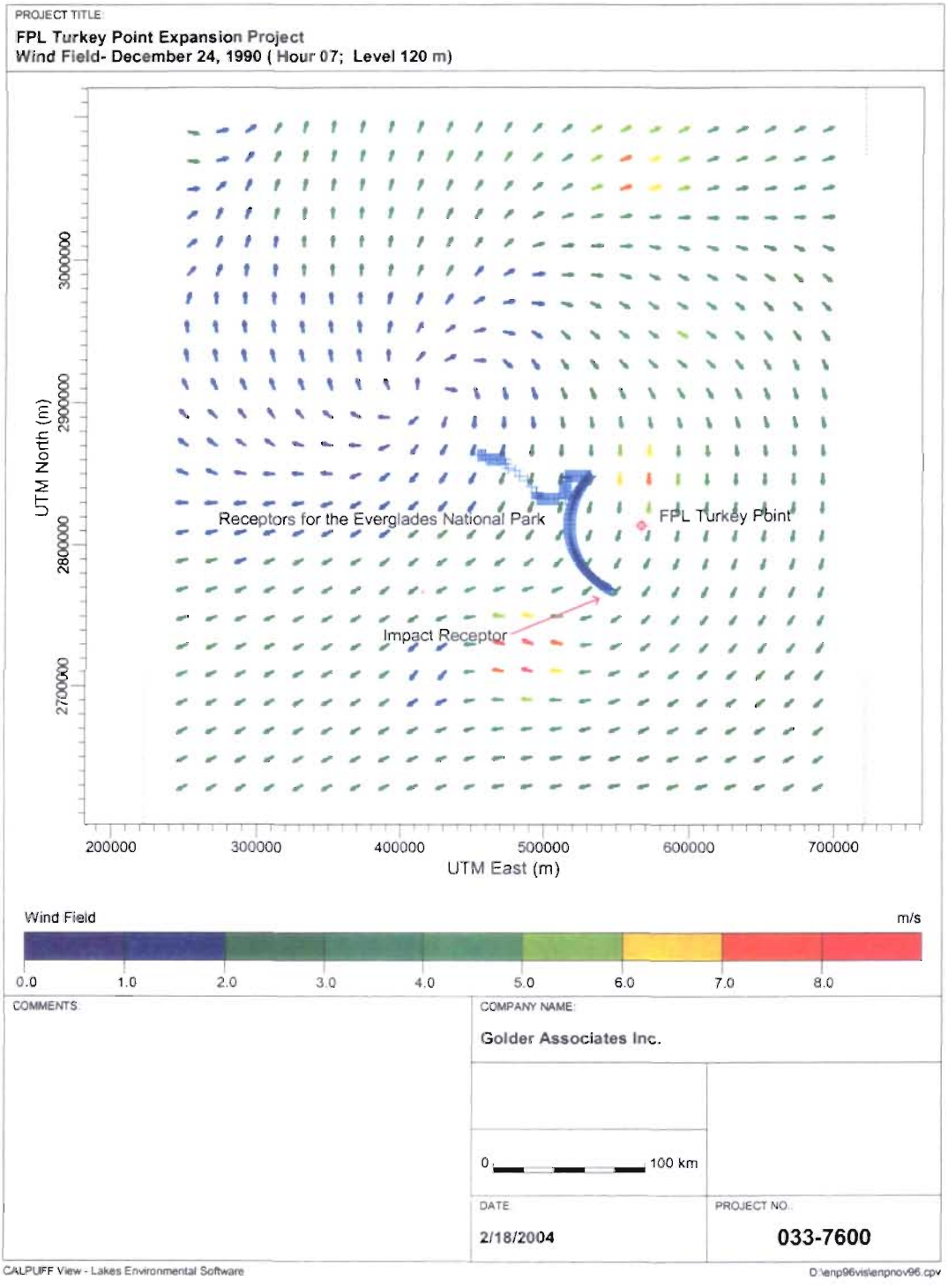
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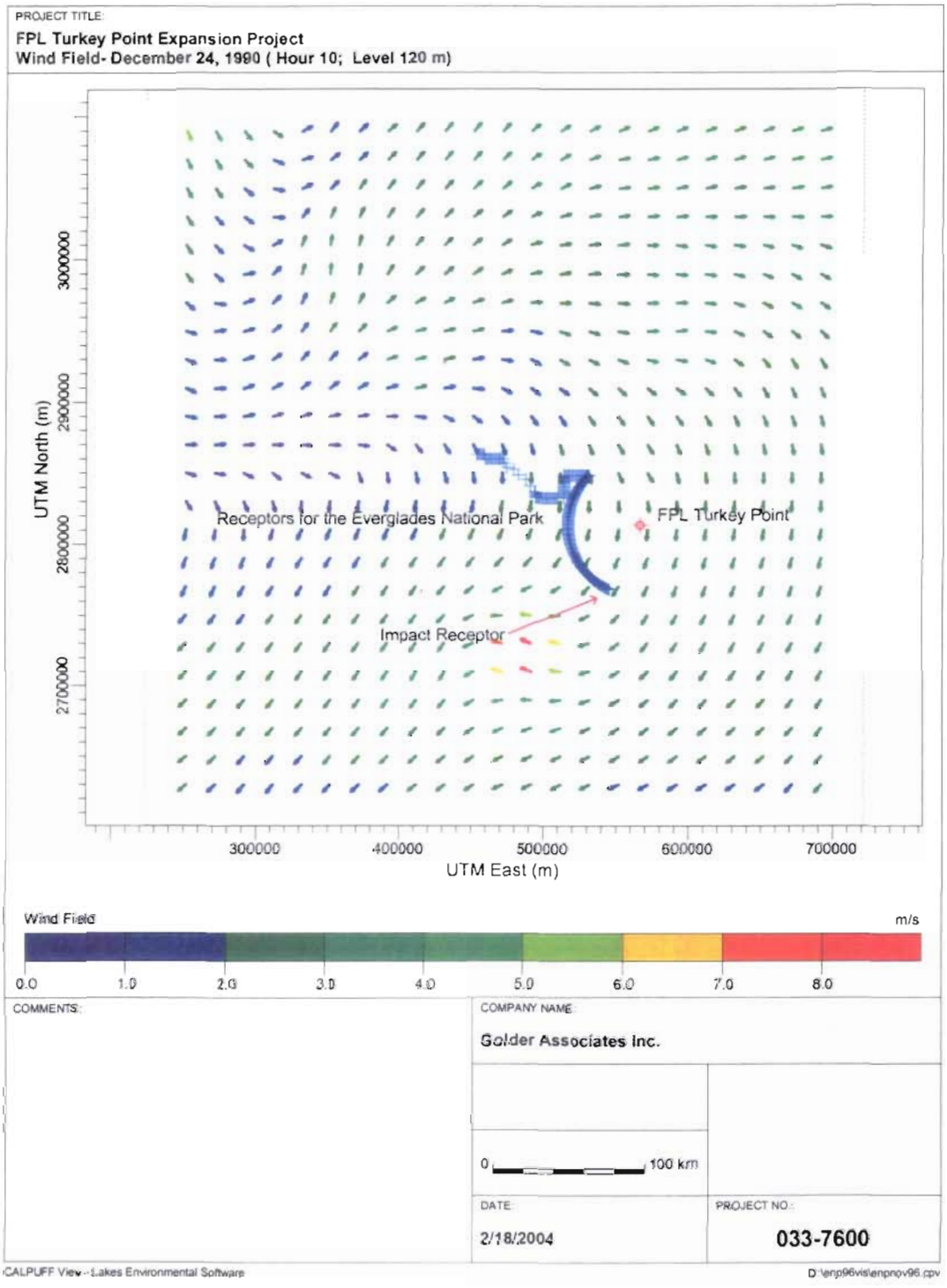
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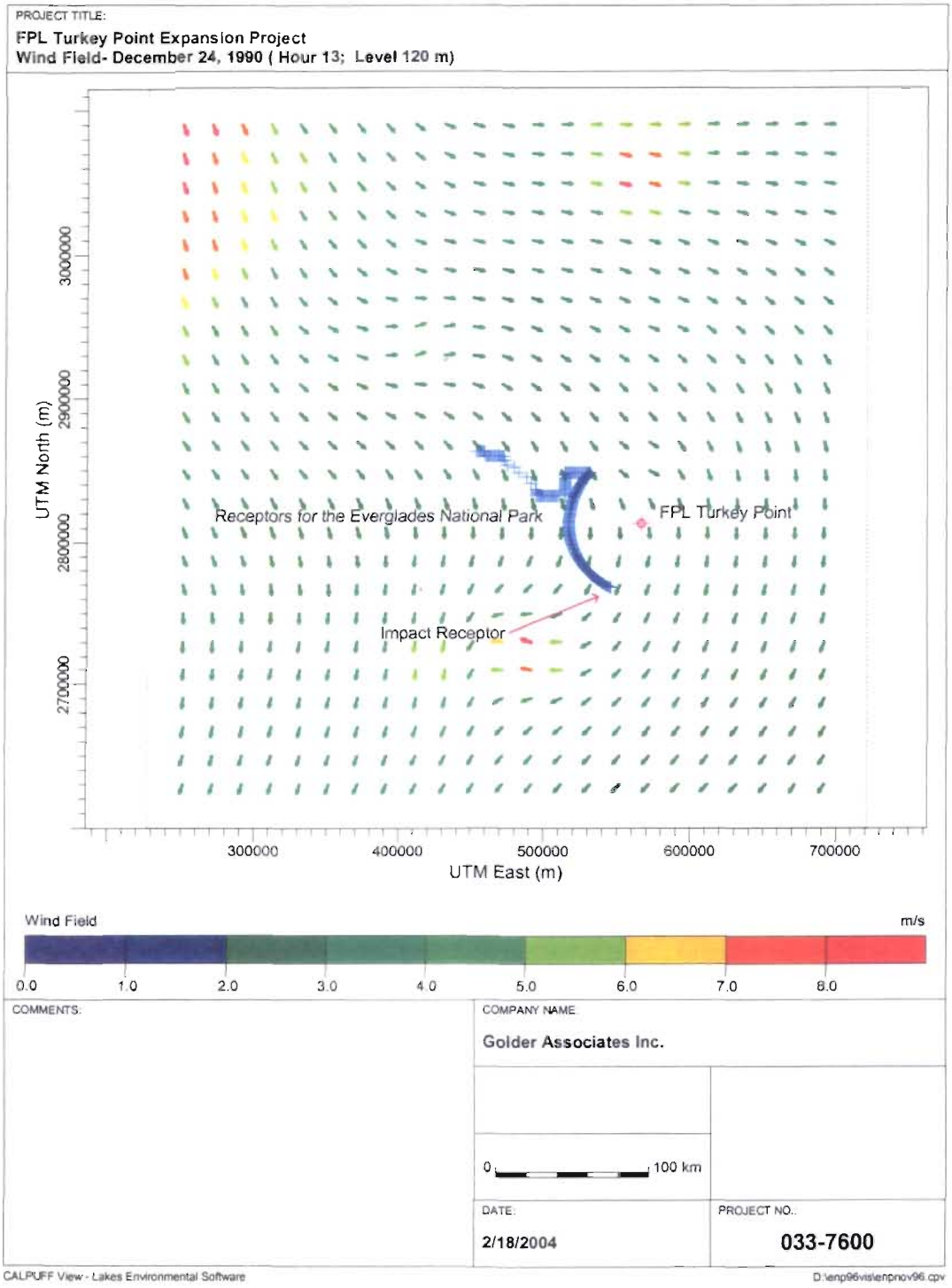
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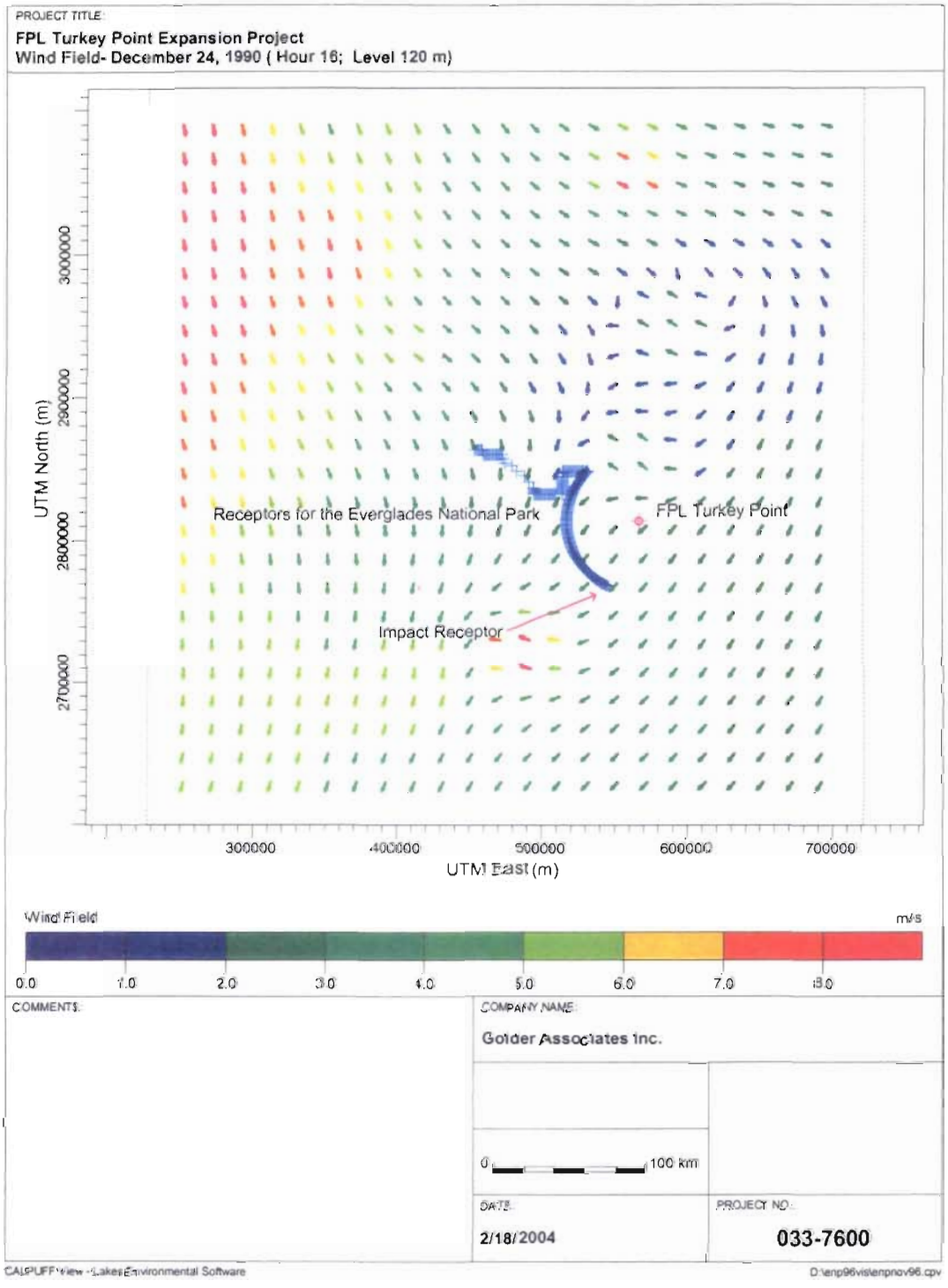
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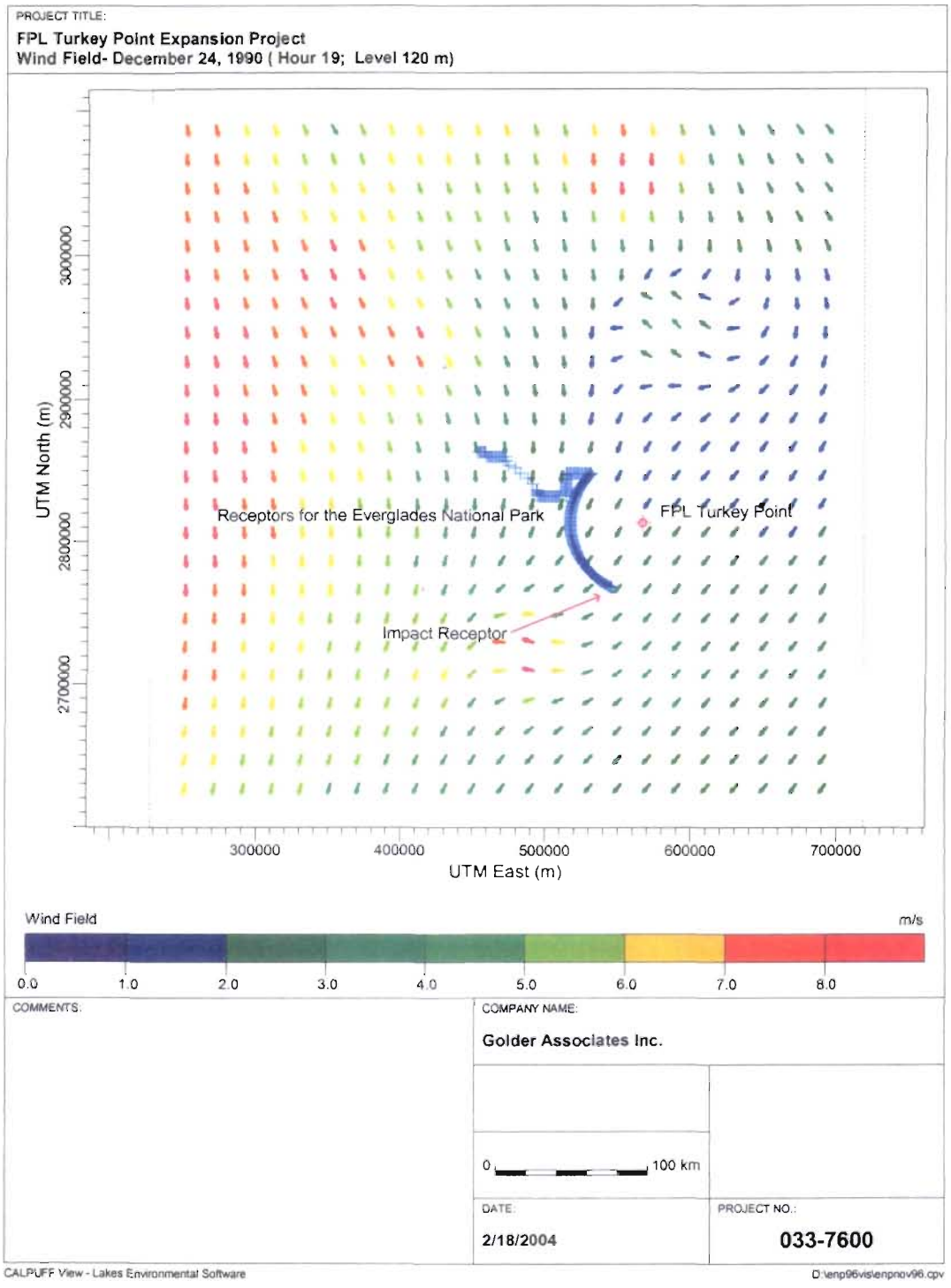
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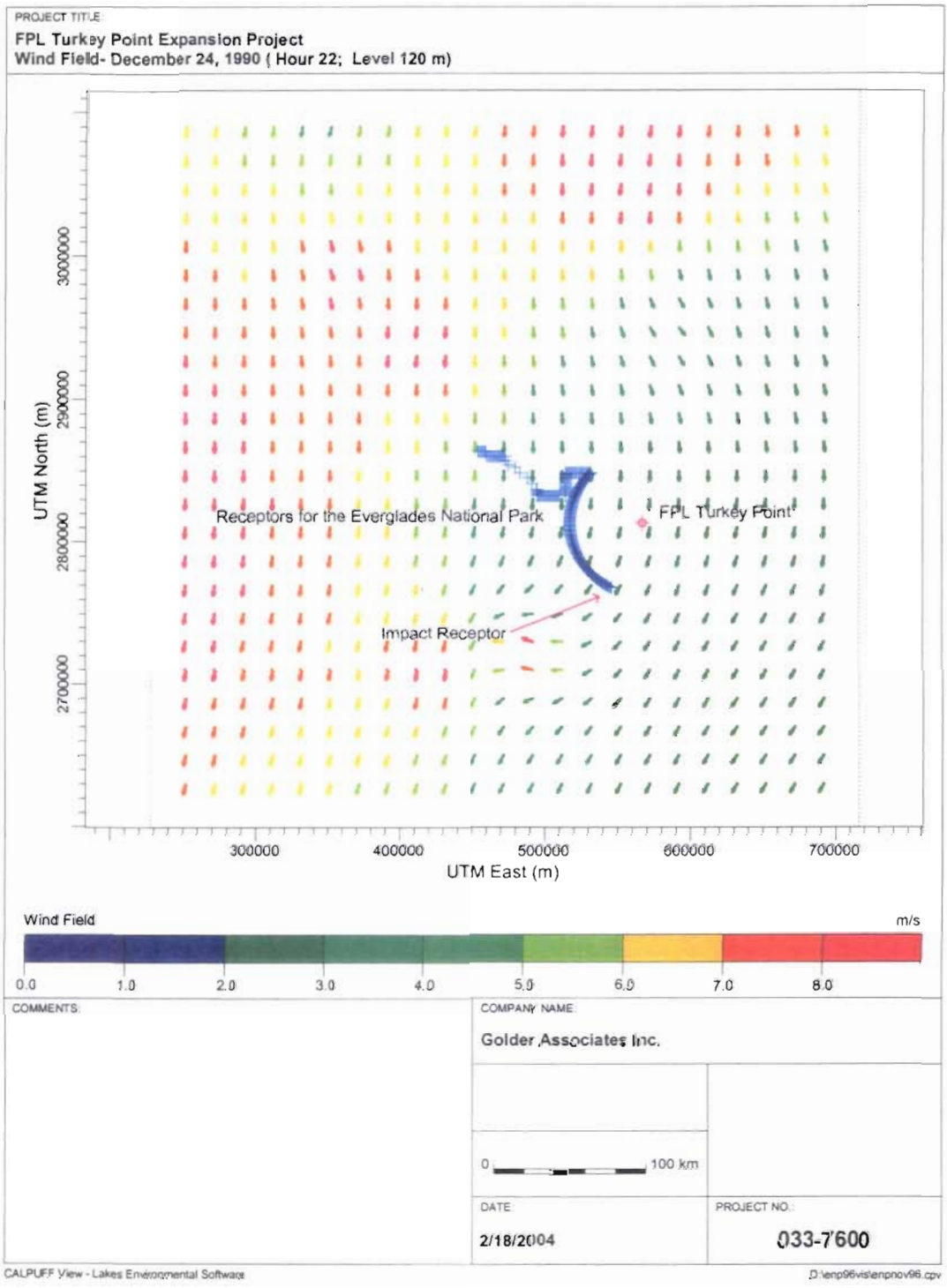
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FFWCC-1(a): Florida Department of Environmental Protection, Ronald Mezich

FFWCC General Comment:
The proposed construction of additional power generating units adjacent to the existing Turkey Point power plant does not appear to pose significant threats to the Florida manatee or its habitat. However, several aspects of the proposed mitigation will require additional information for review. Culverts proposed to improve the hydrologic connectivity between Biscayne Bay and Areas A, C, D and H may have the potential to entrap manatees. The risk is greatest with those culverts that are proposed to connect Biscayne Bay or tidal creeks directly to one of the mitigation areas (A, D, H, and the optional mitigation area within Biscayne National Park). Additionally, Area C appears to be indirectly linked to Biscayne Bay by culverts through Area H.

The CERP Interagency Manatee Task Force is currently developing a manatee Conservation Plan for the protection of manatees during Everglades restoration work. These guidelines will include criteria for the installation of culverts and the appropriate manatee protection techniques to avoid entrapment. We recommend that Florida Power & Light use these guidelines where appropriate in the Optional Mitigation area. The draft guidelines and future final guidelines can be obtained from the U.S. Fish & Wildlife Service's South Florida Ecological Services Office (Dave Ferrell – 772-562-3090).

In order to complete our review of this concern, we will require the following:

General Response:
The tidal creeks and mangrove wetlands where culverts will be installed are not believed to be of sufficient depth to allow manatee access. This will be verified when the mitigation plan is approved. The culverts proposed to be installed under the transmission line road are 36 inches in diameter. If manatee access is possible, the culvert will be grated in accordance with the guidelines for culverts and appropriate manatee protection techniques as presented in the Comprehensive Everglades Restoration Project Interagency Manatee Task Force's Manatee Conservation Plan.

FFWCC Comment 1(a): Site plans for Areas A, C, D, H and the optional mitigation area with the locations of proposed culverts.

Response 1(a): Figure 8, On-Site Mitigation Proposal, in SCA Appendix 10.1.4 presents the conceptual mitigation plan. Once the final mitigation plan is developed, details for culvert location and design will be developed. The final mitigation plan will include details to address Manatee access. FPL will accept a condition of certification that includes following the Manatee Conservation Plan developed for the CERP where Manatee access is possible.

FFWCC Comment 1(b): The location of tidal creeks within these same areas and their bathymetry at MHW.

Response 1(b): A survey will be conducted prior to installation of each culvert.

FFWCC Comment 1(c): The location of any existing canals that may intersect these creeks or culverts.

Response 1(c): See Figure 8, On-Site Mitigation Proposal, in SCA Appendix 10.1.4.

FFWCC Comment 1(d): The number and dimensions of proposed culverts in these areas.

Response 1(d): See Figure 8, On-Site Mitigation Proposal, in SCA Appendix 10.1.4.

SFRPC-1: South Florida Regional Planning Council

SFRPC Comment 1: The Project must be consistent with the goals and policies of the Miami-Dade County comprehensive development master plan and its corresponding land development regulations.

Response 1: Comment acknowledged. FPL has developed, sited, and arranged the equipment that comprises the Project in a manner that complies with the goals, objectives, and policies of the Miami-Dade Comprehensive Development Master Plan and applicable land development regulations.

SFRPC Comment 2: Staff recommends that impacts to the natural systems be minimized to the greatest extent feasible and that sensitive wildlife and vegetative communities in the vicinity of the Project be protected and disturbed habitat be appropriately mitigated. This will assist in reducing the cumulative impacts to native plants and animals, wetlands and deep-water habitat and fisheries that the goals and policies of the Strategic Regional Policy Plan for South Florida (SRPP) seek to protect.

Response 2: Comment acknowledged. Impacts to natural systems and natural resources, including those of regional significance, have been minimized to the greatest extent practical and mitigation has been proposed for unavoidable impacts.

SFRPC Comment 3: The Project is located over the Biscayne Aquifer, contiguous to wetlands and mangrove communities, adjacent to Biscayne National Park and within the Biscayne Bay SWIM area, all natural resources of regional significance designated in the SRPP. The goals and policies of the SRPP, in particular those indicated below, should be observed when making decisions regarding this Project:

Strategic Regional Goal

3.2 Develop a more efficient and sustainable allocation of the water resources of the region.

Regional Policies

3.2.5 Ensure that the recharge potential of the property is not reduced as a result of a proposed modification in the existing uses by incorporation of open space, pervious areas, and impervious areas in ratios which are based upon analysis of on -site recharge needs.

3.2.6 When reviewing proposed projects and through the implementation of the SRPP, discourage water management and proposed development projects that alter the natural wet and dry cycles of Natural Resources of Regional Significance or suitable adjacent buffer areas or cause functional disruption of wetlands or aquifer recharge areas.

Require all inappropriate inputs into Natural Resources of Regional Significance to be eliminated through such means as; redirection of offending outfalls, suitable treatment improvements or retrofitting options.

3.2.10 The discharge of freshwater to Natural Resources of Regional Significance and suitable adjacent natural buffer areas shall be designed to imitate the natural discharges in quality and quantity as well as in spatial and temporal distribution.

3.2.11 Existing stormwater outfalls that do not meet or improve upon existing water quality or quantity criteria or standard, or cause negative impacts to Natural Resources of Regional Significance or suitable adjacent natural buffer areas shall be modified to meet or exceed the existing water quality or quantity criteria or standard. The modification shall be the responsibility of the outfall operator, permittee or applicant.

Strategic Regional Goal

3.4 Improve the protection of upland habitat areas and maximize the interrelationships between the wetland and upland components of the natural system.

Regional Policies

Remove invasive exotics from all Natural Resources of Regional Significance and associated buffer areas. Require the continued regular and periodic maintenance of areas that have had invasive exotics removed.

Required maintenance shall insure that re-establishment of the invasive exotic does not occur.

Response 3: Comment acknowledged. The location of the Project minimizes impacts to wetlands and mangrove communities. Where impacts to wetlands are unavoidable, a mitigation plan has been developed that provides enhancement of existing wetlands and preservation of like-kind wetland systems. The Project Area's upland habitat is located in the designated open space and will not be impacted. Improvements to the habitat will be made by complying with the County's landscaping requirements. Exotic vegetation will be removed at the Project Area, which will be maintained periodically to prevent future exotic species proliferation. Non-potable water from the Floridan Aquifer will be used for cooling thereby minimizing potential impacts to potable freshwater supplies. The stormwater management plan for the Project will meet the requirements of SFWMD, DERM, FDEP, and EPA.

SFRPC Comment 4: In addition Council staff agrees that:

The consideration of natural gas as an alternative to the greater use of oil fuel is a positive step.

Response 4: Comment acknowledged. Natural gas will be the primary fuel for Turkey Point Unit 5.

SFRPC Comment 5: With regard to the policies of the utility which impact the resources and economy of the region, Florida Power and Light has balanced conservation measures through its Demand Side Management programs with expansion of energy-generating facilities to simultaneously meet the energy needs of our expanding population while reducing the potential of that need for energy.

Response 5: Comment acknowledged. FPL is committed to balancing the need of demand-side conservation programs, while meeting increased electric demands of southern Florida through the most cost effective and efficient supply side projects.

SFRPC Comment 6: The proposed energy facility expansion is generally consistent with the goals and policies of the Strategic Regional Policy Plan for South Florida, specifically the following:

Strategic Regional Goal

2.3 Enhance the economic competitiveness of the region and ensure the adequacy of its public facilities and services by eliminating the existing backlog, meeting the need for growth in a timely manner, improving the quality of services provided and pursuing cost-effectiveness and equitability in their production, delivery and financing.

Regional Policies

Encourage the application of resource recovery, recycling, cogeneration, district cooling, water reuse systems, and other appropriate mechanisms where they are cost-effective and environmentally sound, as means of reducing the impacts of new development on existing public facilities and services, and the costs of providing new public facilities and services.

2.3.35 Allow flexibility in state, local, and private sector participation in funding public services and facilities.

Encourage the use of user fees which discourage excessive use of infrastructure and services in the region while considering social and economic equity standards.

Response 6: Comment acknowledged.

SFWMD-1: South Florida Water Management District

SFWMD Comment 1: Appendix 10.10

The Water Supply Alternative Analysis presented in Appendix 10.10 concludes that groundwater from the Upper Floridan aquifer is the best source of makeup water for the cooling tower and continued use of city water provided by the Miami-Dade County Water and Sewer Division (WASD) is the best source of service water. SFWMD staff concurs with this conclusion.

However, Appendix 10.10, Section 4.2 – Service Water, proposes the use of surface water from the L-31E canal delivered through a pump and pipeline as a secondary source of service water, when available. This section proposes that *withdrawals from the L-31E canal will only take place during high flow events and the intake structure will be designed to minimize the impacts of entrainment or impingement.* SFWMD staff has concerns that the withdrawal of any volume of water from the L-31E canal would interfere with the gradient criteria stated in the Interceptor Ditch Operation Program and contained in the original agreement dated February 2, 1972, and subsequent supplemental agreements. The applicant should provide a feasibility analysis of the proposed L-31E withdrawals that should include, but not be limited to, an evaluation of the past hydrologic conditions in the L-31E canal and the cooling canal system as they relate to the gradient criteria and application of the Interceptor Ditch Operation Program. Otherwise, this alternative should be removed from consideration.

Response 1: Surface water from the L-31E canal will no longer be considered as an alternative water source for the Turkey Point Expansion Project.

SFWMD Comment 2: The aquifer parameters for the Upper Floridan Aquifer (UFA) from the 1975 report by Dames & Moore used in the impact analysis are similar to those obtained from aquifer performance testing of the aquifer storage and recovery (ASR) test well at the Florida Keys Aqueduct Authority (FKAA) Florida City facility. The sensitivity analysis included with the MODFLOW results predicted that a lower storage coefficient for the UFA would result in greater drawdown in the vicinity of the FKAA ASR well. The applicant should conduct an aquifer performance test (APT) of the two zones identified in the UFA. Should the aquifer parameters derived from the APT be outside the range of parameters that were used in the modeling as presented in the submittal, additional modeling will be required and a proposed mitigation plan will also be required.

Response 2: FPL believes that the modeling results included in the Turkey Point Expansion Project Site Certification Application (based on data produced during the 1970s as a result of extensive aquifer testing by Dames and Moore) is representative of impacts that the Project will have on the Floridan aquifer and associated legal users. The results of the analyses provide reasonable assurance that there will be no adverse impact on existing or future legal users. SFWMD and FPL have agreed that as a condition of certification, an aquifer performance test (APT) of the Floridan aquifer will be conducted to confirm the results of the modeling prior to withdrawal. The condition of certification will include provisions for mitigation in the event that the APT results are not consistent with previous modeling.

SFWMD Comment 3: In follow up to our discussion earlier today, I talked to our water use staff to gain a better understanding of the recent changes to our water use criteria concerning the "mitigation" issue and how it relates to the Florida Keys Aqueduct Authority (FKAA) ASR wells. It appears to me that, in order for FPL to demonstrate that they will be able to meet the District's water use criteria, FPL is going to have to drill a Floridan aquifer test well and do an APT test prior to the District issuing its final agency report and Recommended Conditions of Certification to DEP. This will be necessary in order to determine if sufficient water will be available from the Floridan aquifer to meet FPL's needs for Unit #5 without adversely impacting the FKAA wellfield. Otherwise, when it comes time to issue our final agency report to DEP, we will not be able to state that the proposed withdrawals meet District criteria and we will not be in a position to authorize the proposed withdrawals through our Recommended Conditions of Certification.

District water use staff has also advised me that drilling a Floridan Aquifer well may take up to half a year or possibly even longer. Obviously, this would have an impact on the project's current review schedule.

Response 3: Refer to Response 2 above.

Replacement Pages

will be returned to the existing units. Area D (see Figure 3.2-3) will be retained as an operational laydown area. Area E will be seeded and its runoff, along with that from Area D, will be routed to the stormwater pond which will be retained (see Figure 3.8-2). Except for potentially oil-contaminated areas (containment areas for transformers, oil tanks, and other oil-containing or handling equipment), runoff from Area A (the Power Block) will be collected and recycled to the cooling canal system. Runoff from the potentially oil-contaminated areas will be routed through an oil/water separator and then recycled to the cooling canal system.

Generally, drainage will be directed away from structures and routed to the stormwater collection system. The CT/HRSG area will be graded with moderate slopes for effective drainage. Site runoff will be conveyed to the stormwater pond through a drainage system of pipes, channels, swales, and culverts.

3.9 MATERIALS HANDLING

3.9.1 CONSTRUCTION MATERIALS AND EQUIPMENT

Construction materials and equipment will be delivered to the Project Area by existing roads and possibly by barge for large components. The existing access road and the proposed new access roads will be used during construction and operation of the Project.

Materials will be unloaded and moved around the site using portable cranes and trucks. Some of the heaviest items such as the new CTs, new steam turbines, electric generators, HRSGs, and transformers may require barge delivery as discussed in Section 3.9.4. Pollution control measures for the laydown areas will include runoff collection as is described in Section 3.8. Main roads in the laydown areas will be surfaced with aggregate/limerock and treated with dust palliative to reduce dust. Water sprays will also be used on unpaved roadways, as required, to control dust due to traffic.

3.9.2 FILL MATERIAL

Material unsuitable for the power block and associated structures will be removed from the Project Area. This material, primarily organic soils and muck, will be transported to the EMB for use in improving the wetland systems as approved by FDEP and USACE permit requirements. Fill material will include materials such as limerock stockpiled along the existing cooling canal berms at the Turkey Point Plant Site. The existing stockpiles are a result of the original construction of the

SITE CERTIFICATION APPLICATION
TURKEY POINT EXPANSION PROJECT

VOLUME 3 OF 3

Submitted by:

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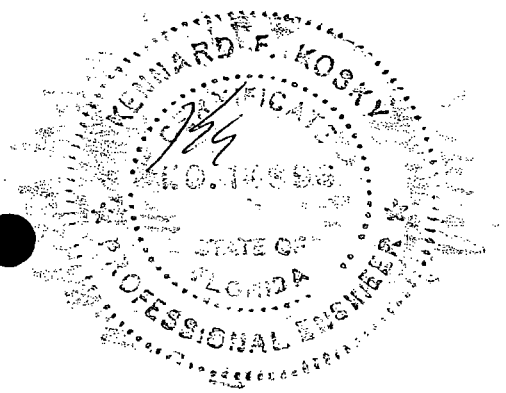
November 2003
0337600



FPL

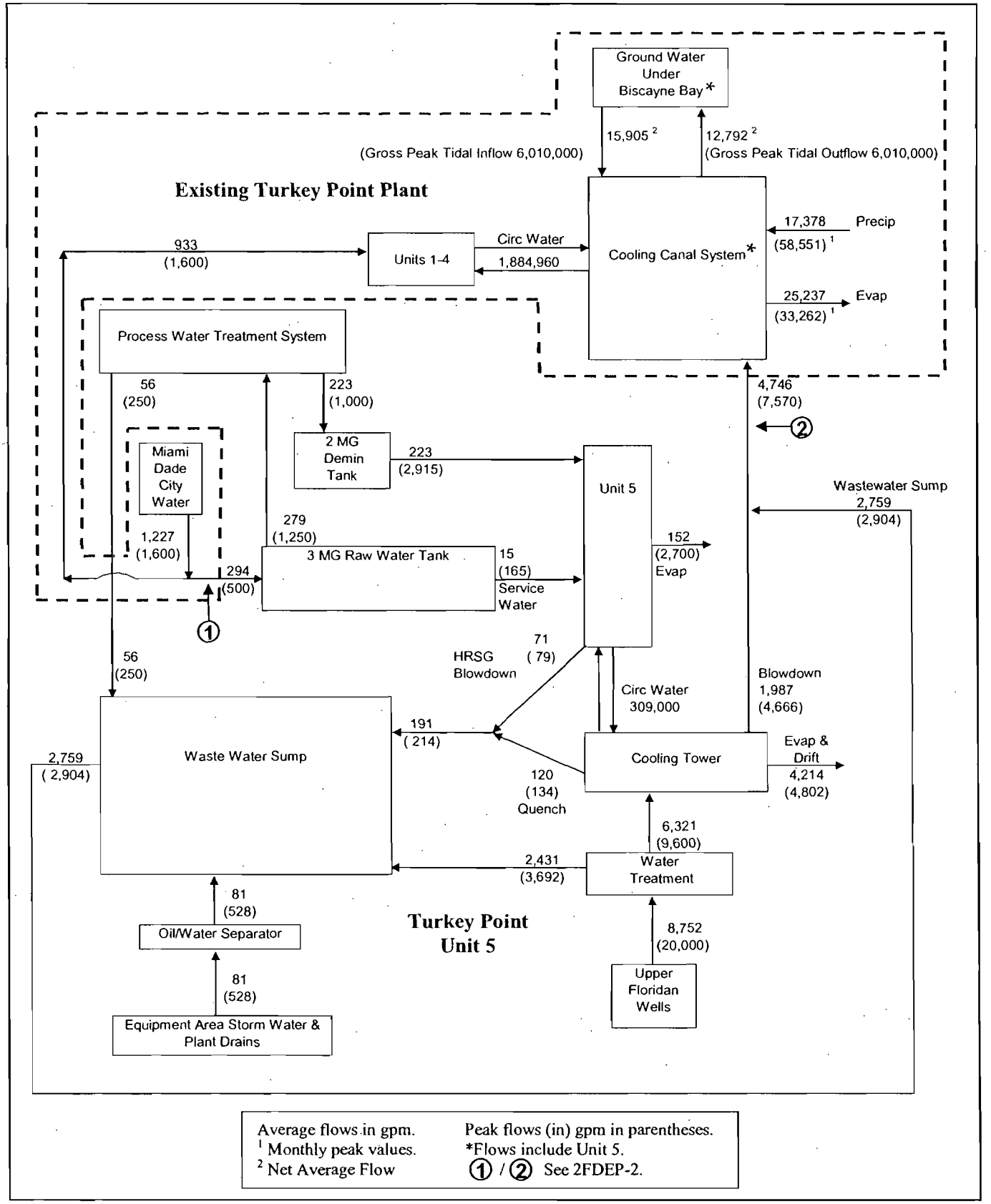


Figure 3.5-1.
Average Water Use Diagram

Source: Tetra Tech FW, Inc., 2004; Golder, 2004.

FPL

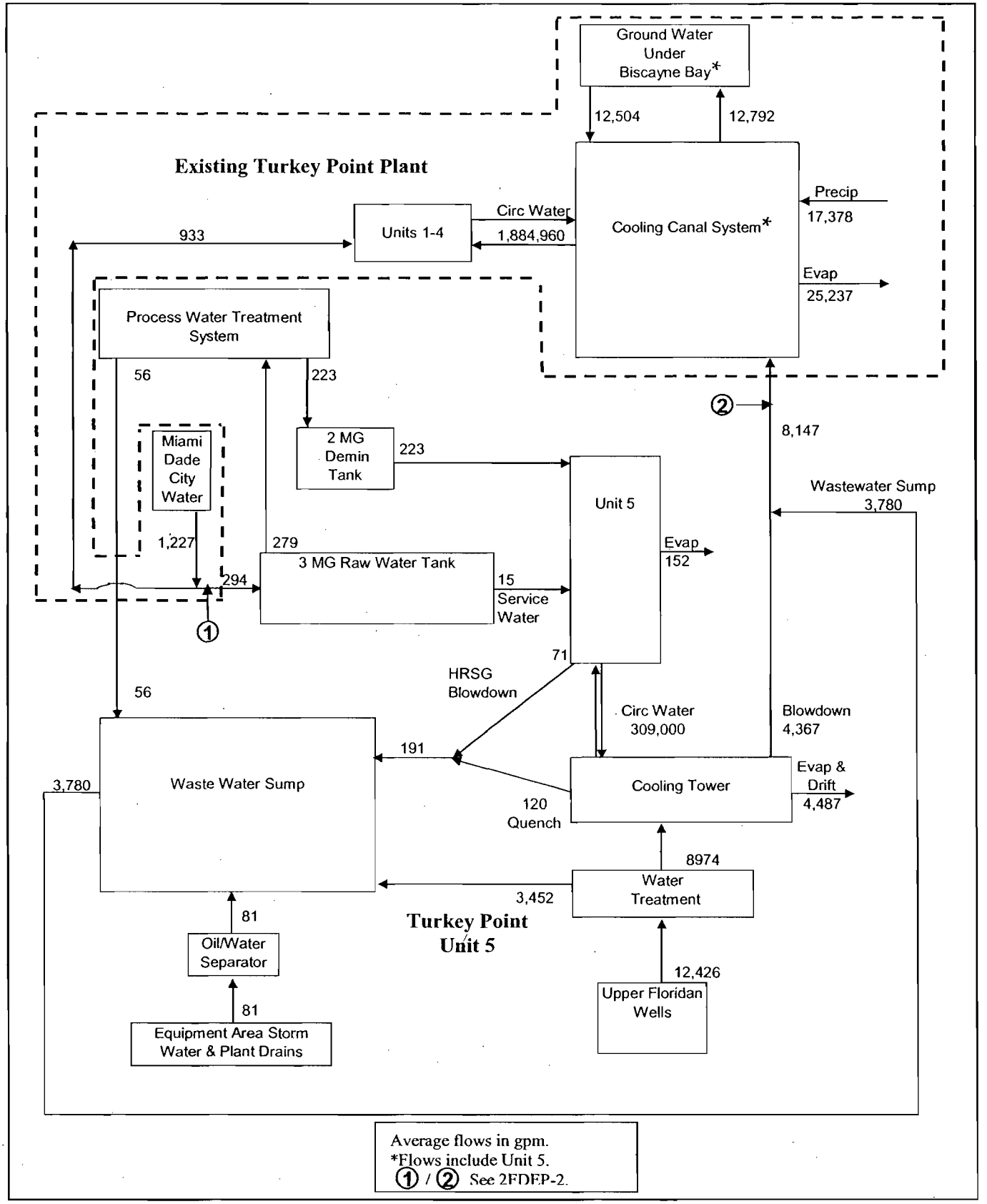
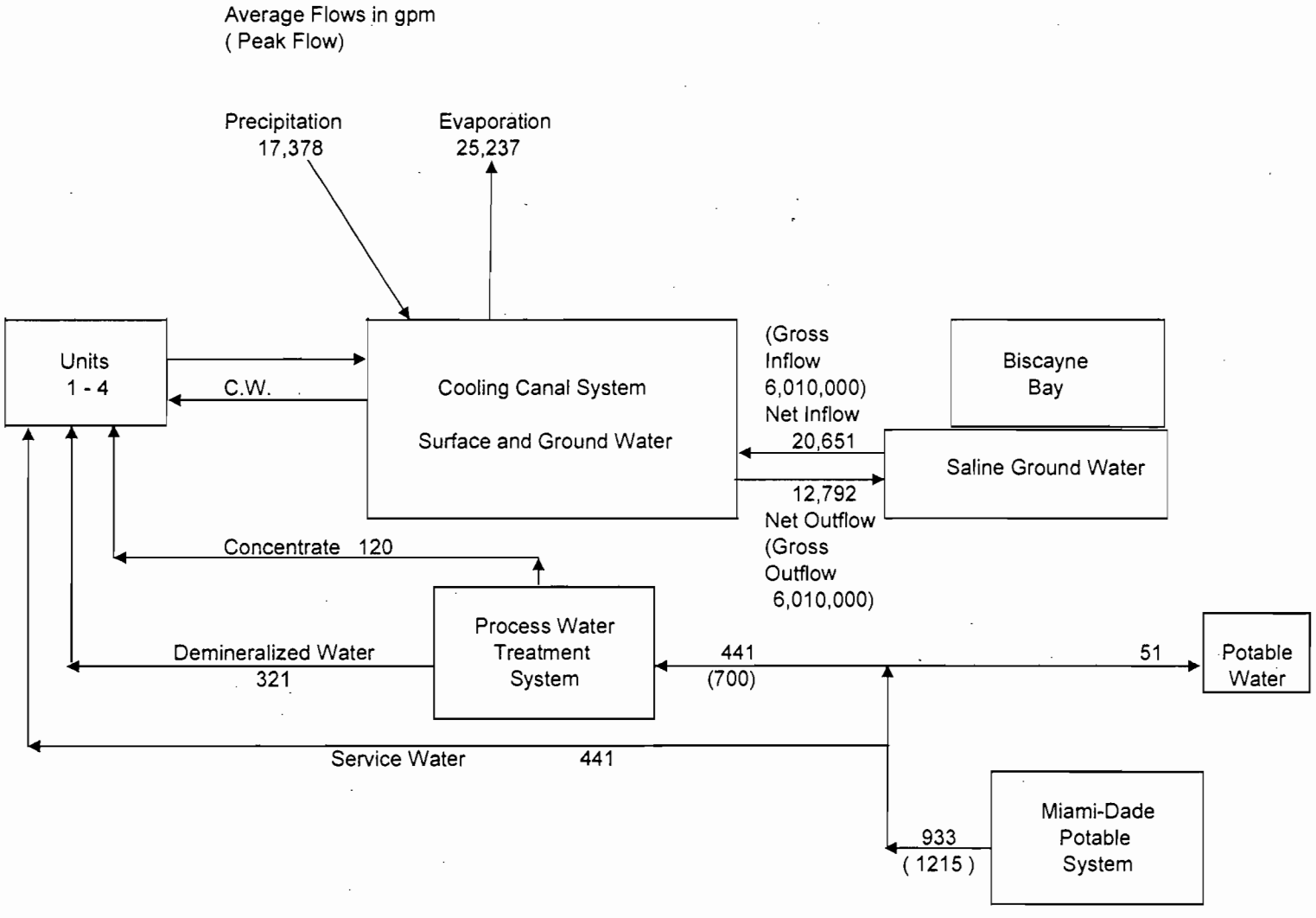


Figure 3.5-2.
Special Water Use Diagram

Source: Tetra Tech FW, Inc., 2004; Golder, 2004.

FPL

Figure 2.3-8. Existing Plant Water Balance



The Project water balance is presented schematically in Figure 3.5-1. The water quality of the proposed cooling tower makeup water source is presented in Table 3.5-1, which has been derived from information described in Section 2.3.4. Similarly, expected water quality of the reclaim water is presented in Table 3.5-2. The following sections (3.5.1 through 3.5.4) provide more detailed descriptions of proposed plant water uses.

3.5.1 CIRCULATING WATER HEAT REJECTION SYSTEM

A rectangular wet mechanical draft cooling tower located within the power block will be used to reject the Project heat load of 2.3 billion Btu/hr to the atmosphere. Makeup water from the upper Floridan aquifer will be pre-treated to remove scale-causing chemicals (e.g., calcium, magnesium, and sulfate). Cooling tower blowdown will be released to the existing cooling canal system at a location near the discharge for Units 1 and 2 (see Figure 3.2-2). Table 3.4-3 presented design information on the cooling tower. As shown in Figure 3.5-1, cooling tower circulating water will be used for steam condensate cycle makeup water.

Figure 3.5-2 presents a special case water-use diagram developed to represent the maximum expected 90-day water demand of the heat dissipation system for cooling tower makeup. This special case water usage will be used to simulate a 90-day maximum withdrawal without recharge and meets the SFWMD requirements for groundwater modeling.

3.5.2 DOMESTIC/SANITARY WASTEWATER

A new restroom will be installed to handle additional domestic/sanitary wastewater. A lift station will send this wastewater to the existing plant sanitary wastewater treatment plant. The increase in flow rate will not cause the system capacity to be exceeded.

3.5.3 POTABLE WATER SYSTEMS

Potable water uses for the Project will not cause the facility to exceed the existing capacity from Miami-Dade potable water supply system. Potable water use will be limited by using water conserving features such as bottled water for drinking purposes. Permanent safety shower/eyewash stations will be installed at the site.

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **0.0015% Sulfur (S) oil**	4. Equivalent Allowable Emissions: **3.1** lb/hour **47.8** tons/year
5. Method of Compliance: **Fuel sampling.**	
6. Allowable Emissions Comment (Description of Operating Method): **Based on oil firing at 100% load: 35°F. TPY see PSD Report Section 2.0 and Appendix A.**	

Allowable Emissions Allowable Emissions 2 of 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **See Comment**	4. Equivalent Allowable Emissions: **13.3** lb/hour **47.8** tons/year
5. Method of Compliance: **Fuel sampling.**	
6. Allowable Emissions Comment (Description of Operating Method): **Requested allowable emissions and units: Pipeline Natural Gas. Natural gas firing CT with duct firing. TPY see PSD Report Section 2.0 and Appendix A.**	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

APPENDIX 10.7

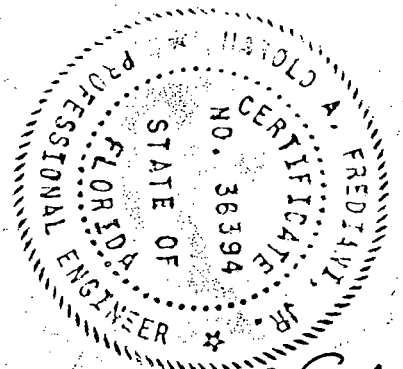
COOLING POND MODELING REPORT

2007 GENERATION PROJECT

COOLING POND MODELING REPORT

February 24, 2003

by:
TETRA TECH FW INC.
210 Hollyridge Drive
Roswell, GA 30076-1208
Certificate of Authorization Number: 9645



Harold A. Frediani 2/24/04

Harold A. Frediani, Jr. P.E. 36394

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FPL 2007 Generation Project - Cooling Pond Modeling Study

I. Introduction

FPL is considering the potential addition of an 1,100-MW combined cycle unit at the Turkey Point site. The conceptual heat dissipation system is proposed as an evaporative cooling tower, such as permitted for Martin Unit 8. Presently, the configuration of the cooling tower makeup and blowdown systems consists of the following:

- Cooling tower makeup to be water withdrawn from the upper Floridan aquifer.
- Cooling tower blowdown to be discharged to the hot water side of the cooling canal system.

The Existing Turkey Point plant configuration includes 4 units with the following design operating characteristics:

Type of Condenser Cooling	Closed-Cycle
Megawatts	2,320 MW
Circulating Water Flow (cfs)	4,250
Composite Delta T Across Condenser (°F)	12.22
Heat Rejection Rate (Btu/Hr)	11.9×10^9

The units utilize a 4,370-acre closed-cycle cooling canal system for condenser cooling (see Figure 1 for cooling canal system schematic). The cooling canal system receives tidal inflow and outflow from the ground water beneath Biscayne Bay due to the exceptional porosity of the underlying rock. Therefore, it has no intake or discharge system and does not require an NPDES permit. Figure 2 shows an idealized cross section taken through the cooling canal system from west to east at the location shown by the red arrows on Figure 1. Water levels in Figure 2 are set assuming the water level in Biscayne Bay is at mean tide (Elevation zero). Figure 3 is a close-up view of the western end of the cross section from Figure 2, showing details of the Interceptor Ditch along the western edge of the cooling canal system and the Levee 31-E and its associated canal. The Interceptor Ditch was installed to prevent cooling canal water from migrating to the west. The Interceptor Ditch is equipped with pumps and level monitors; the pumps are operated whenever necessary to ensure the hydraulic gradient is always towards the cooling canal system so as to recapture any seepage. Figure 4 is a close-up view of the eastern end of the cross section from Figure 2, showing the relationship between the eastern edge of the cooling canal system and

the western shoreline of Biscayne Bay. The location of Figure 4 is also shown on the aerial view in Figure 4a.

This investigation has performed the following tasks:

1. Determine water quality in the potential cooling tower makeup source, and one additional potential HRSG makeup source.

2. Perform screening modeling of the thermal performance of the cooling canal system in order to quantify its exchange of water with the ground water beneath Biscayne Bay.

3. Perform thermal performance modeling of the proposed cooling tower to estimate its operating temperatures and evaporation rates.

4. Prepare a water balance for the proposed configuration under average flow conditions.

5. Prepare estimates of the expected water quality of the cooling canal system and the proposed cooling tower under average flow conditions.

II. Screening Modeling

This modeling was performed utilizing the EQTP model. This is a steady state energy balance computer model that was originally written in the 1970s, and documented in a paper presented at the 33rd Annual Meeting of the American Power Conference in April 1972. This model has since been used to analyze numerous cooling systems, including several in Florida.

A. Model Description

EQTP is a steady state energy balance computer model which simulates the expected thermal performance of a heated water body with respect to both temperature and evaporation effects. The program assumes that heat transfer to and from a heated water body is a function of the water's equilibrium temperature. This model was originally described by Patterson, Leporati and Scarpa ("The Capacity of Cooling Ponds to Dissipate Heat", Ebasco Services Incorporated, presented at the 33rd Annual Meeting of the American Power Conference, Chicago, Illinois, April 20-22, 1972).

The problem of predicting the steady-state temperatures in a heated water body reduces to a quantitative determination of the energy transfer through a boundary between the atmosphere and the water. The processes involved in the heating and cooling of a water mass can be summarized as follows:

Heating Process

1. Absorption of short-wave radiation from the sun and the sky, Hs
2. Absorption of longwave radiation from the atmosphere, Ha
3. Heat rejected to the water by the plant, Hp
4. Convection of heat through the bottom of the water body from the interior of the earth
5. Transformation of kinetic energy to heat
6. Heating due to chemical processes
7. Condensation of water vapor

Cooling Process

1. Reflection of short-wave solar radiation by the water, Hsr
2. Reflection of longwave atmospheric radiation by the water, Har
3. Longwave radiation emitted by the water, Hbr
4. Conduction of sensible heat to the atmosphere, Hc
5. Heat carried away by evaporation, He

In the heating process terms 4 through 7 are small in comparison with terms 1 through 3 and, therefore, can be neglected. Thus the following equation is solved within the steady state model:

$$Hs+Ha+Hp-Hsr-Har-Hbr-Hc-He=0$$

Where:

$$Hs = Ho\ (0.61S+0.35)$$

Ho = the solar and sky short-wave radiation received on a horizontal surface of the earth during a cloudless day
S = percentage of possible sunshine

$$Ha = 4.15x10^{-8}(Ta + 460)^4\ (C+0.03\ 1\ (e_a)^{1/2}\ )\ Btu /\ ft^2 / day$$

Ta = the ambient air temperature, °F
C = Brunt coefficient determined from air temperature and the ratio of solar radiation and clear-sky solar radiation, dimensionless
e_a = air vapor pressure, mm Hg

$$Hbr = \gamma w \sigma (Ts + 460)^4\ \ Btu / ft^2 / day$$

γw = emissivity of water = 0.97, dimensionless
σ = Stephan-Boltzman constant = 4.15×10^{-8} Btu / ft^2 / day
Ts = water surface temperature, °F

$$He = (73 + 7.3W)(e_s - e_a)\ Btu\ /\ ft^2 / day$$

W = wind speed measured 25 feet above ground-level, mph
e_s = saturation vapor pressure determined from the water surface temperature, mm Hg
e_a = air-vapor pressure, mm Hg

$$Hc = 0.26(73 + 7.3W)(Ts - Ta)(P/760)\ Btu / ft^2 / day$$

Ta = ambient air temperature, °F
Ts = water surface temperature, °F
W = wind speed, mph
P = barometric pressure, mm Hg

To determine the distribution of temperature throughout the water body, a heat exchange coefficient which describes the rate of heat lost across the air-water interface per unit area per unit temperature increase is calculated as follows:

$$Kf = Hp/[At(Ef-En)]$$

Kf = the forced heat exchange coefficient, Btu/ft^2/day/°F
At = total effective area of the cooling pond, ft^2
Hp = plant heat rejection rate, Btu/day
Ef = forced equilibrium temperature, °F
En = natural equilibrium temperature, °F

For a closed-cycle water body, the temperature at the circulating water intake can be calculated as follows:

$$Ti\text{-}En = \Delta T / e^{r} - 1$$

Ti = inlet circulating water temperature, °F
ΔT = the condenser rise, °F
En = natural equilibrium temperature, °F
r = $KfAt/\rho CpQp$
ρ = density of water, lb/ft^3
Cp = specific heat of water, Btu/lb/°F
Qp = plant condensing water flow, ft^3/day

Once the inlet temperature has been computed, the temperature at any point in the lake may be calculated as follows:

$$T\text{-}En = (Ti + \Delta T - En) / e^{r_1}$$

T = the temperature at any point in the pond, °F
r_1 = $KfA/\rho CpQp$
A = effective area between the circulating water discharge point and the point in question, ft^2

The primary assumption of the model is that of the steady state energy balance. This assumption provides the limitation that the model time step has to be long enough for transient factors to be dampened out. For example, the diurnal variation in air temperature occurs too fast for a large body of water to follow; therefore, the minimum time step that is usually appropriate has been found to be 5 days.

The model derivation also assumes that the only mechanisms of heat transfer into the heated water body that need to be considered are the absorption of short-wave radiation from the sun and the sky, the absorption of longwave radiation from the atmosphere, and the heat rejected to the water body by the plant.

Model output includes the condenser inlet temperature and natural and forced equilibrium temperatures, heat exchange coefficients, and evaporation on a monthly basis.

B. Data Inputs

Data inputs for the EQTP model include meteorological data, cooling canal system configuration data, and plant operating data.

Meteorological data for the period January, 1998 through December, 2002, were obtained from the National Climatic Data Center for Miami International Airport. These data include ambient air dry-bulb temperature, precipitation, dew point, wind speed, barometric pressure, and sky cover (which was utilized to estimate % sunshine). Graphs of monthly averages of these data over the period of record are included in Figures 5-10.

Cooling canal system configuration data were determined based on historical records. This information indicates that the cooling canal system water level rises and falls with the tidal water level in Biscayne Bay, and that the canal sides are essentially vertical. The water level at the southern end of the cooling canal system stays at approximately the same level as Biscayne Bay. Because of the existing units' circulating water (CW) pumps, the water level on the discharge side (labeled Lake Warren on Figure 1) generally tracks about 1.7 feet above that of Biscayne Bay. Similarly, the water level on the CW pumps intake side (labeled Loch Rosetta on Figure 1) generally tracks about 1.4 feet below that of Biscayne Bay. At the cross section in Figure 2, the water level is shown at 0.85 feet above that of Biscayne Bay (0.0 feet MSL) on the western side, which is approximately halfway between the CW pumps' discharge and the south end of the cooling canal system. On the eastern side of the cross section in Figure 2, the water level is shown at -0.70 feet below that of Biscayne Bay, which is approximately halfway between the CW pumps' intake and the south end of the cooling canal system. For modeling purposes, the cooling canal system area was assumed to be a constant 4,370 acres, and the capacity was assumed to vary between 10,051 acre-feet at low tide and 14,421 acre-feet at high tide. It was estimated that tidal flux into and out of the cooling canal system averaged about 4,370 acre-feet per tidal cycle, or about 256,956 acre-feet per month.

Plant operating data input to the model included design values for megawatts and Delta T, and load factors. The nuclear units were assumed to operate at 100% capacity, and the fossil units were assumed to operate at actual historical capacities, which are shown in Figure 11.

The plant supplied 6-hourly operating data for water box inlet and outlet temperatures for each unit for January 1, 1999 through December 31, 2002. However, some of the data were problematic due to missing inlet temperatures or outlet temperatures that were less than the corresponding inlet temperatures. In addition, there were some large discrepancies in the Units 1 and 2 inlet temperatures, as shown in Figure 12. The lower (Unit 1) inlet temperatures were selected for calculation of historical cooling canal cold water temperatures for the period of record.

C. Model Calibration with Actual Plant Data

The EQTP model was run for a five-year period beginning with January, 1998, to simulate existing operation of the cooling canal system over the 60-month period to December, 2002 for which actual data are available.

Figure 13 compares actual and predicted condenser inlet temperatures for the period of record. Figure 14 shows the same data for the period from January, 2000, until December, 2002. Temperature correlation is reasonable, allowing for the relatively poor quality of the plant data, and the assumption that Units 3 and 4 ran at 100% capacity factor. Based on the reasonableness of the correlation, the cooling canal system was judged to be operating with 100% effective area.

Cooling canal salinities were downloaded from the EPA web site for the period of September, 2000, through March, 2003 (a single value for each month). Salinity data for Biscayne Bay, in the plant vicinity, were downloaded from the SFWMD web site for the period January, 1998, through December, 2002, and were assumed to be representative of the ground water beneath Biscayne Bay. Monthly averages were plotted for the Biscayne Bay data, although the data were not continuous over each month. The results are shown on Figure 15, for the 5-year period of record, and on Figure 16 for the period from September, 2000, through December, 2002. Regression analysis was performed on these data to derive a relationship between Bay salinity and cooling canal salinity (See Figure 17). A linear curve-fit was performed , with Y-intercept at X=0, so that the slope of the line would be representative of the average cycles of concentration of bay water in the cooling canal system. The resultant average cycles of concentration was determined to be 1.6145.

Based on the geometry of the cooling canal system and the known water levels, temperatures, and chemical composition of the cooling canal system and the adjacent ground waters, it was hypothesized that a column of ground water exists beneath the cooling canal system which interchanges vertically with the surface waters in the cooling canal system. It was further postulated that this cooling canal system ground water oscillates vertically with the tide along with the cooling canal surface water, gains limited amounts of adjacent ground water on the incoming tide (see Figure 18), and loses limited amounts of cooling canal water to the adjacent ground waters on the outgoing tide (see Figure 19).

Modeling results were analyzed to calculate the net amounts of makeup and blowdown (net meaning fresh inputs rather than recirculated cooling canal water that has moved out and then back in), and an empirical relationship was developed to determine the net makeup and net blowdown as functions of precipitation, and natural and forced evaporation. Based on these relationships, an average water balance was developed for the existing units, and is shown on Figure 20. Based on the results of the EQTP modeling, plots of predicted versus measured cycles of concentration are shown in Figure 21, for the period 1998-2002, and Figure 22, for 2000-2002. The agreement is reasonable, in that the salinities in both the cooling canal system and the bay were grab samples, taken at different times. Figure 23 shows historical salinity in the cooling canal and the bay, and the corresponding precipitation.

Cooling tower modeling was performed, using the technique of Leung and Moore, to estimate the minimum, average, and maximum cooling tower cold water temperatures and evaporation rates, assuming a 100% capacity factor on the new combined cycle unit. The results are shown on Figure 24. The overall average evaporation rate from the cooling tower was estimated to be 559 acre-feet per month (about 4,214 gpm). Based on these results, a water use diagram was prepared for the new unit, and is presented as Figure 25.

Based on the modeling, average cycles of concentration (based on Biscayne Bay water quality) were estimated for both the cooling tower and the cooling canal system. The results are:

Cycles of Concentration Relative to Biscayne Bay		
	Existing	With Proposed New Unit
Cooling Canal System	1.6145	1.360
Cooling Tower	--------	0.313

These concentration factors show that the cooling canal system level of dissolved constituents will be decreased by the operation of the new combined cycle unit, because the total dissolved solids level of the new unit's wastewater discharge to the cooling canal system will be lower than that of the ground water that is displaced by that discharge.

Utilizing these concentration factors, levels of chemical constituents were estimated in the cooling canal system and in the cooling tower, based on grab sample analyses provided by FPL of the existing cooling canal water, and historic water quality data for the Upper Floridan aquifer. As shown on Figure 25, cooling tower blowdown will be mixed with water treatment wastewater, process water treatment wastewater, HRSG blowdown, and oil/water separator effluent. The present water quality in Biscayne Bay and the cooling canal system, the expected water quality in the cooling canal system after installation of the new unit, and the expected water quality of the combined waste stream from the new unit are presented in Table 1.

D. Additional Information

In addition, analyses were performed on water quality data provided by FPL for the L-31 canal which runs generally north/south east of the plant. The results are provided in Table 2. Similarly, water quality data for the Upper Floridan aquifer were obtained from historical documents. The results are shown on Table 3.

Figure 26 shows the predicted cold water temperatures for the cooling canal system and the cooling tower for the 1998-2002 period of record. The cooling canal system achieves lower temperatures during the winter, while the cooling tower achieves lower temperatures during the summer.

III. Results and Conclusions

Although the screening model runs do not produce exceptionally good results relative to operating temperatures and evaporation rates, the results are reasonable and adequate for the purpose of this study.

The results indicate that there is a very large flow of water into and out of the cooling canal system. Based on the estimated quality in the Upper Floridan Aquifer, the cooling tower for the new unit can be run at the proposed cycles of concentration without raising the levels of concentrations in the cooling tower blowdown to where they would significantly affect the concentrations in the cooling canal system. In fact, as proposed, the discharge of wastewater from the new combined cycle unit will actually lower concentrations in the cooling canal system. The new unit release of 4,746 gpm is negligible compared with the estimated average tidal flushing rate of 3,822,475 gpm. Historical evidence indicates that sufficient water can be withdrawn from the Upper Floridan aquifer to provide cooling tower makeup.

Based on predicted cycles of concentration in the cooling canal system, the wastewater from the new unit reduces the existing system cycles of concentration slightly.

With respect to the cooling tower, it would operate at significantly lower cycles than the existing cooling canal system.

Table 1. Predicted Water Quality With New Unit

All should be tested as total unfiltered.			Existing Cooling Canal		Biscayne Bay		Cooling Canal with New Unit		New Unit Waste Stream to Cooling Canals
ND indicates never detected			Max	Avg	Max	Avg	Max	Avg	Max
No.	***Parameter***	***Unit***							
1	pH	SU	8.21	8.02					
2	TSS	mg/L	19	16	12	10	16	13	18.44
3	COD	mg/L	2,100	1,650	1,301	1,022	1769	1390	350
4	BOD (5-day)	mg/L	ND	ND	ND	ND	ND	ND	20
5	Soluble BOD	mg/L	ND	ND	ND	ND	ND	ND	20
6	Total Residual Chlorine	mg/L	0.80	0.80	0.50	0.50	0.67	0.67	0
7	Total Dissolved Solids (TDS)	mg/L	56,000	54,500	34,686	33,757	47,172	45,909	17,687
8	Ammonia as N	mg/L	0.16	0.16	0.10	0.10	0.13	0.13	2.77
9	Kjeldahl Nitrogen	mg/L	1.90	1.80	1.18	1.11	1.60	1.52	0
10	Nitrite as N	mg/L	ND	ND	ND	ND	ND	ND	ND
11	Nitrate as N	mg/L	ND	ND	ND	ND	ND	ND	0.860
12	Total Phosphorus	mg/L	0.110	0.097	0.068	0.060	0.093	0.081	2.150
13	Dissolved Oxygen	mg/L	12.02	8.7	7.4	5.4	10.1	7.3	7.5
14	Total Hardness	mg/L as CaCO3	10,000	10,000	6,194	6,194	8424	8424	876
15	Total Alkalinity	mg/L as CaCO3	170	165	105	102	143	139	80
16	Nitrogen (total)	mg/L	1.90	1.80	1.18	1.11	1.60	1.52	23.31
17	Fluoride	mg/L	ND	ND	ND	ND	ND	ND	6.7
18	Chloride	mg/L	33,000	30,000	20,440	18,582	27,798	25,271	12,543
19	Iron Total	mg/L	ND	ND	ND	ND	ND	ND	0.120
20	Magnesium	mg/L	2,200	2,050	1,363	1,270	1,853	1,727	191
21	Calcium	mg/L	760	720	471	446	640	607	32
22	Manganese	mg/L	0.0089	0.0086	0.0055	0.0053	0	0	0.074
23	Sulfate	mg/L	4,200	3,950	2,601	2,447	3,538	3,327	1,422
24	Temperature	°C	31.5	30.1	34.5	25.6	31.5	30.1	30.5
25	Antimony	mg/L	ND	ND	ND	ND	ND	ND	ND
26	Arsenic	mg/L	0.0420	0.0295	0.0260	0.0183	0.0354	0.0248	0.0081
27	Beryllium	mg/L	ND	ND	ND	ND	ND	ND	0.20285
28	Cadmium	mg/L	ND	ND	ND	ND	ND	ND	ND
29	Chromium	mg/L	ND	ND	ND	ND	ND	ND	0.18441
30	Copper	mg/L	0.0210	0.0175	0.0130	0.0108	0.0177	0.0147	0.23973
31	Lead	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000
32	Soluble Lead	mg/L	0.0002	0.0002	0.0001	0.0001	0.0002	0.0001	0.0000
33	Mercury	mg/L	ND	ND	ND	ND	ND	ND	ND
34	Molybdenum	mg/L	0.0180	0.0180	0.0111	0.0111	0.0152	0.0152	0.0035
35	Nickel	mg/L	0.0500	0.0395	0.0310	0.0245	0.0421	0.0333	0.20285
36	Selenium	mg/L	0.6700	0.3475	0.4150	0.2152	0.5644	0.2927	0.29505
37	Silver	mg/L	ND	ND	ND	ND	ND	ND	ND
38	Thallium	mg/L	0.0018	0.0011	0.0011	0.0007	0.0015	0.0009	0.0003
39	Zinc	mg/L	0.0190	0.0190	0.0118	0.0118	0.0160	0.0160	0.29505
40	Cyanide	mg/L	ND	ND	ND	ND	ND	ND	ND
41	Phenols	mg/L	ND	ND	ND	ND	ND	ND	ND
42	Oil & Grease	mg/L	ND	ND	ND	ND	ND	ND	ND
43	Silica	mg/L	0.61	0.52	0.38	0.32	1	0	15.8
44	Ortho-Phosphate	mg/L	ND	ND	ND	ND	ND	ND	ND
45	Alkalinity(Bicarbonate)	mg/L	170	165	105	102	143	139	85
46	Total- Phosphate	mg/L					0	0	2.15
47	Turbidity	NTU	2.00	1.92	1.24	1.19	1.68	1.61	5.20
48	Sulfides	mg/L	ND	ND	ND	ND	ND	ND	ND
49	Aluminum	mg/L	0.017	0.014	0.011	0.009	0	0	0
50	Barium	mg/L	0.080	0.073	0.050	0.045	0	0	0.59011
51	Iron(Dissolved)	mg/L	ND	ND	ND	ND	ND	ND	0.120
52	Potassium	mg/L	690	680	427	421	581	573	222
53	Vanadium	mg/L	0.0056	0.0040	0.0035	0.0025	0	0	0

Table 2. Grab Sample Analyses Provided by FPL

All should be tested as total unfiltered.
ND indicates never detected

			L-31N		Cooling Canal	
			Max	Avg	Max	Avg
No.	*Parameter*	*Unit*				
1	pH	SU			8.21	8.02
2	TSS	mg/L	ND	ND	19	16
3	COD	mg/L	ND	ND	2100	1650
4	BOD (5-day)	mg/L	ND	ND	ND	ND
5	Soluble BOD	mg/L	ND	ND	ND	ND
6	Total Residual Chlorine	mg/L	ND	ND	0.8	0.8
7	Total Dissolved Solids (TDS)	mg/L	390	370	56000	54500
8	Ammonia as N	mg/L			0.16	0.16
9	Kjeldahl Nitrogen	mg/L			1.9	1.8
10	Nitrite as N	mg/L	ND	ND	ND	ND
11	Nitrate as N	mg/L	1.1	1.05	ND	ND
12	Total Phosphorus	mg/L			0.11	0.0965
13	Dissolved Oxygen	mg/L			12.02	8.7
14	Total Hardness	mg/L as CaCO3	240	215	10000	10000
15	Total Alkalinity	mg/L as CaCO3	200	200	170	165
16	Nitrogen (total)	mg/L			1.9	1.8
17	Fluoride	mg/L	ND	ND	ND	ND
18	Chloride	mg/L	60	58.5	33000	30000
19	Iron Total	mg/L	ND	ND	ND	ND
20	Magnesium	mg/L	5.5	5.35	2200	2050
21	Calcium	mg/L	72	70	760	720
22	Manganese	mg/L	ND	ND	0.0089	0.00855
23	Sulfate	mg/L	26	26	4200	3950
24	Temperature	°C			31.5	30.05
25	Antimony	mg/L	ND	ND	ND	ND
26	Arsenic	mg/L	ND	ND	0.042	0.0295
27	Beryllium	mg/L	ND	ND	ND	ND
28	Cadmium	mg/L	ND	ND	ND	ND
29	Chromium	mg/L	ND	ND	ND	ND
30	Copper	mg/L	ND	ND	0.021	0.0175
31	Lead	mg/L	ND	ND	0.0001	0.0001
32	Soluble Lead	mg/L	ND	ND	0.00021	0.000152
33	Mercury	mg/L	ND	ND	ND	ND
34	Molybdenum	mg/L	ND	ND	0.018	0.018
35	Nickel	mg/L	ND	ND	0.05	0.0395
36	Selenium	mg/L	0.0062	0.00435	0.67	0.3475
37	Silver	mg/L	ND	ND	ND	ND
38	Thallium	mg/L	ND	ND	0.0018	0.00107
39	Zinc	mg/L	ND	ND	0.019	0.019
40	Cyanide	mg/L			ND	ND
41	Phenols	mg/L	ND	ND	ND	ND
42	Oil & Grease	mg/L	ND	ND	ND	ND
43	Silica	mg/L			0.61	0.52
44	Ortho-Phosphate	mg/L	ND	ND	ND	ND
45	Alkalinity(Bicarbonate)	mg/L	200	200	170	165
46	Total- Phosphate	mg/L				
47	Turbidity	NTU			2	1.915
48	Sulfides	mg/L			ND	ND
49	Aluminum	mg/L	ND	ND	0.017	0.014
50	Barium	mg/L	0.014	0.0135	0.08	0.073
51	Iron(Dissolved)	mg/L	ND	ND	ND	ND
52	Potassium	mg/L	6.3	6.3	690	680
53	Vanadium	mg/L	ND	ND	0.0056	0.004

Table 3. Upper Floridan Aquifer Water Quality

	Minimum	Average	Maximum
Alkalinity as CaCO3 (mg/l)	160	176.7	200
Alkalinity (Bicarbonate) (mg/L)	196	232.0	268
Aluminum (mg/L) - Non Detects @ 50% and Detects	ND	ND	ND
Ammonia as N (mg/L)	0.004	0.2	1.5
Antimony (ug/L) - Non Detects @ 50% and Detects	ND	ND	ND
Arsenic (ug/L) - Non Detects @ 50% and Detects	ND	ND	ND
Barium (ug/L) - Non Detects @ 50% and Detects	5	65.7	320
Beryllium (ug/L) - Non Detects @ 50% and Detects	0.05	8.6	110
Bicarbonate Ion (mg/L)	260	266.0	270
BOD (5-day) (mg/L)	2.5	7.6	11
Cadmium (ug/L) - Non Detects @ 50% and Detects	ND	ND	ND
Calcium (mg/L)	62	105.2	210
Chloride (mg/L)	54	773.0	6800
Chlorine, Total (mg/L) - Non Detects @ 50% and Detects	ND	ND	ND
Chromium (ug/L) - Non Detects @ 50% and Detects	2.5	10.7	100
COD (mg/L)	60	106.3	190
Color (Color Units) - Non Detects @ 50% and Detects	2.5	42.5	400
Conductivity (umho/cm)	2.92	3102.1	6590
Copper (ug/L) - Non Detects @ 50% and Detects	5.6	19.1	130
Cyanide (mg/L) - Non Detects @ 50% and Detects	ND	ND	ND
Dissolved Oxygen (mg/L)	0.10	2.72	7.50
Fluoride (mg/L) - Non Detects @ 50% and Detects	0.45	1.2	3.6
Hardness (mg/l as CaCO3)	170	716.6	1750
Hardness - Non Carbonate (mg/l as CaCO3)	380	402.0	430
Iron Total (ug/L) - Non Detects @ 50% and Detects	25	220.0	670
Lead (ug/L) - Non Detects @ 50% and Detects	ND	ND	ND
Magnesium (mg/L)	5.1	144.1	252
Manganese (mg/L) - Non Detects @ 50% and Detects	0.01	0.09	0.4
Mercury (ug/L) - Non Detects @ 50% and Detects	ND	ND	ND
Molybdenum (ug/L) - Non Detects @ 50% and Detects	ND	ND	ND
Nickel (ug/L) - Non Detects @ 50% and Detects	1	22.7	110
Nitrate as N (mg/L) - Non Detects @ 50% and Detects	0.001	0.021	0.385
Nitrate + Nitrite as N (mg/L) - Non Detects @ 50% and Detects	0.025	0.6	1.2
Nitrite as N (mg/L) - Non Detects @ 50% and Detects	ND	ND	ND
Nitrogen as N (total) (mg/L) - Non Detects @ 50% and Detects	0.25	8.0	12.56
Oil & Grease (mg/L) - Non Detects @ 50% and Detects	ND	ND	ND
pH (SU)	5.6	7.9	8.94
Phenols (mg/L) - Non Detects @ 50% and Detects	ND	ND	ND
Phosphate, Total as P (mg/l) - Non Detects @ 50% and Detects	0.005	0.05	1.16
Potassium (mg/L)	38	56.1	120
Selenium (ug/L) - Non Detects @ 50% and Detects	0.25	21.8	250
Silica (mg/L)	0.52	5.3	8.4
Silver (ug/L) - Non Detects @ 50% and Detects	ND	ND	ND
Sodium (mg/L)	440	1610.0	3300
Sulfate (mg/L)	17	304.0	770
TDS (mg/l)	310	1911.0	9900
Temperature (F)	68	75.7	86.9
Thallium (ug/L) - Non Detects @ 50% and Detects	ND	ND	ND
TKN as N (mg/L) - Non Detects @ 50% and Detects	ND	ND	ND
TOC (mg/L)	0.126	1.8	12.66
TSS (mg/L) - Non Detects @ 50% and Detects	0.24	3.1	10
Turbidity (NTU)	1.1	3.2	5.2
Zinc (ug/L) - Non Detects @ 50% and Detects	2.5	27.4	160

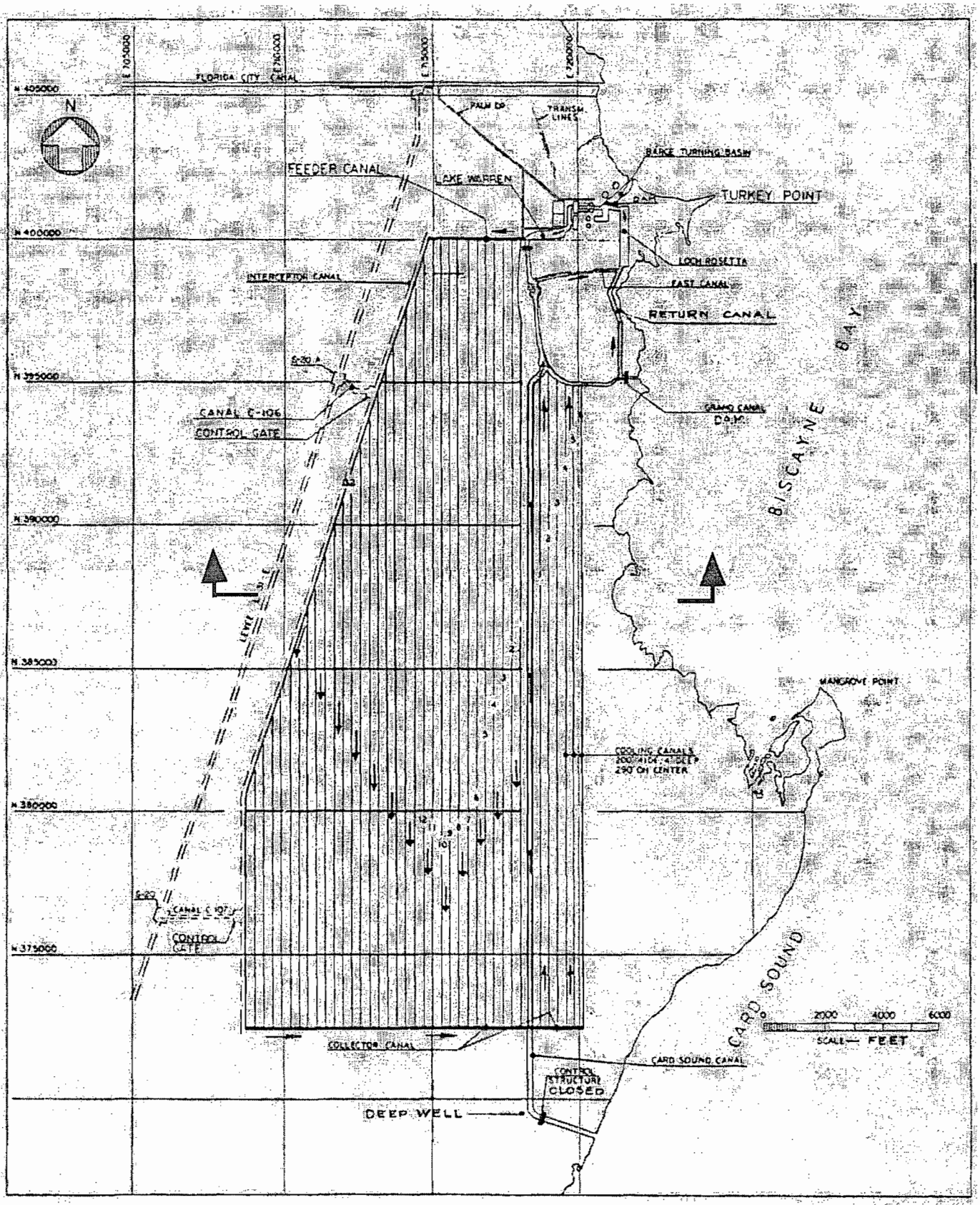


Figure 1 Turkey Point Cooling Canal System - Final Design.

Figure 2. Cooling Canal System Cross Section

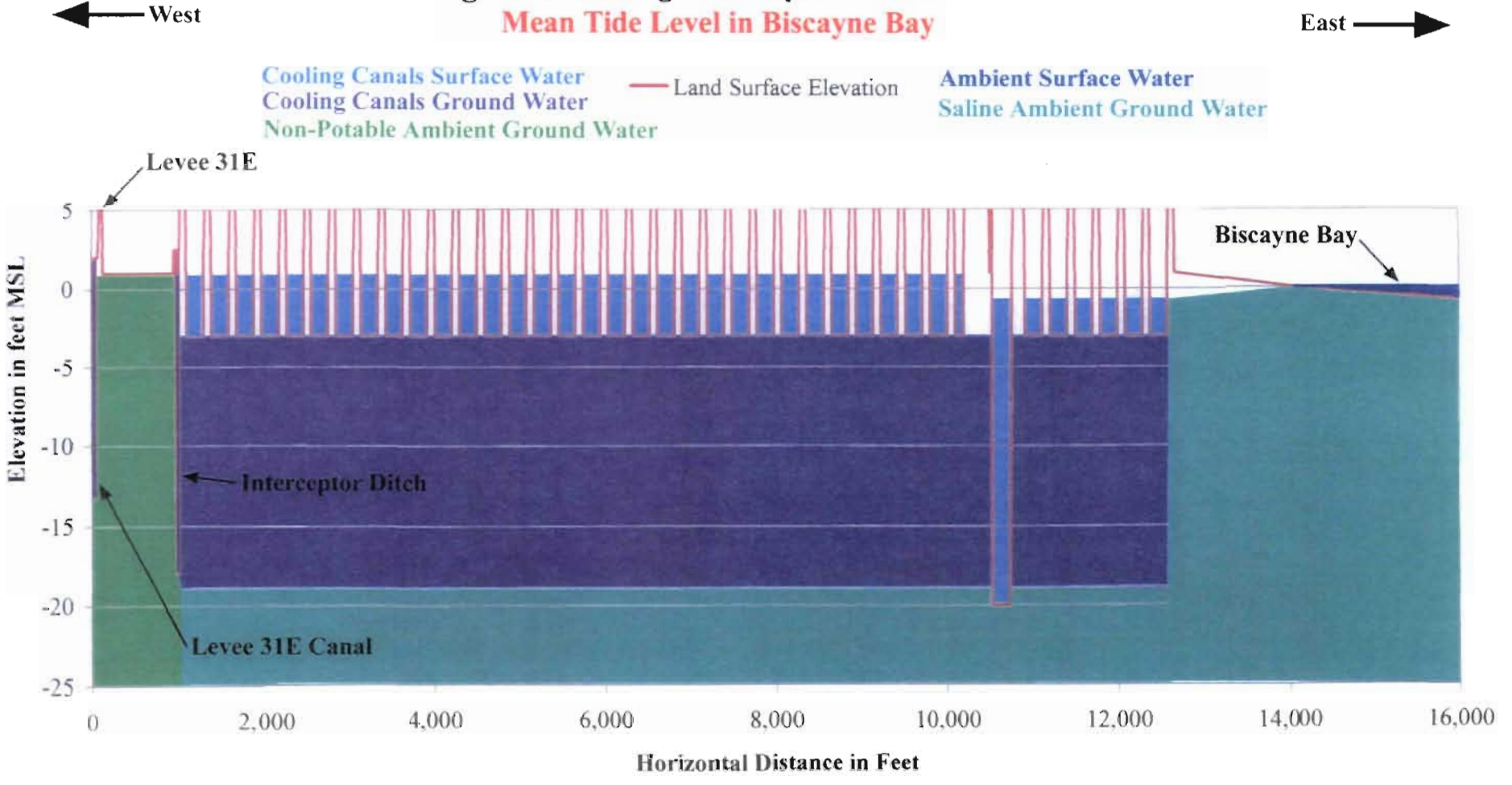


Figure 3. Cooling Canal System Cross Section - Western End

Mean Tide Level in Biscayne Bay

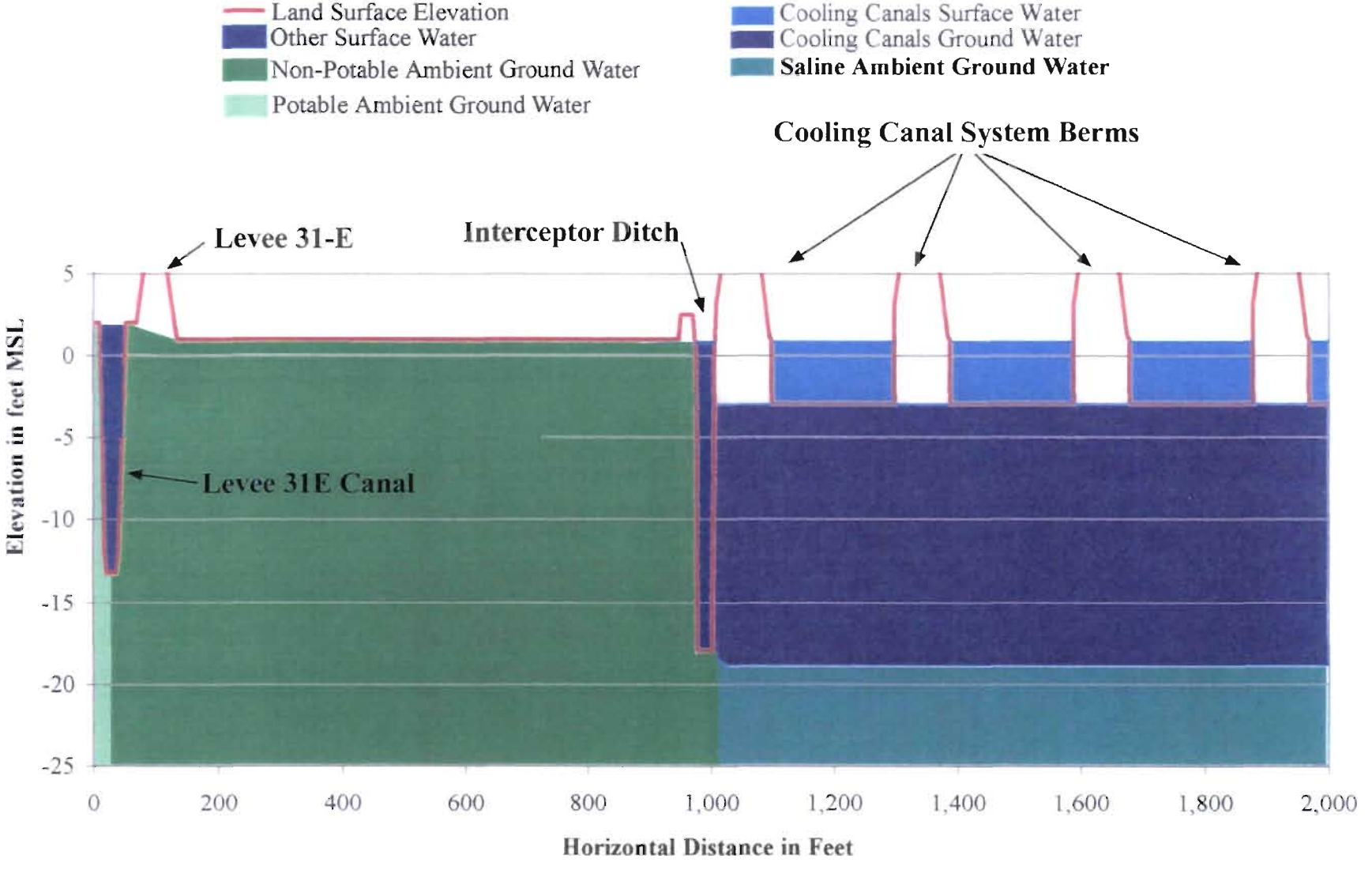


Figure 4. Cooling Canal SystemCross Section - Eastern End

Mean Tide Level in Biscayne Bay

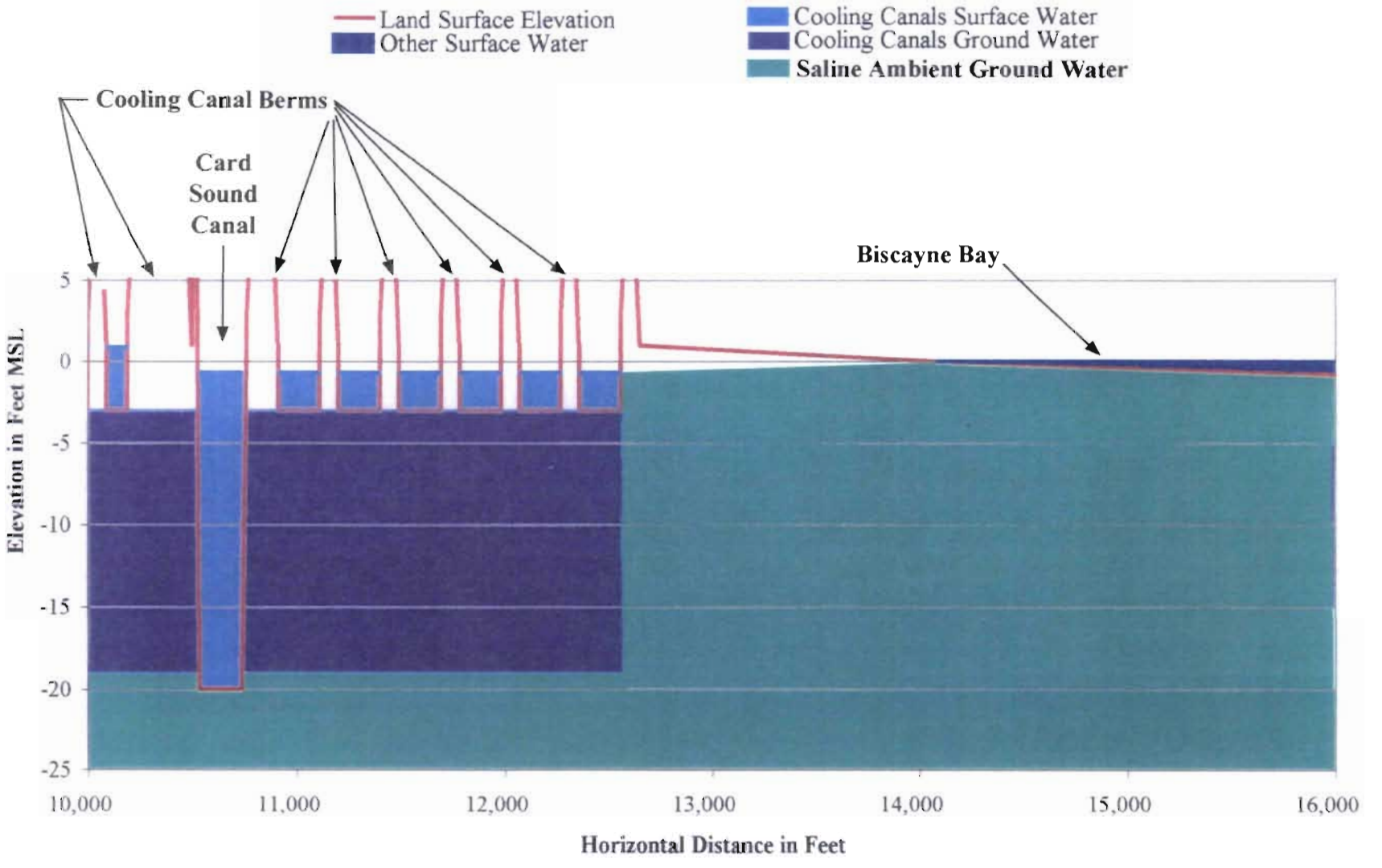


Figure 4A
Aerial View
Cooling Canal
System

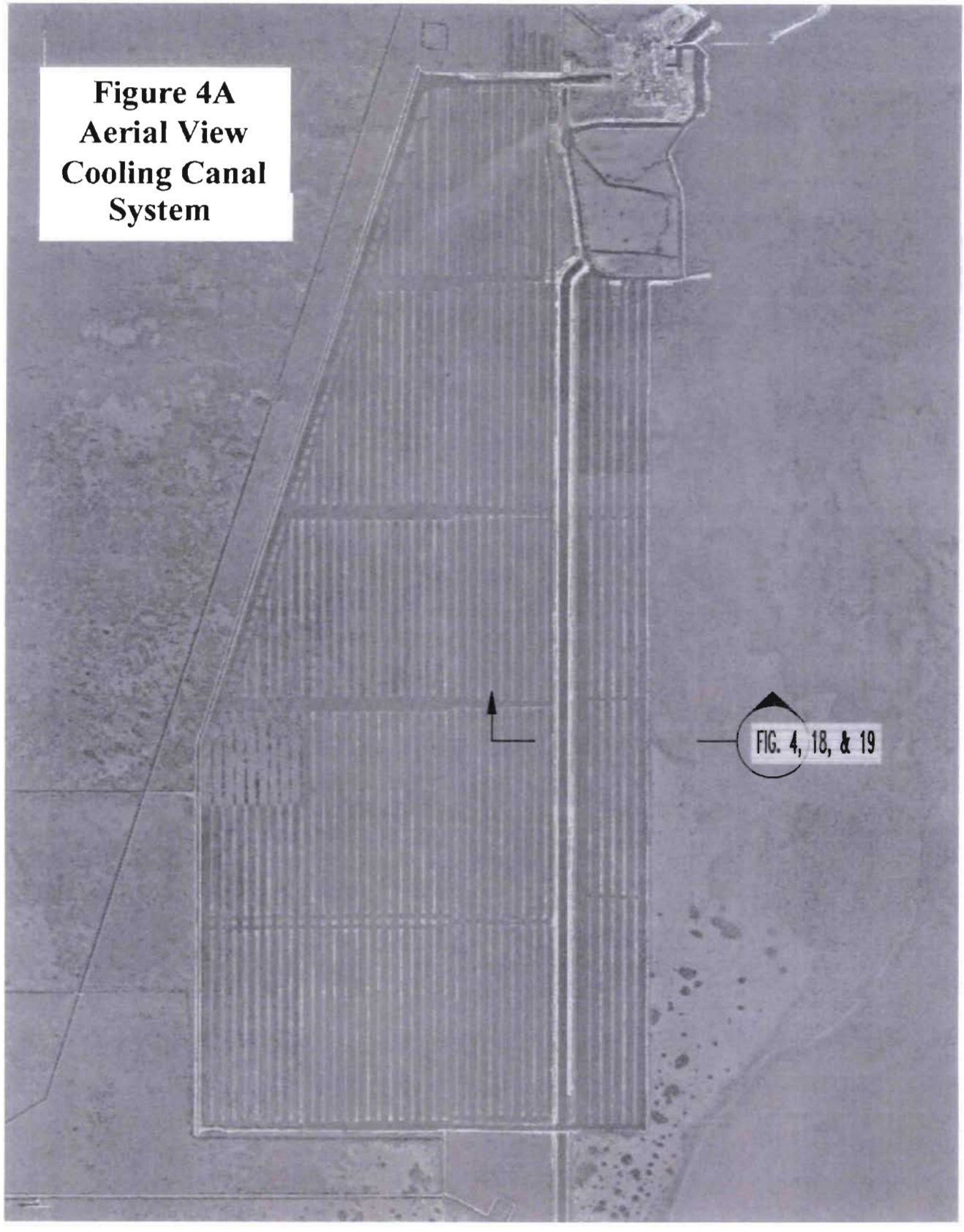


Figure 5. Average Dry Bulb Temperature

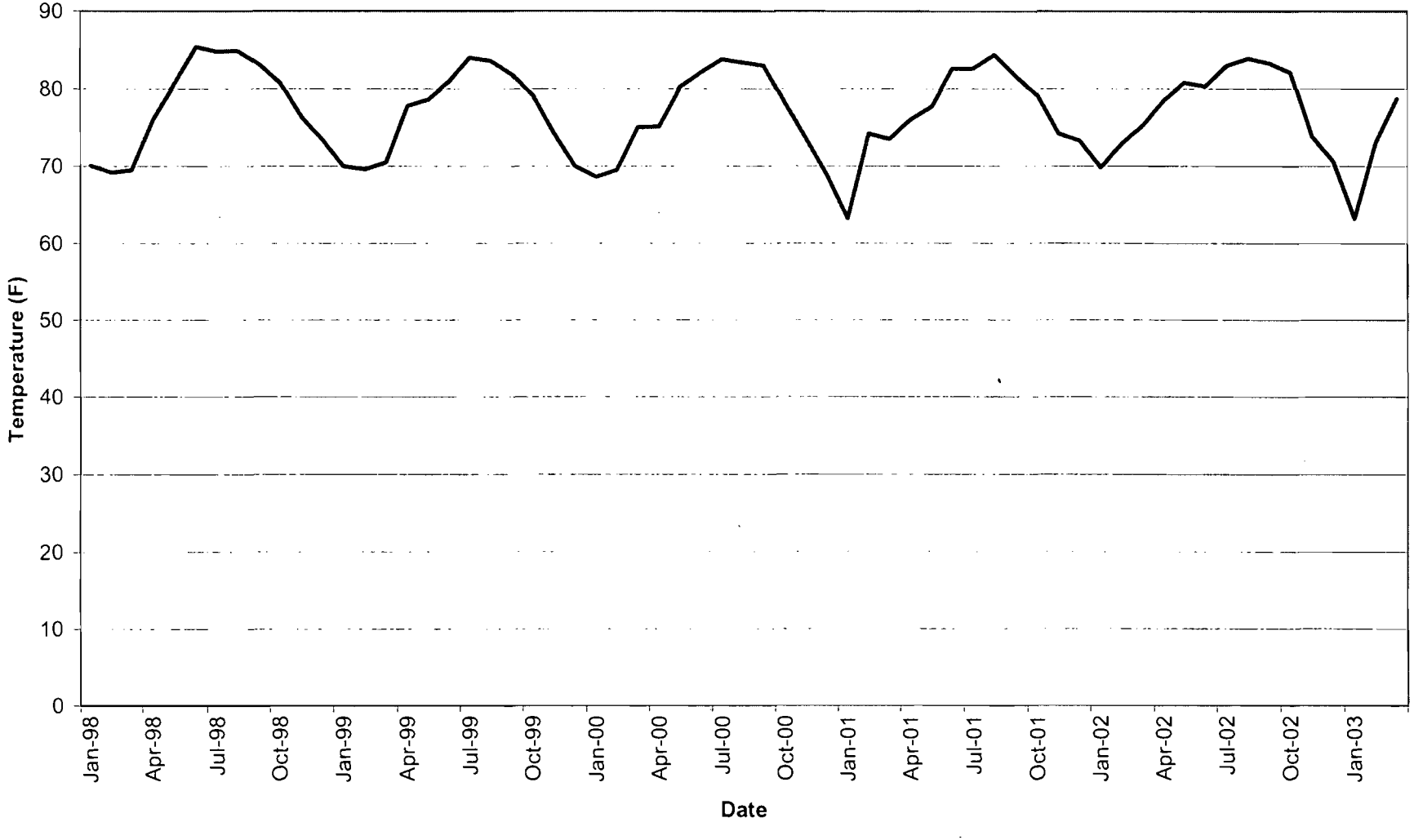


Figure 6. Wind Speed

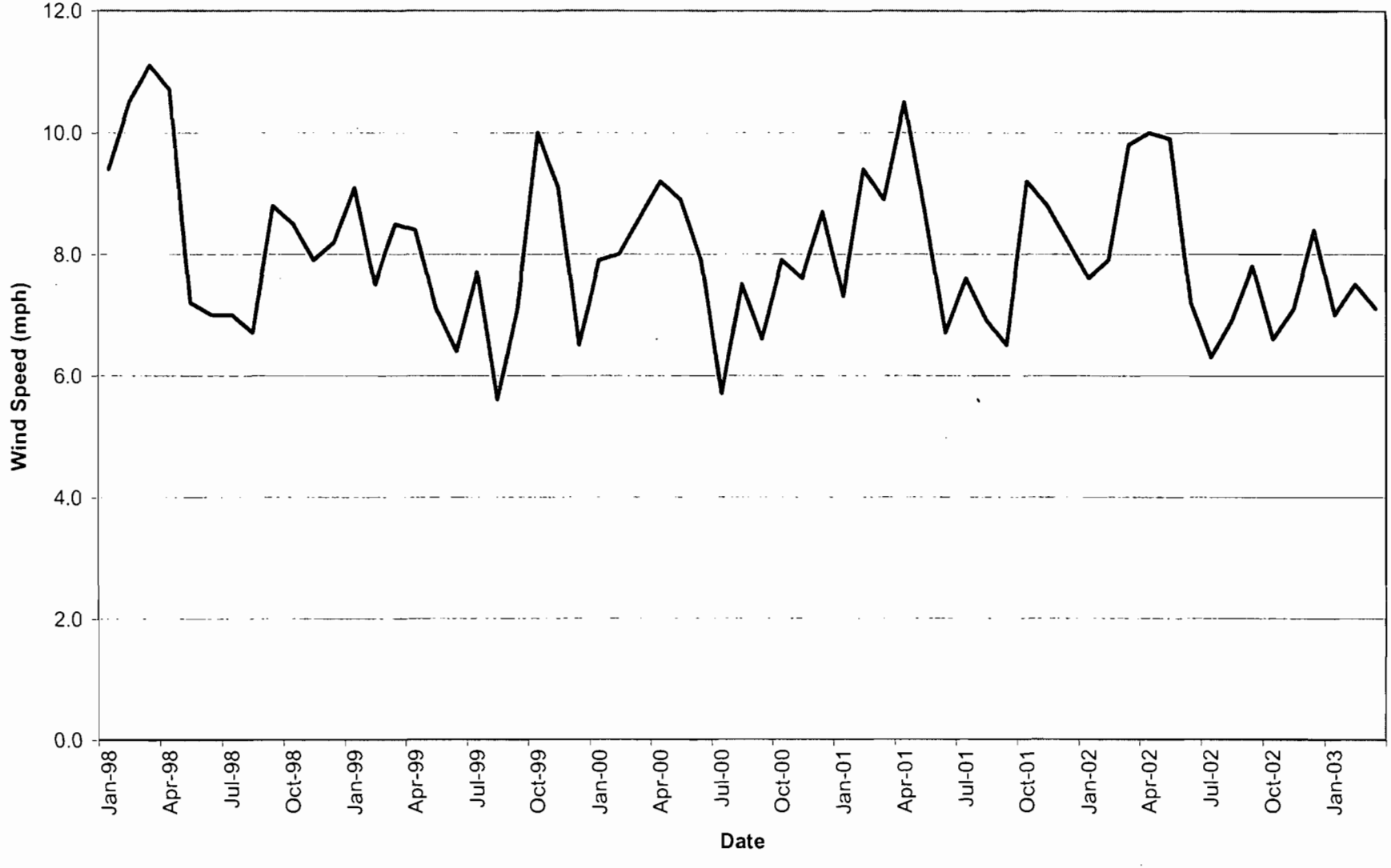


Figure 7. Barometric Pressure

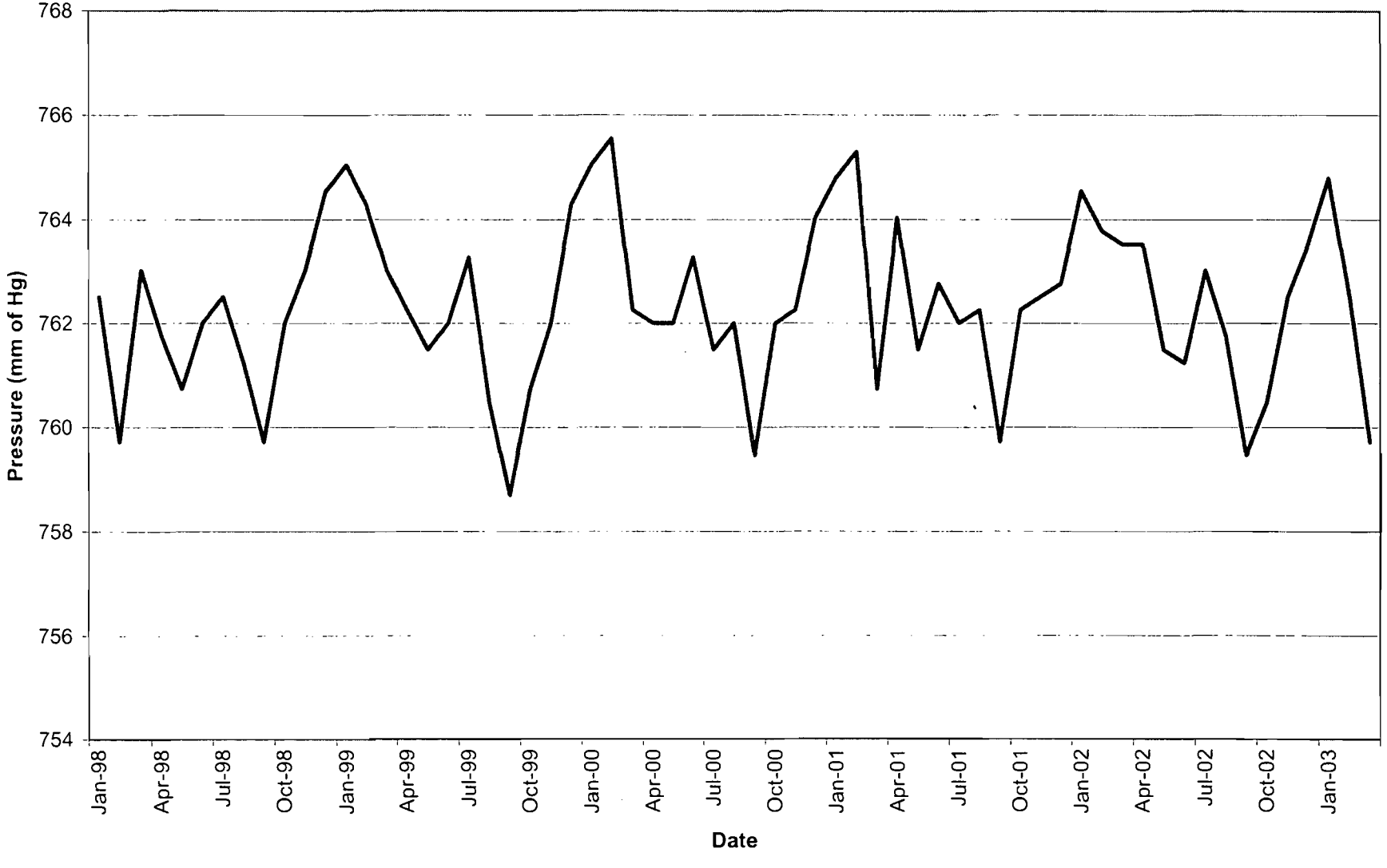


Figure 8. Mean Dew Point

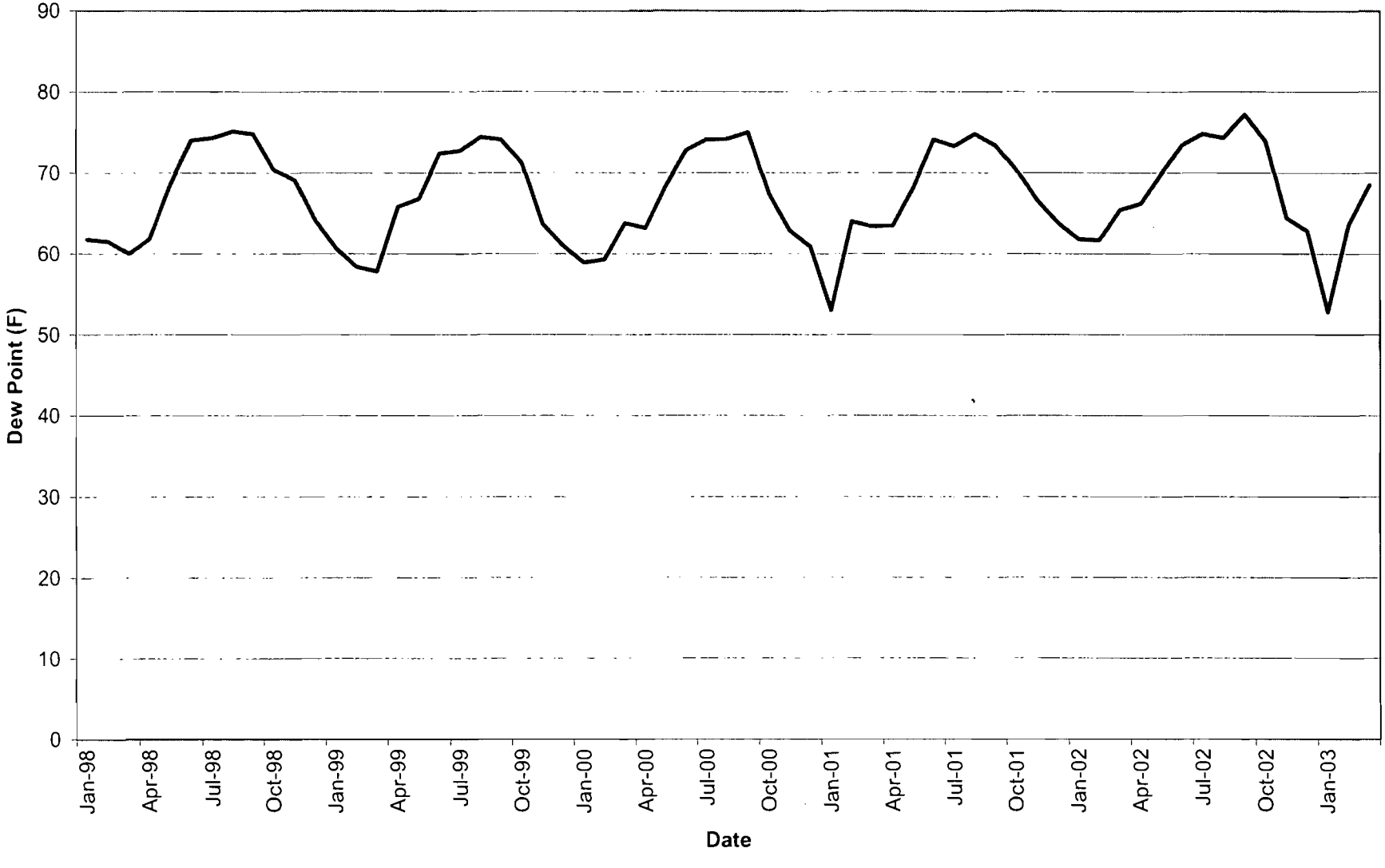


Figure 9. Precipitation

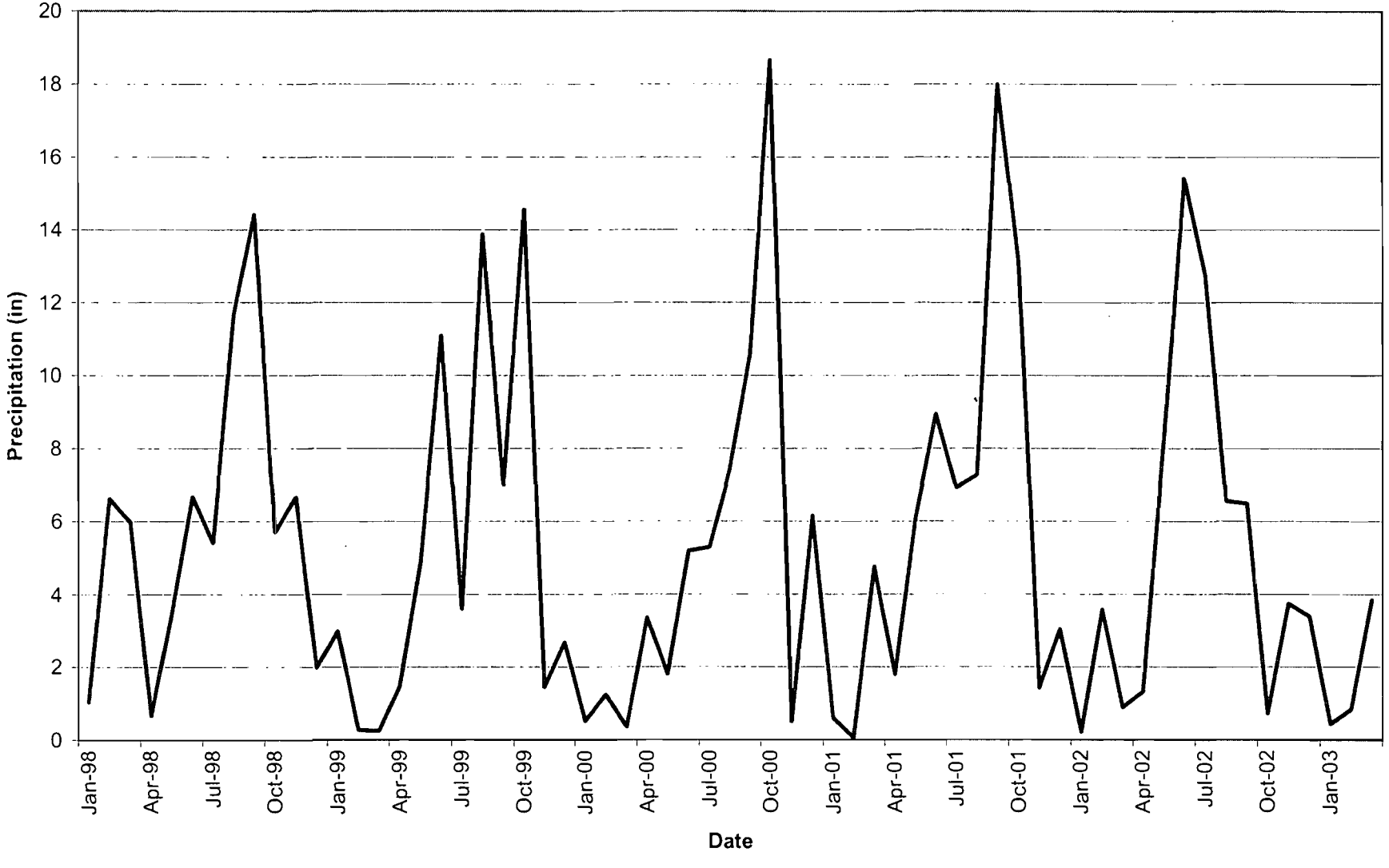


Figure 10. Percent Sunshine

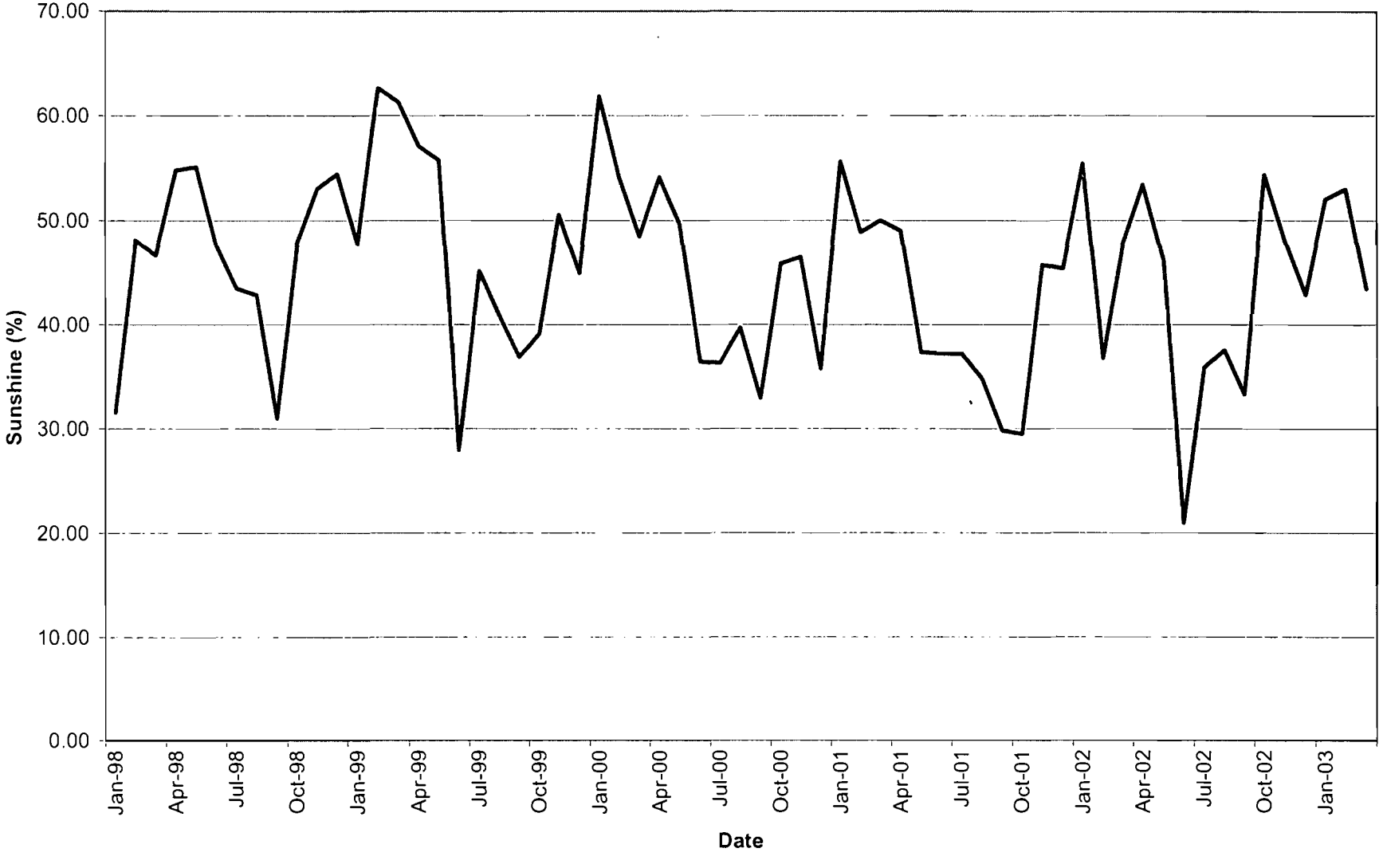


Figure 11. Turkey Point Historical Capacity Factors

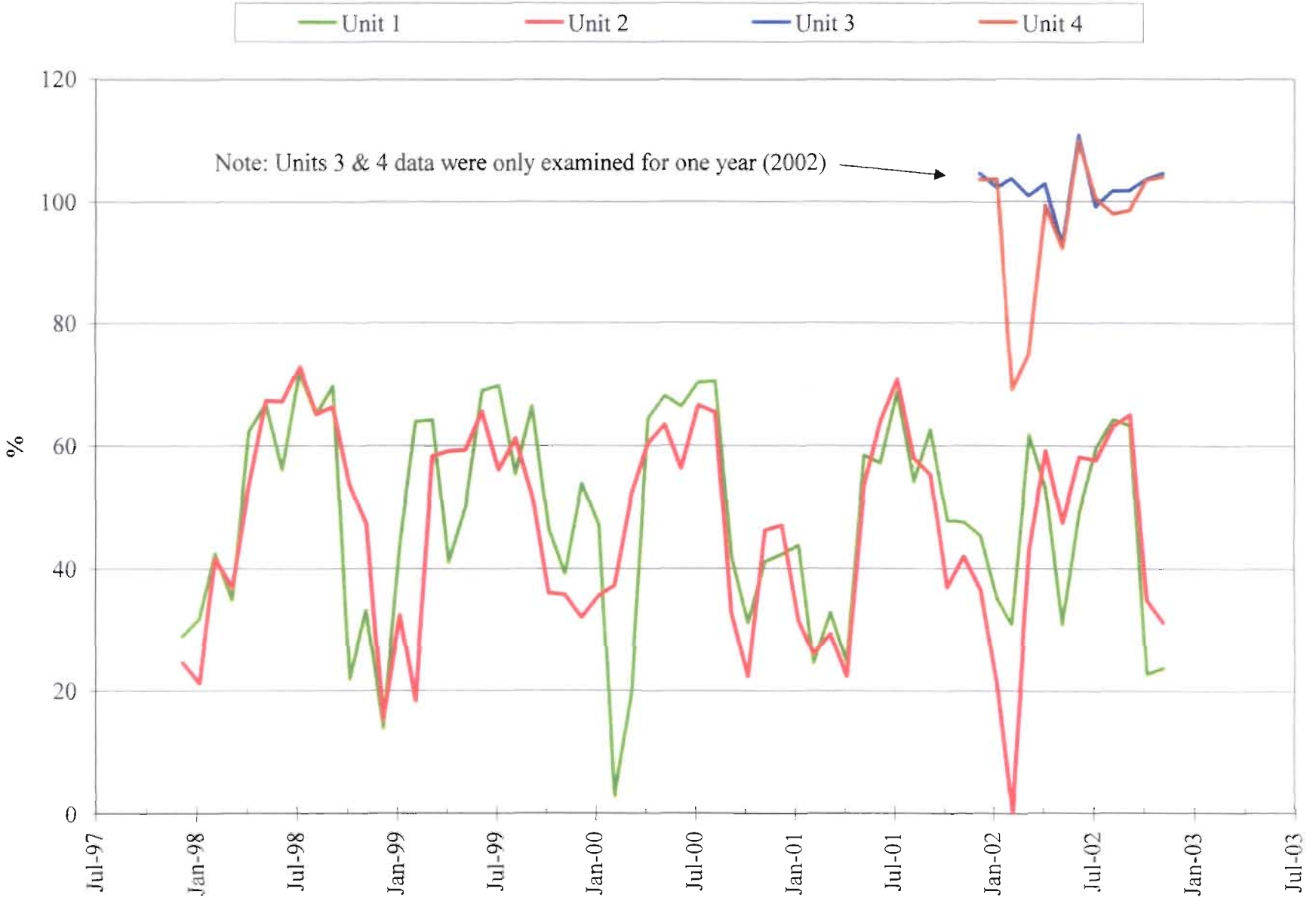


Figure 12. Turkey Point Average Monthly Inlet Temperatures

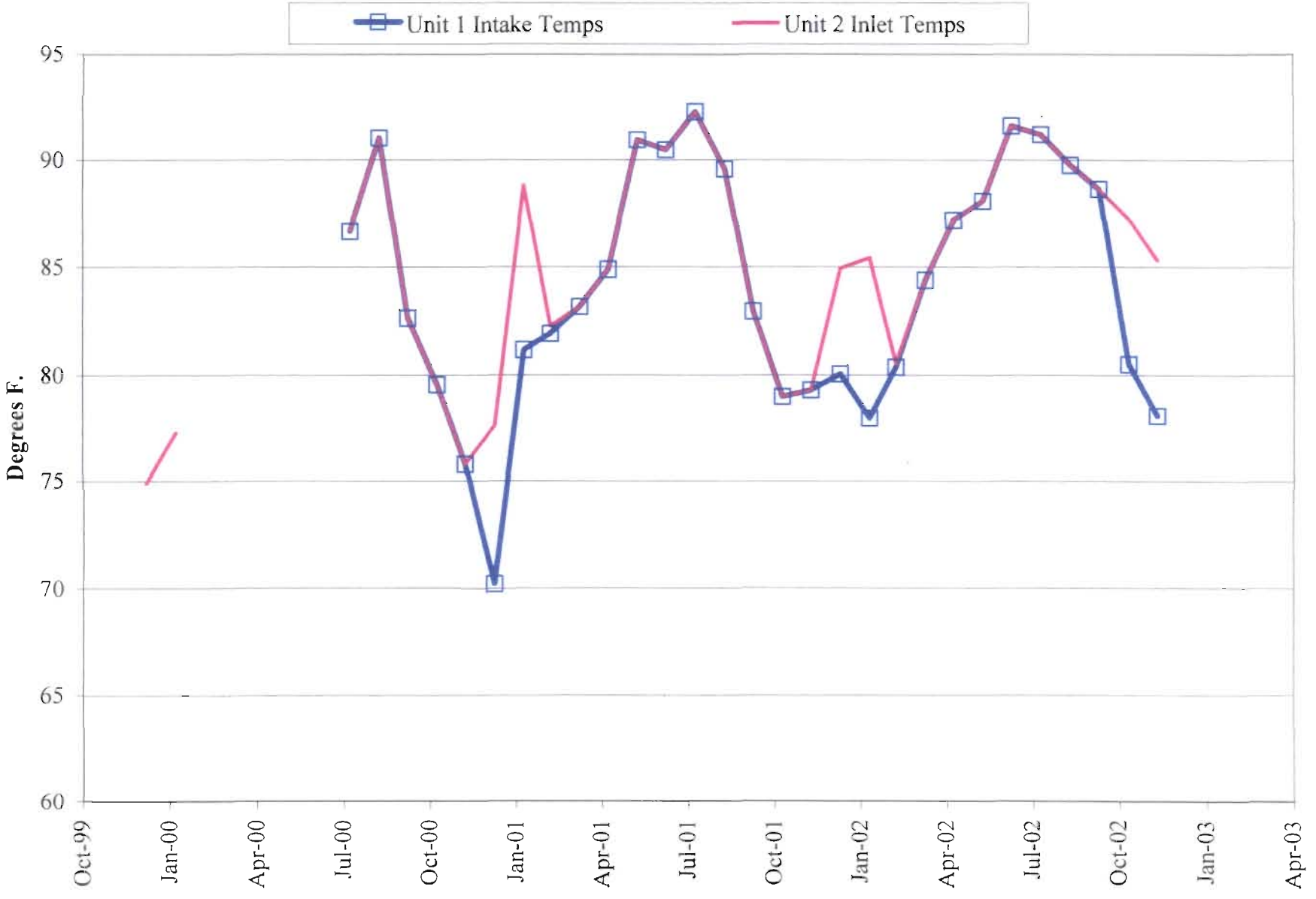


Figure 13. Predicted vs. Measured Cold Water Temperatures

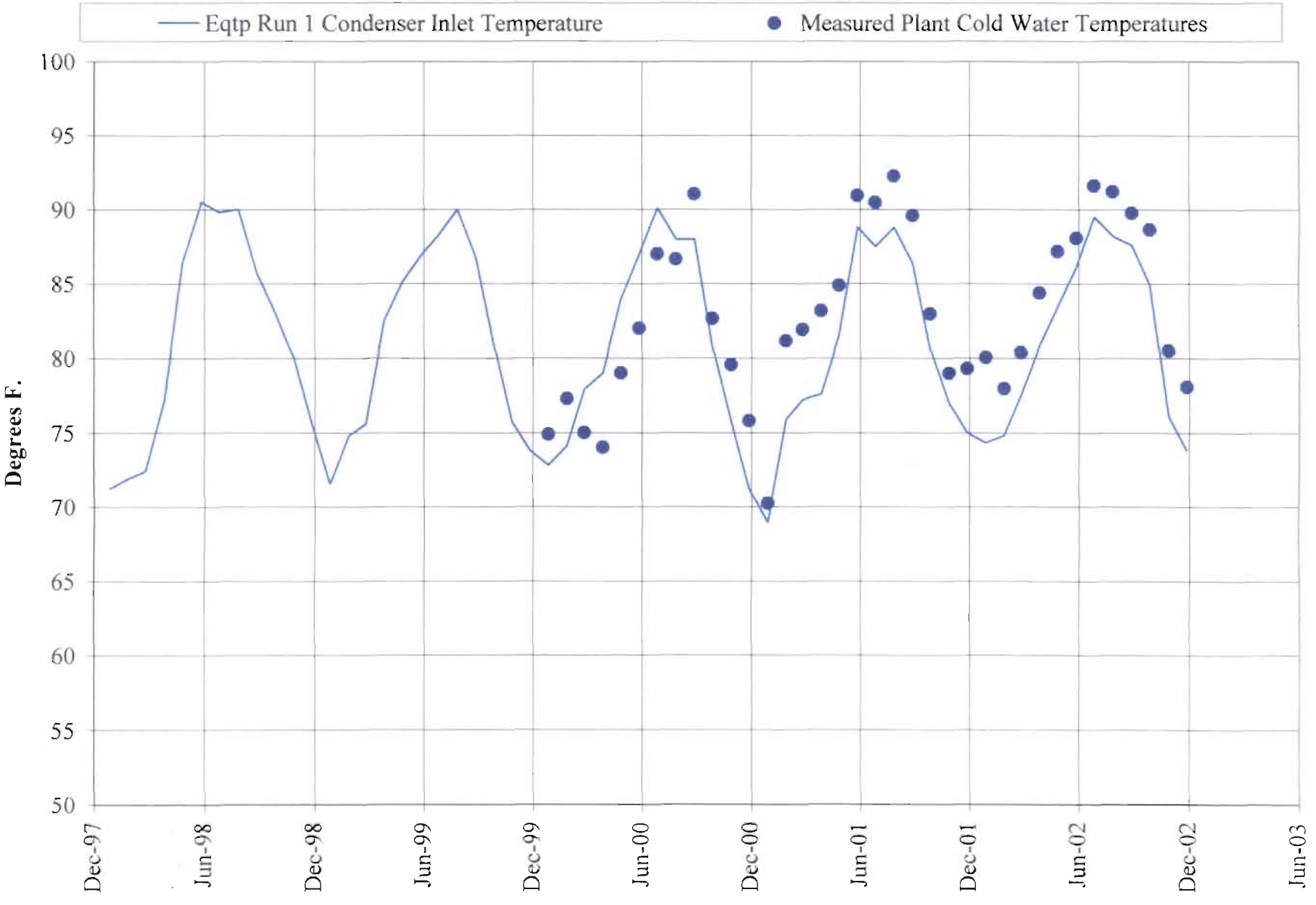


Figure 14. Predicted vs. Measured Cold Water Temperatures

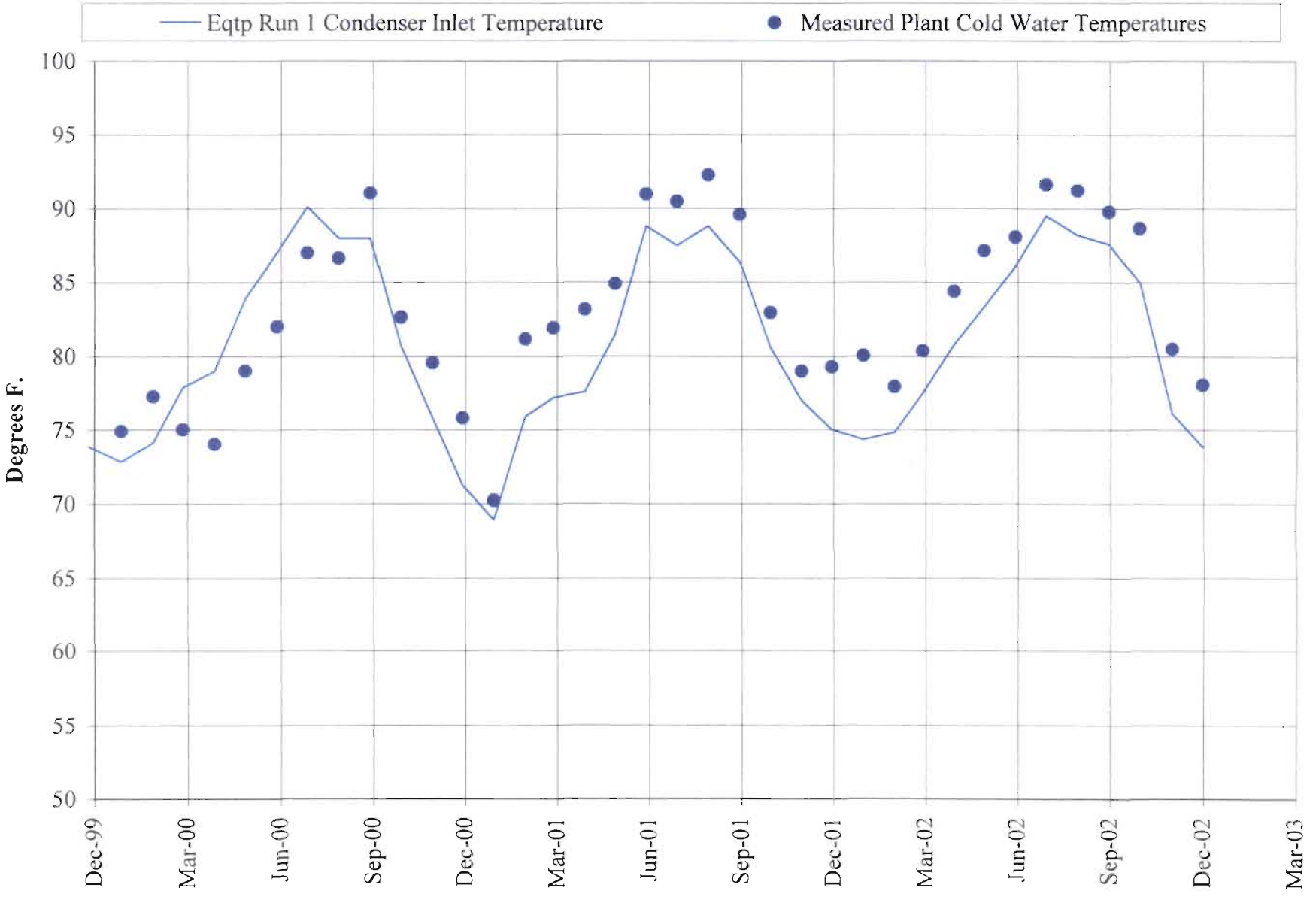


Figure 15. Cooling Canal and Biscayne Bay Salinity

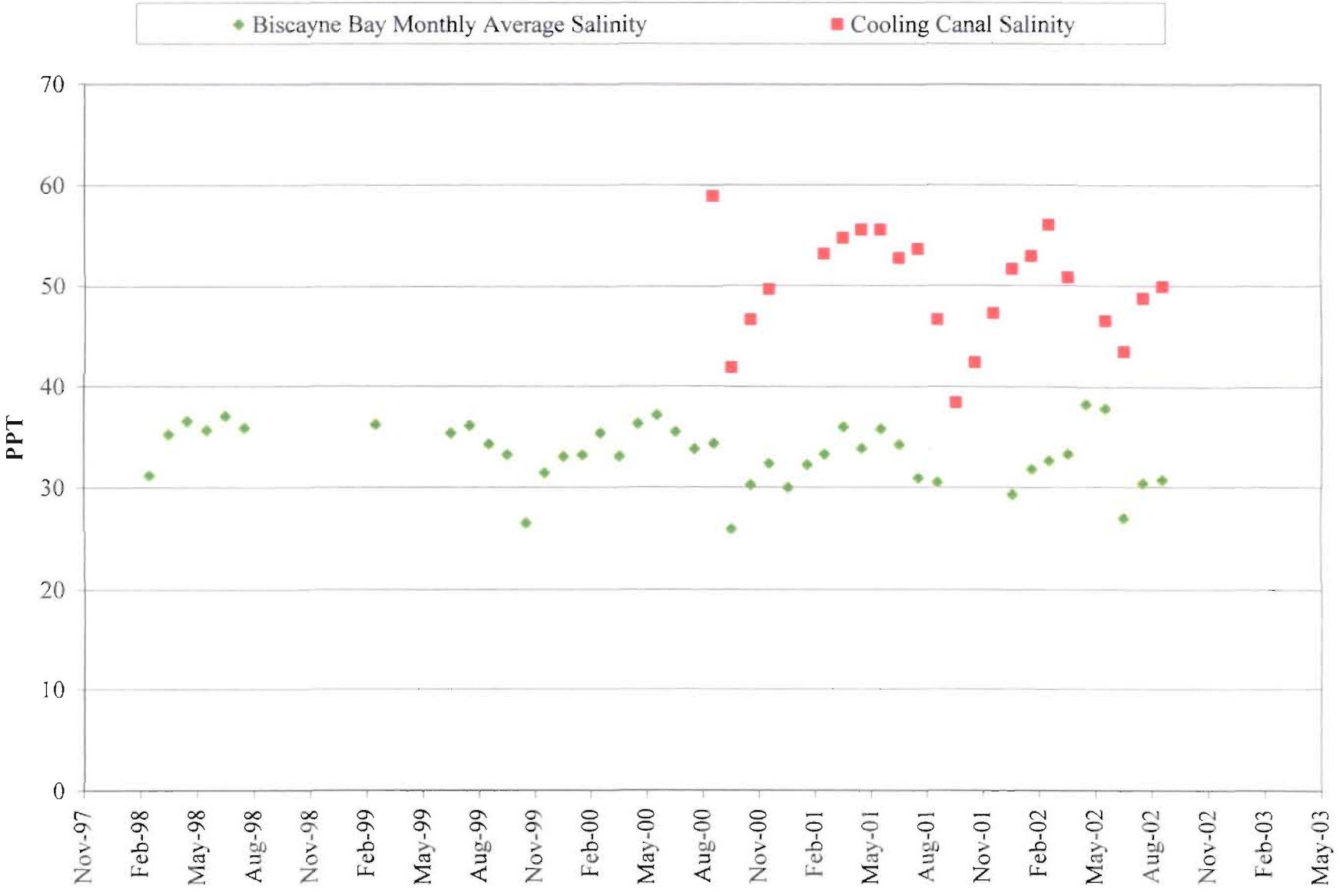


Figure 16. Bay vs. Canals Salinity

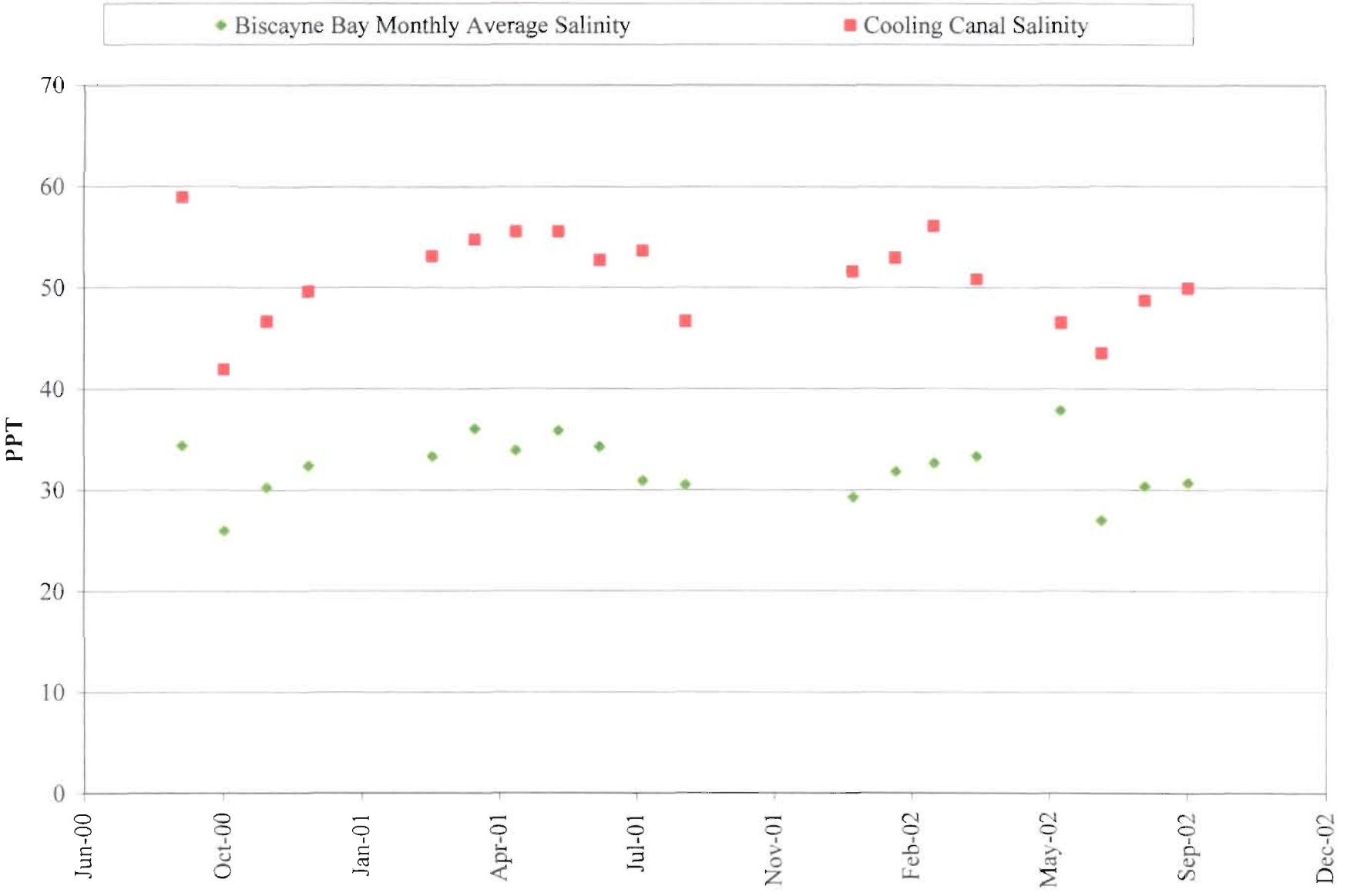


Figure 17. Cooling Canal Salinity vs Biscayne Bay Salinity

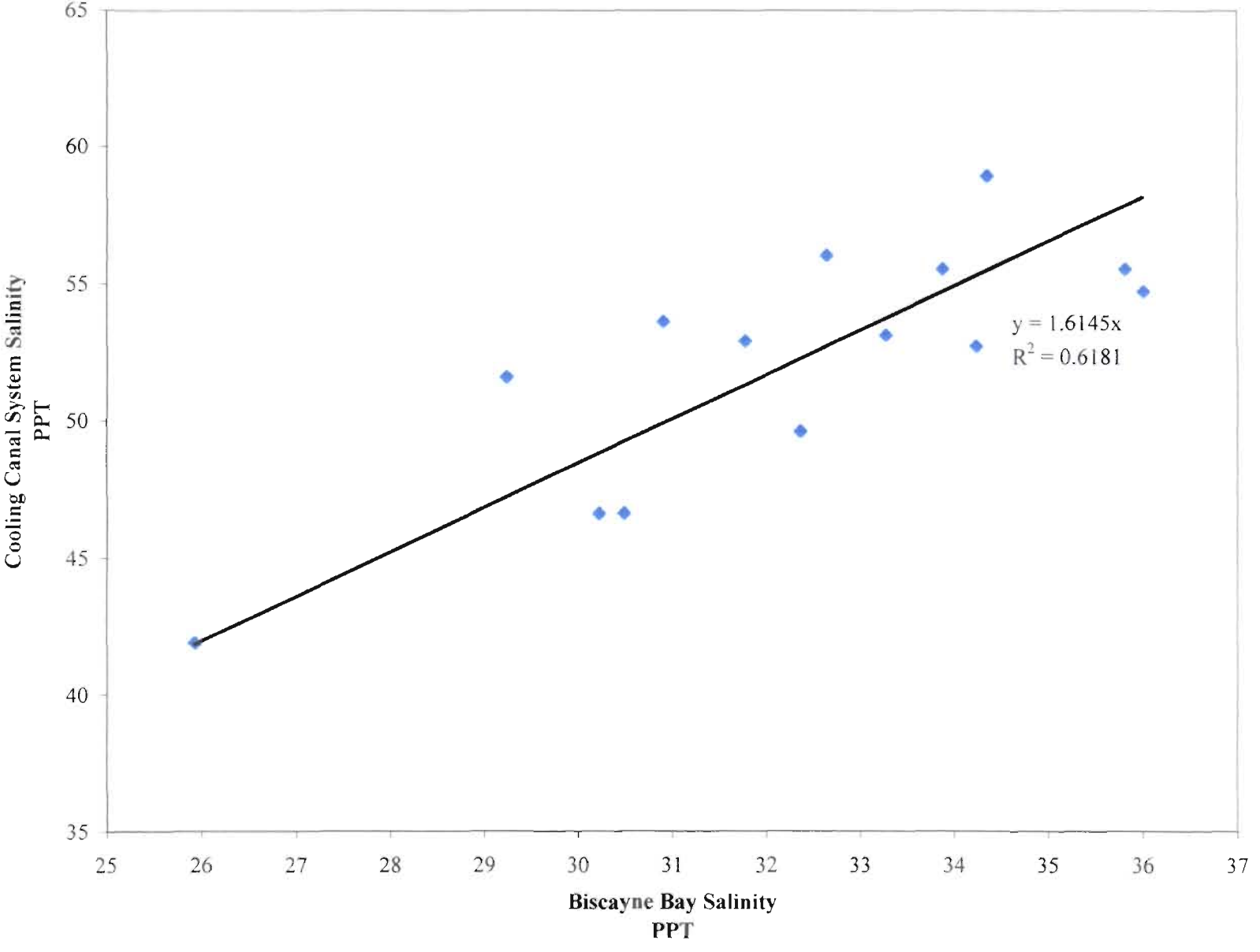


Figure 18. Cooling Canal System Cross Section - Eastern End

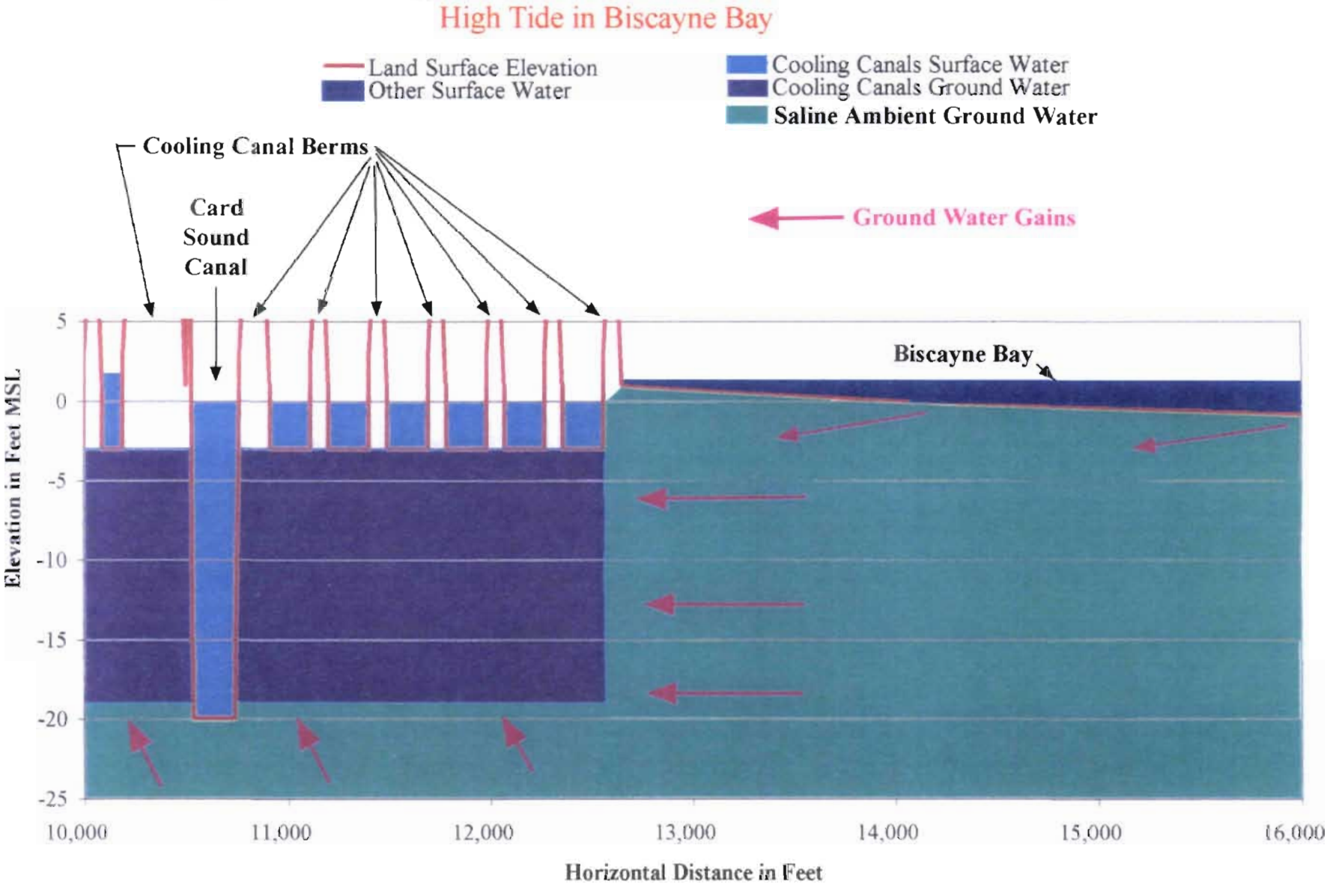


Figure 19. Cooling Canal System Cross Section - Eastern End

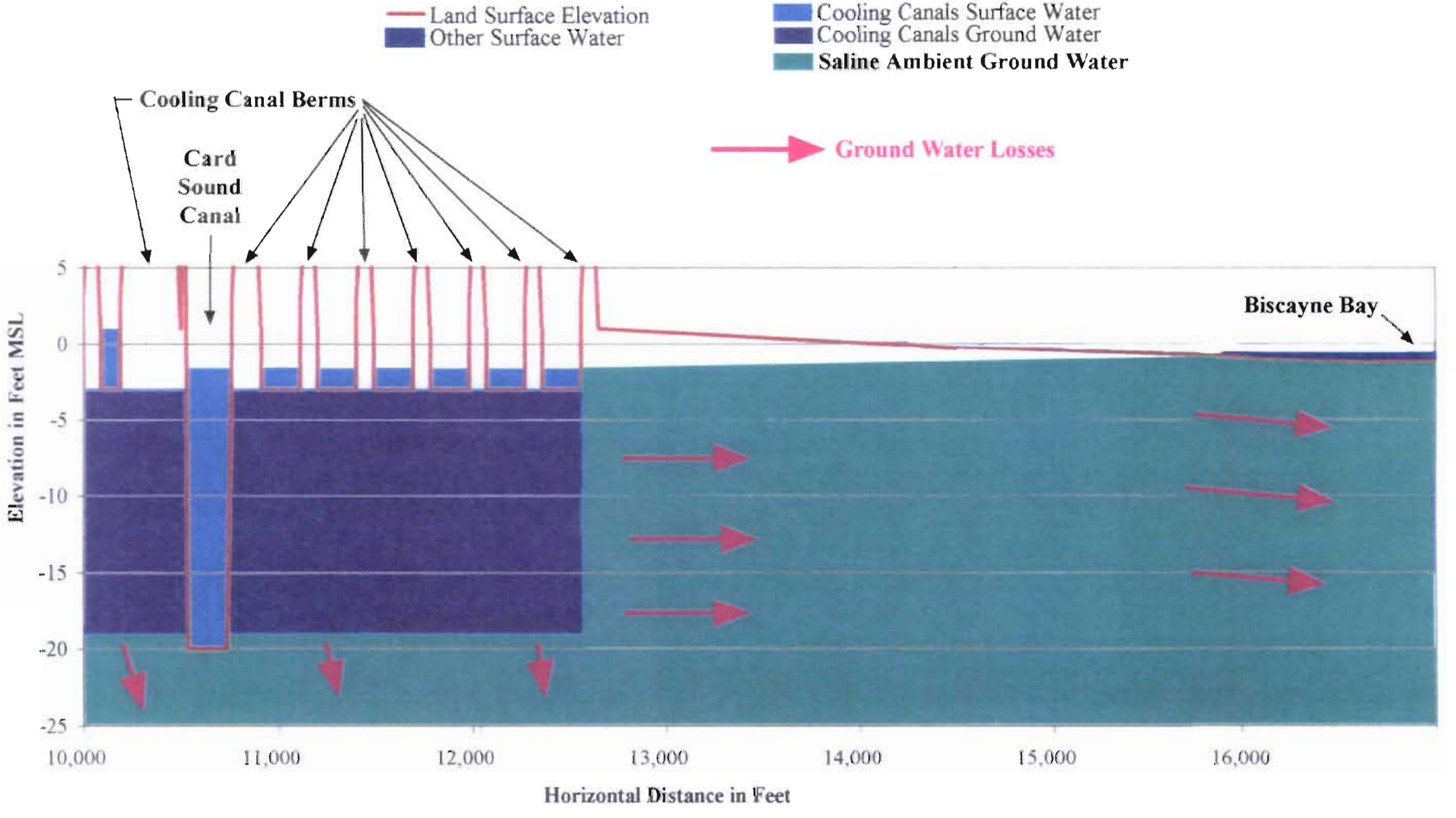


Figure 20. Existing Plant Water Balance

Average Flows in gpm
(Peak Flow)

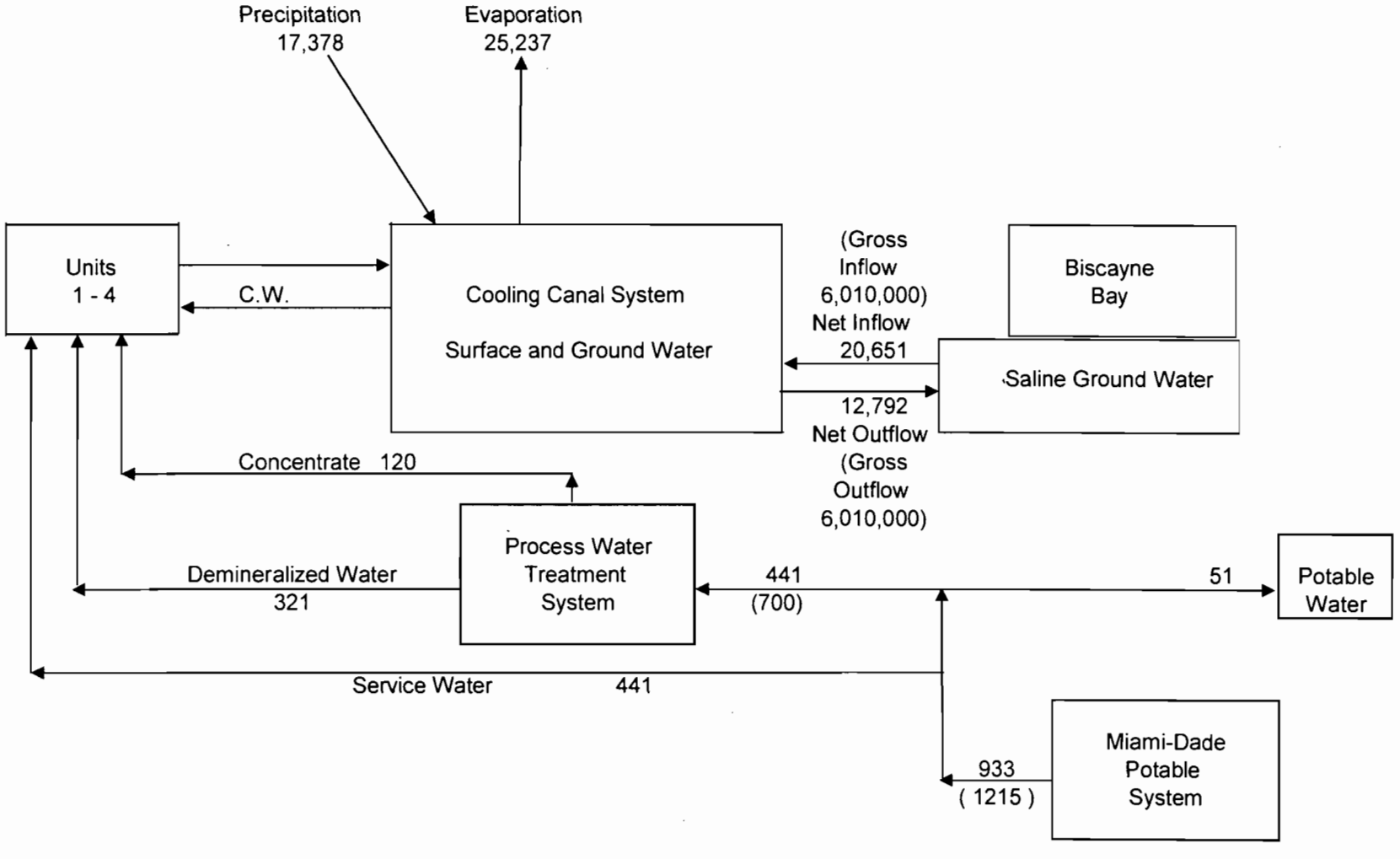


Figure 21. Predicted vs. Measured Cycles of Concentration

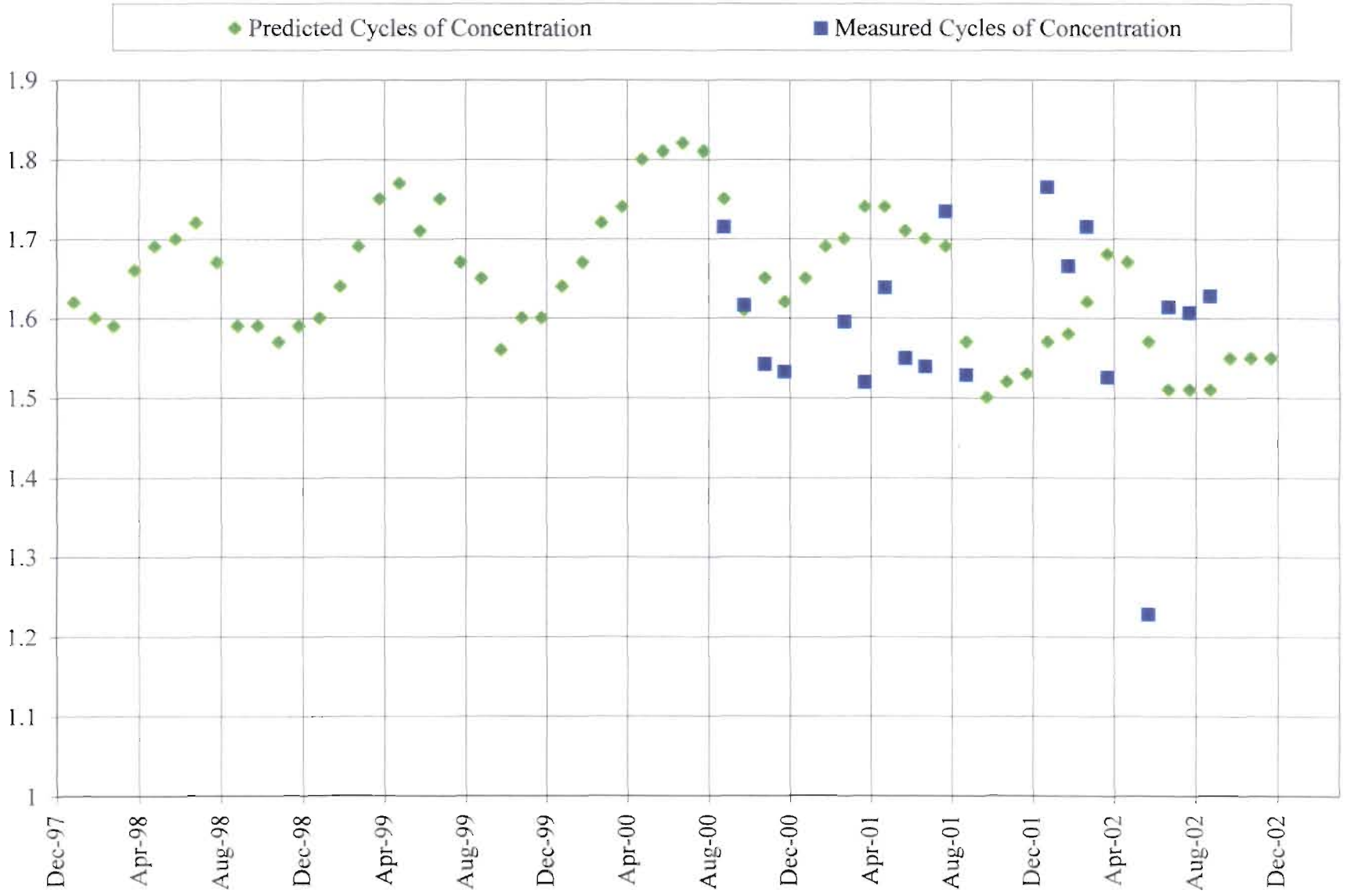


Figure 22. Predicted vs. Measured Cycles of Concentration

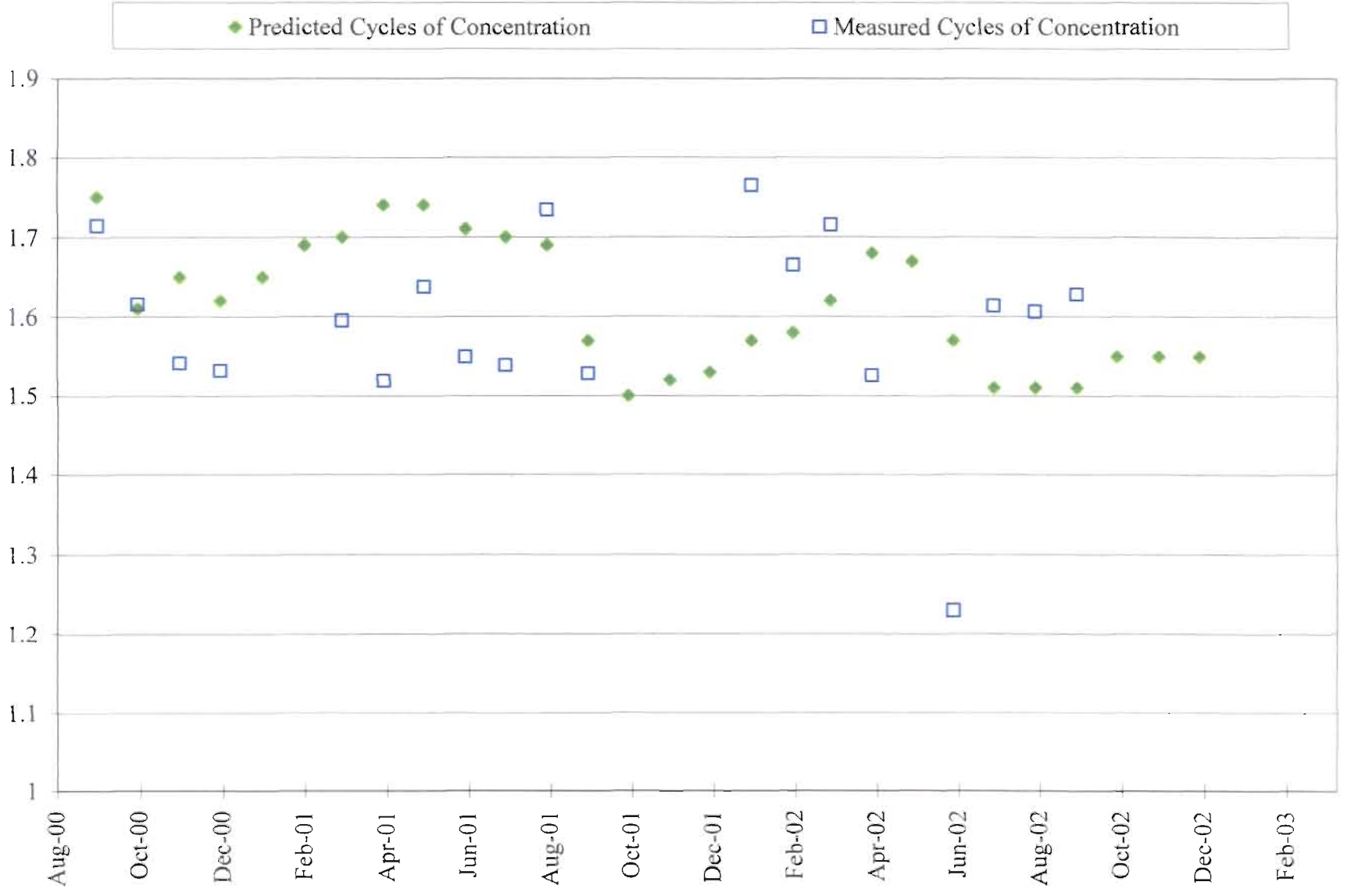


Figure 23. Bay and Cooling Canal Salinity Relative to Precipitation

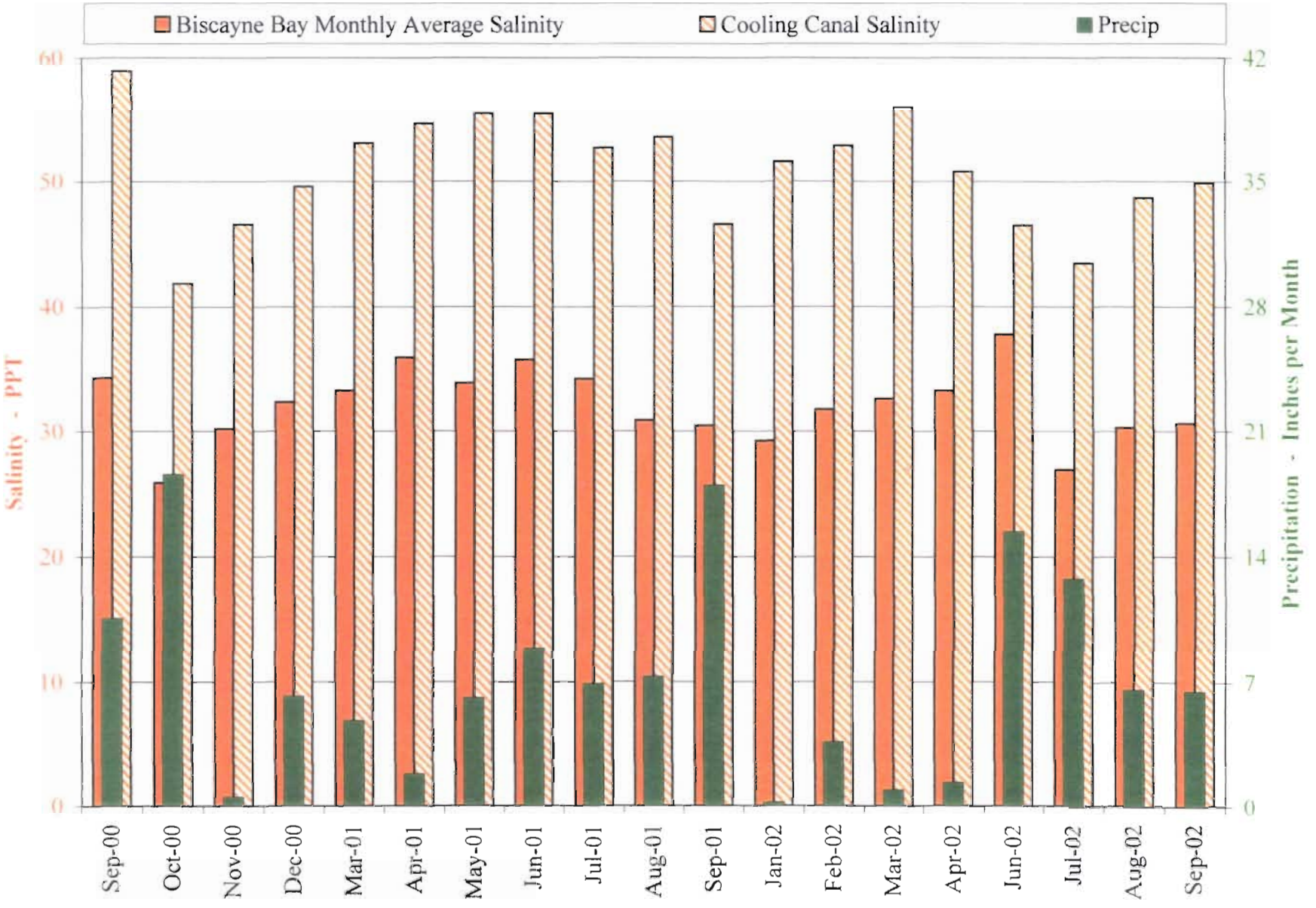
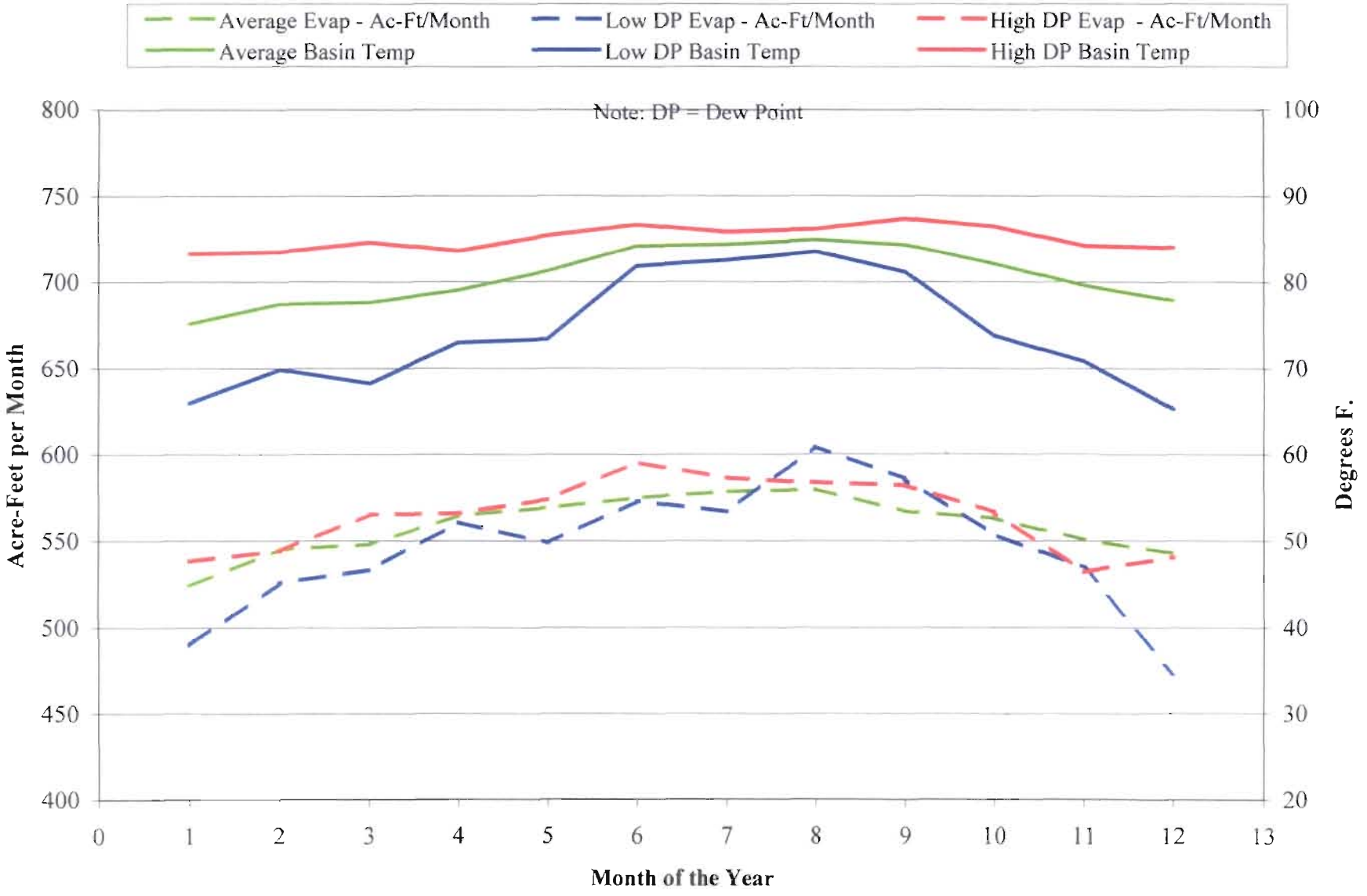


Figure 24. Summary of Predicted Cooling Tower Basin Temperatures and Evaporation Rates



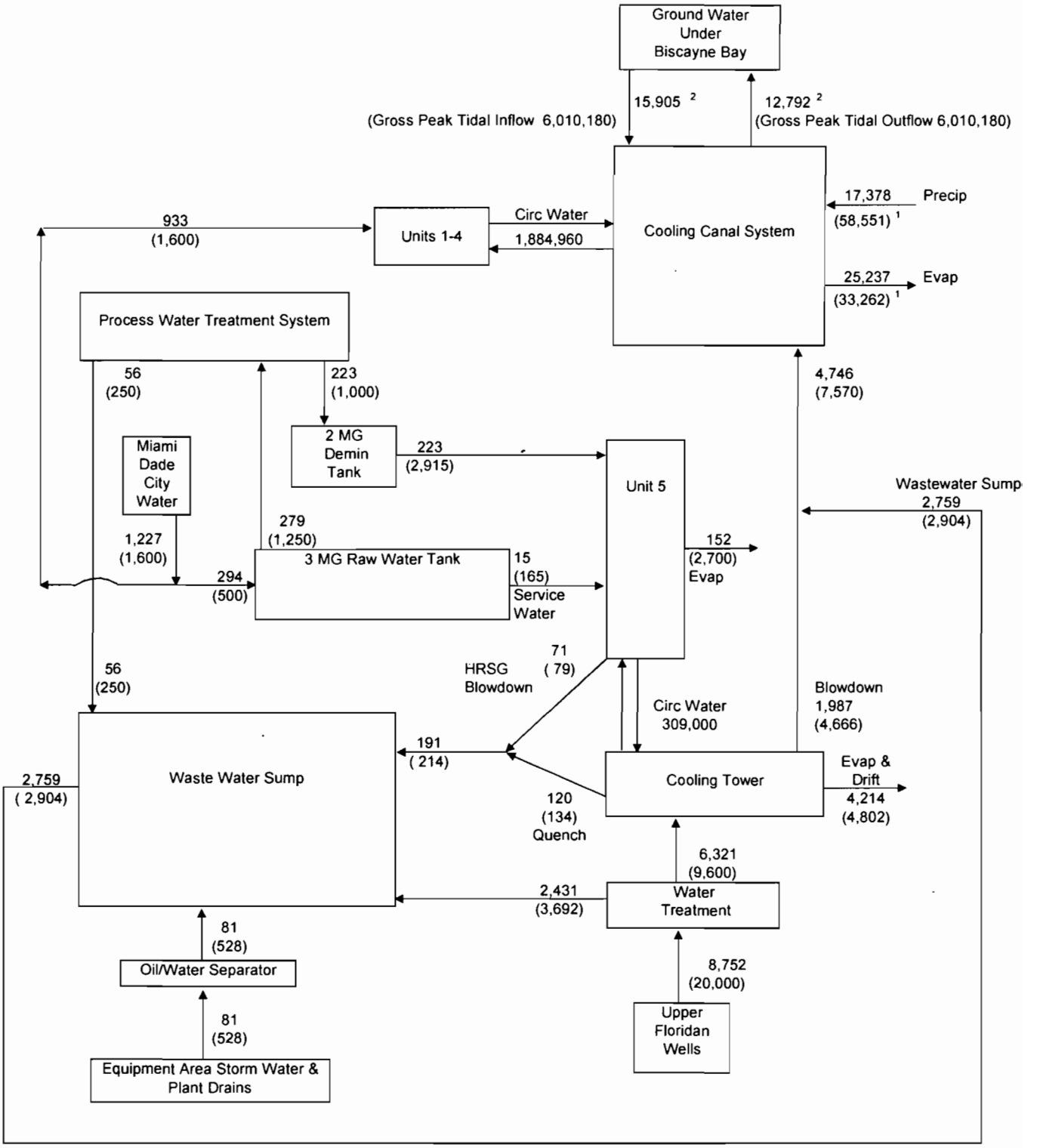


Figure 25. Average Water Use Diagram

Average flows in gpm
Peak flows in gpm in parentheses

[1] Monthly peak values
[2] Net average flow

Figure 26. Cooling Canal System vs. Cooling Tower Cold Water Temperatures