

Ground Water Modeling Summary

The ground water model (built using MODFLOW and the Visual MODFLOW tool) is a steady state, constant density model. It has no water quality features active and does not purport to simulate density dependent flow or salinity changes resulting from any proposed operations or actions. FPL has indicated that this tool is limited in use and scope to two specific narrow questions:

- 1) What is the pumping rate required to dewater the power block area, as described in the application?; and
- 2) What is the origin of the water pulled into the radial collector well system?

In both cases, according to FPL, the focus of the modeling analyses is on pump induced drawdown, which FPL contends is the basis of the SFWMD's completeness questions. FPL has made no claim to have addressed flows resulting from water with different temperature or density, both of which are factors associated with the proposed project.

The SFWMD has identified the following issues associated with the modeling:

Conceptualization and Configuration

The entire model domain is assumed to be constant density and saline. Both of these assumptions are inconsistent with other submitted documentation. The simulation bounds of the model are neither all saline nor are they of the same density. FPL has asserted that the assumption is valid for the type of analyses (pump induced drawdown of flux) conducted. While this may be possible in the narrowest interpretation, it is likely that impacts of density dependent flow or temperature induced buoyancy may dominate in some areas; however, the modeling provided does not afford the SFWMD or FPL the opportunity to examine these situations. Also, it is unusual for a system that is made up of fresh, brackish, salt and hyper-saline water to be generically represented as sea water. While we understand an equivalent fresh water head was used, the impacts of this representation on gradients, stage (heads), simulated drawdown, and flows, as well as conclusions derived from these, need to be further explored and justified.

Boundary Conditions

By utilizing a steady state simulation, the impact of selected boundary conditions will propagate over the entire model. By definition, a steady state is reached when all hydrologic drivers, including those specified at the boundaries, reach equilibrium. This assumption makes the specification of the model boundaries, such as head in the constant head cells that represent Biscayne Bay, very crucial. It is understood that for permitting purposes, non-exact simulations may be acceptable, if they are conservatively estimated; however, a non-conservative estimate (e.g., the water level in Biscayne Bay) could result in under-estimation or over-estimation of pumping rate necessary to achieve necessary drawdown during dewatering. Similarly, a non-

conservatively selected stage in Biscayne Bay could overestimate the contribution of this boundary (source) to the radial collection well system. It is typical in these scenarios for extensive sensitivity analyses to be performed to establish the sensitivity of the outcome or conclusions, to erroneous or non-conservatively specified boundary conditions. FPL has applied an average value to the boundary representing Biscayne Bay. This may mask tidal or seasonal trends and is unlikely to represent the critical condition for dewatering or assessing the impacts of dewatering.

Parameterization

In selecting model parameters and applying them to the model cells, FPL has used a homogeneous representation of aquifer parameters in a highly heterogeneous aquifer system. This representation is, along with some unusual layering in the model construct, suspect, and must be tested to ensure that it does not negate conclusions drawn from the model. Specific concerns include the representation of the vertical hydraulic conductivity of the top two layers in the model (1 to 1 ratio for K_h to K_v), the representations of those layers in locations where canals and other surface features intersect the conceptual (or physical) tops of the model layers, as well as the representation of the vertical connectivity in layers that were split for predictive simulations following the calibration. It is important for FPL to demonstrate that the conclusions and determinations based on modeling remain unchanged, with more correct representation of model parameters.

Calibration

The model was calibrated to the results of on-site pump tests (quantitative) and to regional groundwater gradients and flow directions (qualitative). Both calibrations were based on steady state simulations. FPL justified these simulations by the rapid response of the system to the volumes extracted during the pump test. This was further justified by the intent to apply the tools also in steady state. While these justifications are understood, the calibration remains insufficient and does not represent stresses to the system similar in magnitude to the intended applications. In addition, the conditions used for calibration do not demonstrate the impact of the effect of boundary conditions on the simulation results. Lastly, the model does not include important on-site operations or features present during the pump test that could contribute to the observed data to which the model is calibrated. The foregoing notwithstanding, a review of the calibration results presented show a number of situations where multiple monitoring wells show exactly the same response in the model while they vary in the measured data. This may be suggestive of impacts of a specified boundary or inadequately tuned model parameter. If the variability that is missing is important to the required outcome from the model, then the model may not be adequately calibrated for use.



SOUTH FLORIDA WATER MANAGEMENT DISTRICT

February 11, 2010

Ray Eubanks, Administrator
Plan Review and DRI Processing
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100

Dear Mr. Eubanks:

**Subject: Miami-Dade County DCA #10-1
Comments on Proposed Comprehensive Plan Amendment Package**

The South Florida Water Management District (District) has reviewed the proposed amendments from Miami-Dade County (County). The package includes six amendments of which two present water resources issues of concern to the District. Application Five revises the Miami-Dade Comprehensive Development Master Plan's Open Land category to allow an ancillary use of commercial vehicle storage in Open Land Subarea 1. Application Six, which is related to the Florida Power and Light (FPL) Turkey Point Units 6 & 7 Site Certification, proposes amendments to the roadway network on the Future Land Use Map and amendments to the Transportation Circulation Sub-element for new/temporary roadways. We have the following recommendations concerning Applications Five and Six which we request you incorporate into your response to the County.

Application Five:

- **Incorporate specific environmental controls into the amendment to protect the water resources of the area from potential risks such as leaking fluids and washdown water.**
- **Identify in the text the entity responsible for the proposed environmental monitoring.**
- **Include a policy for coordination with the District regarding environmental monitoring and reporting, especially for the Comprehensive Everglades Restoration Plan (CERP) Study Area.**

Application Six:

- **Indicate which roadway improvements will be temporary and which will be permanent and specify the time-frames when each temporary roadway improvement will be restored to its previous, or better, condition.** Although the applicant, FPL, indicates that all of the roadway improvements will be temporary, the County's Supplement to the Initial Recommendations Report for Application 6 states, "The [Miami-Dade County Planning] Department favors the dedication of the proposed roadway improvements as permanent facilities". Without clear identification of temporary and permanent roadway improvements, the District cannot identify all potential impacts.
- **Provide assurance that the proposed roadway improvements will be designed to be compatible with CERP Biscayne Bay Coastal Wetlands Project Alternative "O".** The amendment does not demonstrate how the proposed roadway improvements will be designed to be compatible with CERP Biscayne Bay Coastal Wetlands Project Alternative "O". Under Alternative "O", additional surface water flow (sheetflow) is to be diverted southward, through existing wetland slough systems, into environmentally sensitive lands

located south of Palm Drive (S.W. 344th Street), generally between the District's L-31E Canal and U.S. Highway 1. Under this amendment, several new roadway improvements are proposed that could interfere with the proposed sheetflow. Prior to adoption, the amendment should be revised to include policies, strategies, and commitments to ensure that the appropriate engineering analyses are conducted and any proposed drainage features, including culverts, be designed, sized, and spaced to handle existing and proposed flows.

- **Eliminate or reduce the direct and secondary wetland impacts and impacts to wetland-dependent listed species.** The amendment does not demonstrate elimination or reduction of direct and secondary wetland impacts and impacts to wetland-dependent listed species. Please provide alternative analyses to document elimination or reduction of direct and secondary wetland impacts for all potential roadway corridors. Potential secondary impacts include habitat fragmentation, other induced development, and habitat alteration related to opportunistic undesirable (or exotic) vegetation.
- **Revise the FPL Turkey Point Units 6 & 7 Mitigation Plan to address the following:**
 - **Revise the habitat assessment to better reflect the actual habitat values.**
 - **Provide mitigation adequate to offset the proposed wetland impacts.**
 - **Include the additional roadway improvements proposed under the "Additional Access Option" in the plan.** The plan only addresses the roadway improvements proposed by FPL. It should be modified to include the additional roadway improvements under consideration that are referred to in the County's Supplement to the Initial Recommendations Report as the "Additional Access Option".
- **Identify specific measures that will be adopted to protect the environmentally sensitive lands south of Palm Drive (S.W. 344th Street) from illegal access and activities such as dumping, use of all-terrain vehicles, and poaching.** The new roadways proposed south of Palm Drive will increase opportunities for illegal access to environmentally sensitive lands, including those in the Model Lands Basin area.

We look forward to continuing this collaboration with the County and the Department of Community Affairs in developing sound, sustainable solutions to protect the region's water resources. For assistance or additional information, please contact Rod Braun, Director, Intergovernmental Policy and Planning Division, at (561) 682-2925 or rbraun@sfwmd.gov.

Sincerely,



Kim Shugar
Director, Intergovernmental Programs Department
South Florida Water Management District

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