

1. INTRODUCTION

Florida Power & Light Company (FPL) is pleased to submit its March 2012 Semi-Annual Monitoring Report. This FPL Turkey Point Plant Semi-Annual Monitoring Report for the Units 3 and 4 Uprate Project (Semi-Annual Monitoring Report) has been prepared in accordance with the FPL Turkey Point Power Plant Groundwater, Surface Water, and Ecological Monitoring Plan, referred to herein as the Monitoring Plan (South Florida Water Management District [SFWMD] 2009a). The Monitoring Plan requires the collection of groundwater, surface water, meteorological, flow, and ecological data in and around the plant to establish baseline conditions and determine the horizontal and vertical effects and extent, if any, of the cooling canal system (CCS) water. For further details, refer to the Monitoring Plan (SFWMD 2009a) and Fifth Supplemental Agreement (SFWMD 2009b). The primary purpose of this Semi-Annual Monitoring Report is to summarize the monitoring efforts to date, to present and summarize the data and to discuss results.

Data were collected in accordance with the FPL Quality Assurance Project Plan (QAPP) (FPL 2010) and included changes to the QAPP provided by the Agencies to FPL in June 2011 and suggested revisions to the QAPP provided by FPL to the Agencies in August 2011. The suggested revisions by FPL more accurately reflected data collection practices being performed in the field. Any notable deviations are discussed herein.

1.1 Brief Overview of Automated Monitoring Network

FPL installed an extensive automated monitoring network to collect groundwater, surface water, meteorological, and hydrologic data at 15-minute intervals over a broad area surrounding Turkey Point. A brief overview of each monitoring network is provided below, and further discussion regarding the instrumentation, data collection, and results for the network is included in Section 2 of this report. Photographs of the automated stations were provided in the February 2011 Semi-Annual Report (FPL 2011a).

1.1.1 Groundwater

From February through June 2010, FPL installed 42 wells in 14 well clusters (TPGW-1 to TPGW-14) at and around Turkey Point (Figure 1.1-1). The locations were determined based on site conditions and extensive coordination among FPL and the SFWMD, the Florida Department of Environmental Protection (FDEP), and Miami-Dade County Department of Permitting, Environment and Regulatory Affairs (PERA) (collectively described herein as the Agencies). The placement of station locations in Biscayne Bay also was coordinated with Biscayne National Park (BNP).

Three separate wells were installed at each location: a shallow well (S); an intermediate depth well (M); and a deep well (D). The borehole for the deep well was drilled first, and down-hole geophysical methods were conducted to help determine high flow zones and other subsurface characteristics. Based on a collaborative effort among FPL, JLA Geoscience, and the SFWMD, screen depths were established with screen lengths varying from 2 to 5 feet based on site conditions. Appendix A provides a brief summary of the well construction information, and further details are provided in the JLA Geosciences, Inc. Geology and Hydrogeology Report (2010).

Following well completion, the top of each well casing was surveyed and infrastructure (probes, telemetry, solar panels, and other elements) was installed to facilitate the collection of automated groundwater quality and stage data at 15-minute intervals. Most of the locations were re-surveyed in June 2011 to confirm the elevations. The measured water quality parameters include actual conductance and temperature. Salinity, density, and total dissolved solids (TDS) are calculated by the instrumentation based on the measured parameters. Groundwater data are remotely transmitted via telemetry each day and uploaded to a FPL electronic data management system (EDMS).

1.1.2 Surface Water

Per the Monitoring Plan and as shown on Figure 1.1-2, automated surface water stations were installed at the following locations:

- Seven stations in the CCS;
- Five stations in adjacent canals;
- Three stations in the Interceptor Ditch (ID); and
- Five stations in Biscayne Bay.

In addition, two non-automated stations were installed:

- One station in the CCS (TPSWCCS-8); and
- One station in Card Sound Canal (TPSWC-6).

The locations of the monitoring stations were jointly determined with the Agencies and provide broad coverage of the key water bodies in the project area. Two additional stations (TPBBSW-10 and -14) were added at a later date to record stages in Biscayne Bay; these stations are co-located with TPGW-10 and -14.

The automated surface water stations record the same water quality data parameters as the groundwater stations. Stage data are recorded at all locations except four stations in Biscayne Bay that do not have the infrastructure to support stage recorders or a telemetry system (TPBBSW-1, TPBBSW-2, TPBBSW-4, and TPBBSW-5). The data at these four Biscayne Bay locations are retrieved manually at approximately six-week intervals and downloaded into the FPL EDMS database, referred to herein as the FPL database. Data from the other stations are

transmitted via telemetry daily onto a secure server system and automatically uploaded into the FPL database.

1.1.3 Meteorological

One meteorological station that includes instrumentation to measure solar radiation, wind speed, wind direction, air temperature, relative humidity, and rainfall was installed near the center of the CCS (TPM-1). Four additional rainfall gauging stations were installed around the CCS. Data are collected at 15-minute intervals. Data from the meteorological station are uploaded daily into the FPL database, while the rainfall gauges are manually downloaded during routine site visits. Seven rainfall collectors were installed around the CCS. Additionally, five evaporation pans have been installed at various locations. Figure 1.1-3 illustrates the locations of the above-mentioned stations.

1.1.4 Hydrological

Three Acoustic Doppler Velocity Meters (ADVMs), otherwise known as index-velocity meters or flowmeters, were originally set up to determine flow in the CCS at the following three locations: near the power plant discharge into the CCS; the southern end of the CCS before the water enters the return canal of the CCS; and near the intake into the plant from the CCS. Limited data was collected from two of the three stations via telemetry and automatically uploaded to the FPL database (Figure 1.1-4).

1.2 Quarterly Sampling for Laboratory Analysis

The aforementioned monitoring network for groundwater and surface water supports the collection of water samples for laboratory analysis. The Monitoring Plan specifies samples must be collected from the 42 groundwater wells and the 20 surface water stations previously discussed. For this reporting period, samples must also be collected on a quarterly basis from one additional location on the Card Sound Road Canal. The samples are analyzed for a variety of parameters including CCS Tracer Suite constituents, ions, trace elements, nutrients, and TDS, along with field parameters, depending on the media and whether the effort was a quarterly or semi-annual event.

Further discussion of the analytical parameters, sample collection methods, and results is provided in Section 3 of this Semi-Annual Monitoring Report. The analytical data included in this report are focused on two sampling events for this semi-annual monitoring period: June 2011 and September 2011; however, some of the results are presented and discussed in context with the previous four quarters of analytical results (June/July 2010, September 2010, December 2010, and March 2011).

Samples were also collected at five existing wells as part of FPL's routine sampling for the ID operation. Initially, the timing of these sampling events was offset from the monitoring plan sampling events, with samples being collected from historic wells L-3, L-5, G-21, G-28, and G-35 in October 2010 and January 2011. Based on discussions with the Agencies following the

January 2011 sampling effort, FPL changed the ID operation sampling to occur in the same month as the monitoring plan sampling. Results from the June 2011 and September 2011 sampling events are included in this report.

1.3 Ecological Monitoring

The Monitoring Plan and QAPP outline an ecological monitoring program. Biotic components of interest include marsh vegetation in adjacent wetlands, mangroves, submersed aquatic vegetation, and benthic fauna in and adjacent to Biscayne Bay. Ecological monitoring efforts (setting up transects [Figure 1.3-1] and conducting ecological surveys) were initiated in October 2010 and completed in December 2010. Additional monitoring in the marsh and mangrove areas was conducted in February 2011 and May 2011, and monitoring results were included in the August 2011 Annual Report (FPL 2011b). In addition, results from the subsequent April/May 2011 monitoring event in Biscayne Bay were included in the August 2011 Annual Report.

Quarterly monitoring in the marsh/mangroves is ongoing, and this Semi-Annual Monitoring Report presents the results from the monitoring efforts in August 2011 and November 2011. The monitoring in Biscayne Bay is conducted twice a year, and the results from the September 2011 semi-annual event are provided in this Semi-Annual Monitoring Report.

Information on the transect plot setups, sampling methods and materials, laboratory results, and general findings are included in Section 5 of this Semi-Annual Monitoring Report.

1.4 Broad-Scale Porewater Surveys

In accordance with the Monitoring Plan and through coordination with the Agencies, a broad-scale survey of porewater temperature and specific conductance was conducted in March/April 2010 (dry season) at over 200 locations in adjacent wetlands and Biscayne Bay. A second porewater temperature and specific conductance survey was conducted in August 2010 (wet season) at 100 locations in Biscayne Bay. Based on the initial temperature and specific conductance measurements, locations were established for the porewater samples that would be collected for Tracer Suite laboratory analysis. The wet season Tracer Suite sampling effort took place in October 2010 and the dry season sampling event was conducted in April 2011. As directed by the Agencies, the information will be submitted as a separate report entitled Initial Ecological Characterization Report.

1.5 Water Budget

An approach for the water budget, with input from the Agencies, has been developed for the CCS and was included in Appendix L of the August 2011 Annual Report (FPL 2011b). Refinements to the water budget are underway and a status update is provided herein.

FIGURES



Figure 1.1-1. Locations of Groundwater Monitoring Stations.



Figure 1.1-2. Locations of Surface Water Monitoring Stations.

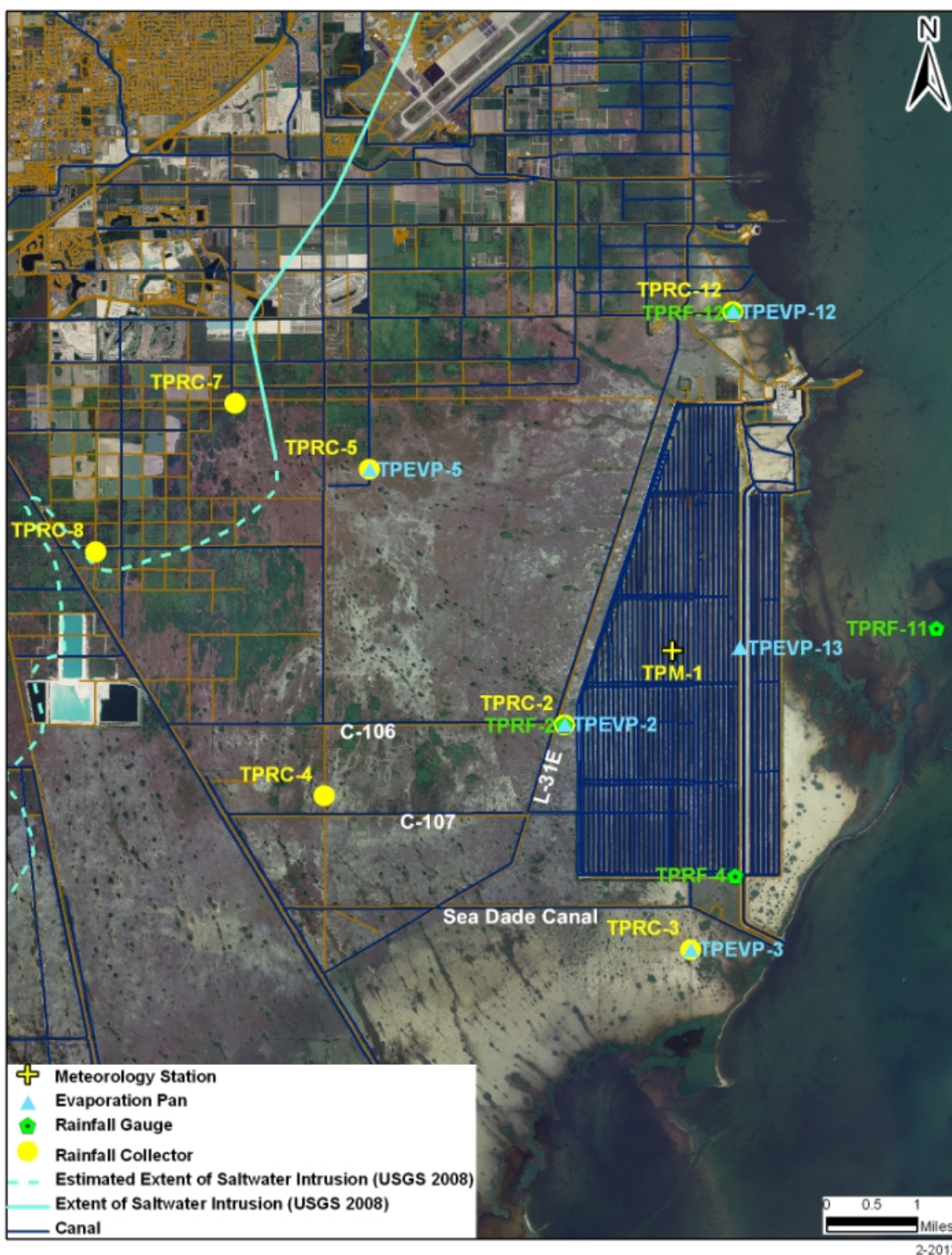


Figure 1.1-3. Locations of the Meteorological Station, Rainfall Gauging Stations, Rainfall Collectors, and Evaporation Pans.



Figure 1.1-4. Flow Meter Locations in the CCS.

