Progress Energy

September 9, 2010

Florida Department of Environmental Protection
Siting Coordination Office
Mail Station 48
3900 Commonwealth Blvd.
Tallahassee, Florida 32399

DEPARTMENT OF
ENVIRONMENTAL PROTECTION

SEP 10 2010

SITING COORDINATION

Attention: Mr. Mike Halpin

RE: Progress Energy Florida (PEF)
Crystal River Units 3, 4 & 5
PA77-09O
Conditions of Certification Modification P Request

Dear Mr. Halpin:

Progress Energy Florida (PEF) requests that the Conditions of Certification (COC) (PA77-09O) be amended or modified as necessary to accommodate the following changes:

Vertical Expansion of the Ash Storage Area

PEF is proposing to increase the stacking height of the ash disposal area that serves the four coal fired units located at the Crystal River Energy Complex located in Crystal River, Florida, in Citrus County. Presently, the maximum stacking height for the ash storage area is 80 feet. PEF requests authorization to increase the stacking height (vertically expand) the ash storage area to 120 feet and steepening the side-slopes from 4 horizontal to 1 vertical (4H:1V) to 3 horizontal to 1 vertical (3H:1V).

The purpose for the vertical expansion, in part, is to compensate for an area of permitted ash storage space that was forfeited to accommodate the installation of new systems associated with the clean air project such as a limestone storage building, associated conveyor system, and a temporary gypsum storage pad. PEF also needs additional storage capacity due to reduced beneficial use opportunities driven by a decreased construction market.

The permitted ash storage area that is no longer available for storing ash may be compensated by increasing the vertical stacking height to 120 feet. Although the lateral footprint of the ash storage area was decreased as a result of the installation of new systems associated with the clean air project, the vertical expansion to 120 feet will compensate for the lost horizontal storage capacity. It is estimated that the net storage capacity for the reduced horizontal footprint with a 120 foot stacking height will be approximately the same as the former footprint with an 80 foot stacking height. An engineering package supporting this request is attached.

Incorporation of the CREC Industrial Wastewater Permit (FLA016960)

As suggested to PEF by the FDEP Southwest District Industrial Wastewater (IWW) Section staff, the requirements currently contained in IWW Permit FLA016960 should be incorporated into the COC in lieu of maintaining the site-wide IWW permit. PEF and the District staff believe this is appropriate because all of existing monitoring wells associated with the Crystal River site currently monitor systems that have a nexus to the certified site areas, including the ash storage area together with new wells proposed by the SW District Solid Waste Section in conjunction with the ash storage area horizontal expansion project; the Units 4 & 5 coal pile; the FGD blow down treatment pond area; and the Units 4 & 5 IWW percolation pond. Additionally, the percolation pond system normally associated with the Crystal River Units 1 & 2 and Crystal River Unit 3 receives treated FGD blow down wastewater from the Units 4 & 5 FGD system and the South Coal Pile receives specific coal for use in the certified Units 4&5.

Attached is a copy of the existing IWW Permit as well as a site map delineating monitoring wells and industrial wastewater percolation pond systems at the site.

PEF also proposes the development and submission to the Department of an ***Industrial Wastewater Operations & Maintenance Plan*** (IWW O&M Plan) within 120 days of this COC modification that, at minimum, incorporates a description of the IWW system site-wide (including IWW treatment systems, monitoring wells, and percolation ponds); provides a description of monitoring requirements and frequencies, including monitoring requirements proposed by the Solid Waste Section relative to additional ash storage area monitoring wells as a condition of the horizontal expansion; and describes various operation and maintenance activities associated with the IWW systems. PEF believes that the site wide Groundwater Monitoring Plan should also become a part of the overall plan. PEF further proposes that future changes or requests involving the IWW system at the Crystal River site be processed as a post certification submittal by revising and submitting IWW O&M Plan updates (including any groundwater monitoring plan updates) to the Department for review and approval. In regards to Water Quality Criteria Exemptions, PEF suggests the following language or similar language be incorporated into the COC:

Requests for Water Quality Criteria Exemptions will be processed as modifications to the COC and to be continued, must be reapplied for within 5 years of the approval of the associated modification.

Increase permitted flow to the South Percolation Pond System

Progress Energy Florida (PEF) was granted a minor revision to the Industrial Waste Water Permit FLA016960 to reduce the permitted flow to the percolation pond system from 0.91 MGD monthly average daily flow (MADF) to 0.76 MGD MADF as a result of the need to relocate the pond berm to facilitate a proposed cooling tower construction. The new flow rate was based on the volume ratio reduction of the pre and post development conditions of the impacted pond system and not a "mounding study". Subsequently, PEF had commissioned a formal study, the result of which is attached, to determine if the pond system could handle an increased flow in the post development condition. The study does show that the pond system can adequately handle up to 1.2 MGD.

It is important to note that PEF had applied for a modification to the existing IWW permit to incorporate the new flow limit but it was agreed upon with the FDEP SW District, that this request should coincide with the overall request to incorporate the site wide IWW Permit into the COC, therefore, PEF requests that the

permitted inflow to the percolation pond be changed 1.2 MGD MADF. A copy of the original modeling study and permit modification request supplied to the FDEP SW District is attached for your reference.

Incorporate the Crystal River North Domestic Wastewater Permit (FLA011862)

For an unknown reason, the FDEP did not incorporate the Crystal River Units 4 & 5 Domestic Wastewater Permit FLA011862 into the original Site Certification. To be consistent with the Power Plant Siting Act, PEF requests that this oversight be corrected and that the referenced permit be incorporated into the Condition of Certification. A copy of the current permit is included with this submittal.

Reallocation of Per Well Water Use

PEF has now placed the Unit 4 and Unit 5 Flue Gas Desulfurization systems on line. It has been found that the per well water use limit regime as indicated in Section C.II.A. of the Conditions of Certification does not allow enough operational flexibility. After discussion with the Southwest Florida Water Management District, PEF requests that the previously referenced condition be modified as follows:

District ID/ Owner ID	Water Allocation Average Gallons per Day	Well Casing/Depth Feet	STATUS
1/PW-1	430,900	35/200	EXISTING
2/PW-2	430,900	47/200	EXISTING
3/PW-3	430,900	60/200	EXISTING
4/PW-4	430,900	41/200	EXISTING
5/PW-5	430,900	35/200	EXISTING
6/PW-6	430,900	50/200	EXISTING
7/PW-7	430,900	50/200	EXISTING
14/PW-8	430,900	50/200	EXISTING
15/PW-9a	430,900	50/200	EXISTING
16/PW-10a	430,900	50/200	EXISTING
TOTAL ALL WELLS	**4,309,000**		

This change reflects a reallocation of the total authorized withdrawal quantity evenly across all ten wells. It also corrects the status of wells PW-8, PW-9a and PW-10a. All other conditions to remain the same.

Determination that the Crystal River Unit 4 & 5 (CRN) stormwater management system is capable of treating the entire CRN area.

PEF held discussions with the FDEP Southwest District regarding the piecemeal approach that PEF has taken to provide stormwater calculations for the additions of impervious surfaces within the CRN area. It was agreed that for future additions it would be appropriate to conduct a one-time stormwater modeling of the CRN area and assume the entire area is 100% impervious. Attached is the modeling that was conducted by Golder Associates. This study proves that the existing CRN stormwater management system is capable of managing the entire CRN area as defined by the drainage basins indicated in the study.

PEF proposes that any authorization for installation of impervious surfaces within the defined drainage basins be processed as post certification submittals. PEF further proposes that these post certification submittals be restricted to a notice of intent, description of the installation, identification of the appropriate drainage basin, aerial showing the location of the proposed installation, and certification that wetlands will not be impacted. Installation of the new impervious surface may commence 30 days after the receipt of the notice by the Department unless an objection, determination that a COC modification is warranted, or request for additional information is made.

Also included in this submittal are two $10,000 checks (#198026) (#199043) for the required FDEP two-agency (FDEP and SWFWMD) review administration fee. Three copies of the complete submittal package are also being delivered to Mr. Danny Stubbs at the FDEP Southwest District Office.

Progress Energy Florida requests that the Site Certification PA77-09O be modified to incorporate the changes as described above. Should you, or your staff, or any other agency representatives have questions regarding this request, please contact me at (727) 820-5588.

Sincerely,

Michael Shrader
Lead Environmental Specialist

Attachments

Cc: Danny Stubbs – FDEP SW District
Paul Williams – SWFWMD (w/o attachments)

APPLICATION FOR A MINOR REVISION TO A WASTEWATER FACILITY OR ACTIVITY PERMIT

1. Instructions

a. In accordance with Rule 62-620.325, F.A.C., this form must be submitted to the appropriate Department district office or approved local program when requests for minor revisions to a permit or minor modifications to a facility are made by a permittee, except for transfer of a permit to a new permittee and addition of a major user of reclaimed water to a Part III reuse system. Application for transfer of a permit to a new permittee shall be made on DEP Form 62-620.910(11). Application for addition of a major user of reclaimed water shall be made on DEP Form 62-610.300(4)(a)1.
b. Each applicable item must be completed in full in order to avoid delay in processing of this form. Where attached sheets or other technical documentation are provided, indicate appropriate cross-references.
c. Three (3) copies of this application with supporting documentation shall be submitted with this form.
d. All information is to be typed or printed in ink. Dates are to be entered in MM/DD/YR format.
e. This application and attachments shall be signed in accordance with Rule 62-620.305, F.A.C. Also, as applicable, this application and all attachments shall be signed and sealed by a professional engineer registered in Florida in accordance with Rule 62-620.310, F.A.C.

2. Facility Information

a. Permit Number: FLA016960 b. Facility Identification Number: FLA016960
c. Project/Facility Name: Progress Energy - Crystal River Energy Complex
d. Contact Name: Michael Shrader
Number and Street: 299 First Avenue North
City/State/Zip Code: Saint Petersburg, FL, 33733
Telephone 727-820-5588

3. Type of Revision

☐ **Correct Typographical Errors**[1] - Submit one copy of each page of the permit showing revisions being requested.

☐ **Change Improvement Schedule**[1] - Provide a description of the improvement, a list of the dates to be revised, and a reason for the proposed change in each date.

☐ **Change Expiration Date of Permit**[1] - Provide the current and proposed expiration dates for the permit and the reasons for the proposed change.

☐ **Change Staffing Requirements**[2] - Describe the proposed change and submit justification for the change in accordance with Chapter 62-699, F.A.C.

[1]A processing fee is not required.
[2]A processing fee is required with the application in accordance with Rule 62-4.050, F.A.C.

☐ **Change Monitoring and Reporting Requirements**[2] - Describe the proposed change and submit justification for the change in accordance with Chapter 62-601, F.A.C.

☐ **Modify Approved Pretreatment Program**[1] - Describe the proposed modification and provide the information required by Rule 62-625.540, F.A.C.

☐ **Delete Point Source Outfall**[1] - Identify the outfall and explain why the outfall is being eliminated.

☐ **Modify or Expand Approved Residuals Land Application Sites**[2] - Attach a new or updated Agricultural Use or Dedicated Site Plan as required by Chapter 62-640, F.A.C.

☐ **Minor Modification to the Facility**[2] - Provide a description of the proposed modification. If applicable, attach any reports, plans, and specifications which have been developed to implement this modification.

☒ **Other**[2] - Provide appropriate documentation. Describe.

4. Certifications

a. Applicant or Authorized Representative

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Larry E. Hatcher — 7/21/10

(Signature of Applicant or Authorized Representative[3]) (Date)

Name (please type) Larry E. Hatcher Company Name Progress Energy - Florida
Title Manager, Crystal River Plant Company Address: 15760 W. Power Line Street
Phone: (352) 563-4484 City/State/Zip Code: Crystal River, FL 34428

b. Professional Engineer Registered in Florida

I certify that the engineering features of this project have been (designed) (examined) by me and found to conform to engineering principles applicable to such projects. In my professional judgement, this facility, when properly constructed, operated, and maintained, will comply with all applicable statutes of the State of Florida and rules of the Department.

Name (please type): Chad D. Drummond, P.E.
Florida Registration Number: 64378
Company Name: Geosyntec Consultants, Inc.
Company Address: 3525 W. Lake Mary Blvd, #306
City/State/Zip Code: Lake Mary, FL 32746
Phone Number: 407.321.7030

July 14, 2010
64378

(Seal, Signature, Date, and Registration Number)

[3]If signed by the authorized representative, attach a letter of authorization in accordance Rule 62-620.305, F.A.C.

Prepared for

Progress Energy

Progress Energy Florida, LLC
15760 West Power Line Street
Crystal River, FL 34428

SUPPLEMENTAL HYDROGEOLOGIC INVESTIGATION and GROUNDWATER MODELING EVALUATION FOR THE IWW POND AREA

Crystal River Energy Complex
15760 West Power Line Street
Crystal River, FL

Prepared by

Geosyntec consultants

14055 Riveredge Drive, Suite 300
Tampa, Florida 33637

July 2010

CERTIFICATION AND APPROVAL

I hereby certify that in my professional judgment this document entitled: *Supplemental Hydrogeologic Investigation and Groundwater Modeling Evaluation for the IWW Pond Area* satisfies the requirements set forth in Chapter 471, Florida Statutes, and other applicable rules and regulations of the state of Florida. I have completed and/or been in responsible charge of work completed by qualified professionals working directly under my supervision.

Prepared by:

John Spencer

John Spencer
Sr. Staff Hydrogeologist

7/7/2010
Date

Chad D. Drummond, P.E. 7-7-2010
Florida Professional Engineer No. 64378
Geosyntec Consultants, Inc.
Certificate of Authorization No. 4321
Telephone: (407) 321-7030
Facsimile: (407) 321-7031

Date

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1. EXECUTIVE SUMMARY

Geosyntec Consultants (Geosyntec) was retained to perform a supplemental hydrogeologic investigation and groundwater modeling evaluation to determine the operating capacity of the redesigned Crystal River Energy Complex (CREC) industrial wastewater (IWW) pond 4. IWW pond 4 was reduced from approximately 8.6 acres to 7.2 acres during the Helper Cooling Tower South (HCTS) construction project. The objective of the groundwater modeling evaluation was to assess the infiltration capacity of the IWW pond system and its effects upon the surrounding hydrogeologic system in order to determine if a return to the originally permitted discharge of 0.91 million gallons per day (mgd) is feasible.

To evaluate the pond area, Geosyntec collected and analyzed plant daily flow rates, daily pond stages, as well as hourly water levels in two shallow monitor wells, the intake and discharge canals, and IWW pond 4 for a period of one month. Slug tests were also conducted on the monitor wells to estimate horizontal hydraulic conductivity. Geosyntec used the information to develop a three-dimensional, finite difference groundwater flow model. The model was calibrated to the observed data, evaluated for parameter sensitivity, and used to evaluate the IWW pond system performance during multiple simulations.

The simulations include: 1) inflows to the ponds with the currently allocated rate of 0.76 mgd; 2) inflows to the ponds with a rate of 0.76 mgd and a 100-year, 24 hour storm event; 3) inflows to the ponds with an increased rate of 0.91 mgd; 4) inflows to the ponds with an increased rate of 0.91 mgd and a 100-year, 24 hour storm event; and 5) a simulation of the maximum inflow the pond can handle before the water surface elevation reaches the overflow elevation of 9 ft North American Vertical Datum 1988 (NAVD-88).

Simulation results indicate that a reinstatement of the original permitted daily discharge rate of 0.91 mgd and a 100-year, 24 hour storm event would result in a stage elevation of 7.2 feet (NAVD-88). The modeling results also indicate that IWW Pond 4 could support an influent rate up to 1.2 mgd and a 100-year, 24 hour storm event before the emergency overflow is overtopped at 9 ft (NAVD-88).

2. INTRODUCTION

2.1 Terms of Reference

Progress Energy Florida, Inc. (PEF) Crystal River Energy Complex (herein referred to as "CREC" or "the site") currently operates under three Florida Department of Environmental Protection (FDEP) industrial wastewater permits (FL0000159, FL0036366, and FLA016960). The IWW pond area was permitted in the past to accept 0.91 mgd of plant effluent discharge; however, the permit was recently reduced to 0.76 mgd due to a reduction in the pond footprint caused by the HCTS project. Geosyntec was retained by PEF to develop a supplemental hydrogeologic investigation and groundwater modeling evaluation to determine if a return to the originally permitted discharge rate of 0.91 mgd was possible.

2.2 Objectives

The objective of the Supplemental Hydrogeologic Investigation and Groundwater Modeling Evaluation is to perform a hydraulic mounding analysis of the approximate 11 acre IWW pond area located at the CREC. The mounding analysis will be used to determine what the affects would be on the IWW pond area and the surrounding hydrologic system if the plant effluent to the pond system was returned to a rate of 0.91 mgd or greater.

2.3 Report Organization

The Supplemental Hydrogeologic Investigation and Groundwater Modeling Evaluation is organized as follows:

- **Section 3** - identifies the site location and the history of major operations at the CREC;
- **Section 4** - briefly describes the regional geology and hydrogeology of the CREC and create the regional conceptual model;
- **Section 5** - briefly describes the site geology and hydrogeology of the CREC used to create the site conceptual model and identifies parameters for the creation of the groundwater model and calibration targets;
- **Section 6** - describes the data collected for additional model parameters and model calibration and;
- **Section 7** - provides a summary of the groundwater model input parameters, model domain creation, model calibration, parameter sensitivity analysis, results, and recommendations.

3. SITE DESCRIPTION

3.1 Site Location

The CREC is located at 15760 West Powerline Street on the western shore of the Gulf of Mexico in Crystal River, Citrus County, Florida. The property is located in Sections 28 through 36, Township 18, Range 16 with the center of the facility at approximately 28°28'2" north latitude and 82°41'49" west longitude. The property encompasses approximately 4,750 acres. Approximately 650 acres of the CREC have been developed with the remaining property consisting of salt marsh and coastal lowland areas. The location of the site is provided on Figure 1.

3.2 Site Operational History

Five power generating units are present at the CREC. Units 1, 2, 4, and 5 are coal-fired steam units and Unit 3 is a nuclear facility. The CREC property was purchased by the Florida Power Corporation prior to 1964. Construction at Unit 1 began in 1964 with coal-fired commercial operations beginning in 1966. Construction of the intake and discharge canals that extend inland from the Gulf of Mexico was initiated in 1965 and completed in 1966. Unit 2 was placed into commercial coal-fire operations in 1969. During the early 1970's Units 1 and 2 were converted from coal-fired steam to oil-fired operations. In 1976 and 1979, Units 1 and 2 reverted back to coal operation. The construction permit for the nuclear unit (Unit 3) was issued by the Atomic Energy Commission in 1968, construction commenced in 1969, and commercial operations were initiated in 1977. During the construction of Unit 3, the intake and discharge canal network were extended further inland from the Gulf of Mexico to accommodate the expanded cooling needs for the operation of Unit 3. With increasing development and power needs for the area, Units 4 and 5 were permitted in 1978 and began commercial coal-fired operation in 1982 and 1984, respectively. Construction of the north/south Crystal River North (CRN) cooling tower make up and blow down channels extending from the existing discharge canal towards Units 4 and 5 began in 1981 and was completed in 1982.

The IWW pond system is located in the southwest corner of the CREC facility and is composed of four interconnected ponds (Figure 2). The pond system is currently designated to primarily receive waste water from coal-fired units one and two, and nuclear unit three as well as discharges from coal-fired units four and five. Ponds 1 and 2 are approximately 0.5 acres each and Pond 3 is comprised of approximately 2.5 acres. Pond 4 has an approximate surface area of 7.2 acres. The ponds are currently interconnected by a series of free-flowing 12 inch (in) diameter pipes that steadily feed plant effluent through the system. Plant effluent discharges first enter the system in Ponds 1 and 2 and once the ponds reach a designated stage, the ponds begin discharging to Pond 3, which continues discharging to Pond 4 once it reaches its designated stage.

During the 2009 reconstruction of Pond 4, the pond bottom was excavated and approximately 3 ft of intake canal dredge spoils were removed. The pond was excavated until limestone was exposed and then backfilled with approximately 2 to 4 ft of clean sand. A laboratory grain size analysis and falling head permeability test was reported in June 2009 by Golder Associates on a sample of the Pond 4 bottom material which surmised the backfill to be composed of fine sand with a permeability of 9.4E-04 centimeters per second (cm/s) or 2.66 ft/day (Appendix A).

The current footprint of Pond 4 is designed to contain approximately 12 million gallons of effluent before overtopping the overflow structure set at 9 ft above mean sea level (msl). As an example of the extensive storage capacity of Pond 4, an extreme scenario consisting of the requested permit amount of 0.91 mgd and the SWFWMD designated 100-year, 24-hour storm event of 11.5 inches; the total volume entering Pond 4 over the 24 hour period would be approximately 5.62 million gallons, or slightly under half of the total pond capacity. A table of pond stage and associated approximate pond volumes is included in Table 1.

4.0 REGIONAL GEOLOGY AND HYDROGEOLOGY

Historical documents provided by PEF were reviewed to evaluate regional and site-specific geologic and hydrogeologic features. The document review was utilized to develop the site conceptual model and to develop the model domain.

4.1 Regional Geology

The geology of Citrus County is comprised of unconsolidated sands, clays, limestones and dolomites at the surface or near surface and is underlain by a thick sequence of limestone and dolomite.

Areas near the coast are comprised mostly of the Gulf Coastal Lowlands (White, 1970). The Gulf Coastal Lowlands comprise the western part of the county and consist of marine terraces and coastal swamps, including areas of paleokarst features which may be thinly covered by clastic sediments. The surface deposits are composed of medium to fine grained, poorly consolidated sand and silt with local deposits of organic material.

Below the Gulf Coastal Lowlands is the Suwannee Limestone which is present near the ground surface in the Brooksville Ridge (Spencer, 1984) and in the southwestern area of Citrus County (SWFWMD, 1987). The Suwannee Limestone is moderate to well indurated, recrystallized various degrees and very fossiliferous.

The Ocala Group occurs beneath the Suwannee Limestone and is comprised of the Crystal River, Williston, Inglis, and Avon Park Formations. The Crystal River Formation is a cream colored coquina, set in a pasty calcite matrix and recrystallized to variable degrees. This formation can be up to approximately 100 ft thick. The Williston Formation is a biogenic, chalky to granular, occasionally loosely cemented dolomitic limestone. It is exposed in the western part of the county near the coast and on several locations along the Withlacoochee River. The formation thickness averages between 30 and 50 ft. The Inglis Formation consists of limestone and dolomitic limestone which is poorly to well indurated, and fossiliferous. The thickness is highly variable, with an average of approximately 50 ft. The Inglis Formation is exposed along coastal areas and along the Withlacoochee River. The Avon Park Formation is a consolidated to well indurated, highly fossiliferous dolomite and limestone. The formation is highly porous and permeable except in the lower part where evaporates, mainly gypsum, fill most of the void spaces.

4.2 Regional Hydrogeology

Groundwater occurs in the Floridan aquifer near the coastal part of Citrus County due to the lack of surficial deposits. There is no surficial or intermediate aquifer in any respect and the Floridan aquifer is considered to exist at land surface. Most of the regional

groundwater flow is concentrated in a moderately thin, karstic zone near the water table (Faulkner, 1973). The highly permeable sections are due to secondary solutioning of the limestone and dolomite along preferred pathways. The transmissivity of the Upper Floridan Aquifer is highly variable due to these karstic solution channels and the varying thickness of the aquifer (SWFWMD, 1987). Several aquifer performance tests (APT) were conducted by SWFWMD across Citrus County and the calculated transmissivity of the Floridan aquifer ranges from 3.8E04 to 2.7E06 ft^2/day. The Floridan Aquifer is estimated to be between 600 and 700 ft thick along the coast.

The regional groundwater flow direction is to the west/southwest toward the coast with natural discharge occurring through coastal springs and upward leakage in low-lying coastal swamps.

5.0 SITE GEOLOGY AND HYDROGEOLOGY

5.1 Site Geology

The geology at the CREC facility is similar to the regional geology of the Gulf Coastal Lowlands. Soil borings and monitor well installation logs (ESE 1981 and 1984, Ardaman & Associates 2006, and Golder Associates 2007 and 2008) indicate an unconsolidated, tan, fine sand with frequent, pebble-size limestone fragments and occasional, interbedded silts and clays. The bottom of the unconsolidated sediments range from 1ft below land surface (bls) to 25 ft bls. Below the unconsolidated sediments is a competent limestone unit that has been identified as the Inglis Formation. The limestone has been described as a massive, competent, light tan to white limestone, with numerous fossils. The shallow upper 50 ft is highly solutioned with substantial interconnected voids.

5.2 Site Hydrogeology

The Floridan aquifer is considered to occur at land surface at the site and groundwater flow is generally to the west/southwest. The water table occurs approximately 5 to 10 ft bls and is tidally influenced near the coast. The majority of groundwater flow occurs through solution channels and cavities. The upper zone of the aquifer is highly permeable because of the solution channels; however, the solid, unfractured limestone in between the voids has a much lower permeability. The lower zone of the aquifer contains smaller voids and solution channels and is considered to be less permeable.

5.3 Monitor Well Locations

Pursuant to the requirements in IWW Permit FLA016960, a groundwater monitor well network has been previously set up to monitor water quality parameters specific to the plant permit. These monitor wells and calculated water levels were used as calibration target points during groundwater model development. The monitor well locations are included in Figure 3 and the water levels that were collected during the third quarter 2009 sample event are included in Table 2.

6.0 DATA COLLECTION

As part of the mounding analysis, Geosyntec collected site-specific hydrogeologic and hydrologic data that included:

- hydraulic conductivity data derived from slug tests performed on two existing monitor wells in the vicinity of the IWW ponds;
- hourly water level readings in two existing monitor wells (MWC-27 and MWC-IF2), in stilling wells located in the intake and discharge canals (SW-intake and SW-dis), and in stilling wells located in IWW Ponds 1 and 4 to evaluate water level response to tidal, meteoric, and plant discharge effects and to aid in transient model calibration;
- daily stage data in all four IWW ponds; and
- daily plant effluent discharge rates into the IWW pond system.

On 6 April 2010 Geosyntec performed slug tests on monitor wells MWC-27 and MWC-IF2 and installed pressure transducers to monitor hourly water levels in the wells, intake and discharge canals, and IWW Ponds 1 and 4 for approximately one month. Stilling wells were also installed next to the staff gauges in IWW Ponds 1 and 4 to mount the pressure transducers during the monitor event. The monitor wells and stilling wells were surveyed to the elevation on the existing staff gauges using a level transit. The staff gauges in the ponds had recently been installed and surveyed to (NAVD-88). Re-surveying select monitor points ensured consistency over the study area. The locations of the monitor wells, stilling wells, and staff gauges are located in Figure 4.

Slug tests were performed on the monitor wells by measuring the water level response from static conditions to an instantaneous change of the water level in a well via a manual slug. Comparing this change in water level to type-curves provided an estimation of horizontal aquifer hydraulic conductivity.

During a manual slug test, a static water level is first obtained from the well and a pressure transducer is lowered to an appropriate depth so as to not be disturbed by the slug head. Then the slug head (normally a piece of weighted PVC pipe) is lowered until the top of the slug head is even with the depth of the static water level. Once the well returns to static conditions, i.e. the water level returns to the static depth, the slug head is instantaneously removed from the well. The removal of the slug head allows the water level to return to initial static conditions. While the pressure transducer measures the water level as it returns to static conditions. The recovering water levels are recorded by the pressure transducer. The test is run until the water level has recovered to at least 90% of the total static water level. The test is run a minimum of three times on the well and the data is later analyzed to calculate the average horizontal hydraulic conductivity.

During the monthly monitoring event, water levels in IWW Pond 4 dropped below the level of the staff gauge and stilling well. To provide for continued data collection, the stilling well and staff gauge were relocated to a deeper part of the pond with standing water. Following the relocation, the staff gauge and stilling well were re-surveyed and a correction factor was applied to the data collected for the remainder of the event.

Water levels were also manually measured in the monitor wells, stilling wells; and staff gauges during the equipment deployment, two weeks into the monitoring event, and at the end of the monitoring event. Water levels and pond stages data are included in Table 3.

7.0 DATA ANALYSIS

Remaining tasks for this investigation included analysis of the collected data and model development. The field data collected was analyzed and reduced to specific input parameters for the numerical groundwater flow model.

Slug test data was evaluated using a commercially available numerical solver, AQTESOLV® (Hydrosolve 2002). Horizontal hydraulic conductivity was calculated using, Hvorslev (1951) and Bouwer-Rice (1976) methods for unconfined aquifers. The calculated horizontal hydraulic conductivity values ranged from 12 to 24 ft/day for MWC-27 and MWC-IF2. The results of the slug tests are summarized in Table 4, and the slug test analyses are located in Appendix B.

Daily plant effluent discharges varied between 0.231 and 0.581 mgd with a mean of 0.383 mgd for the length of the monitoring event (see Table 5). The relatively low flows to the IWW ponds can likely be attributed to the lack of additional effluent provided by Unit 4 which was not yet online.

Hydrographs of the water levels in both monitor wells (MWC-27 and MWC-IF2) show that the wells are influenced by tidal fluctuations within the intake and discharge canals (Figure 5). The recorded water levels in the stilling well located in the discharge canal appear to flat-line during low tidal events. The flat-lines can be attributed to the water level in the stilling well falling below the pressure transducer and the pressure transducer effectively reading zero. It can be assumed that the hydrograph of the SW-Discharge would mirror the hydrograph of SW-Intake during low tides. The recorded water levels in Ponds 1 and 4 show minimal to no tidal fluctuations during the monitoring event, which may indicate that tidal influences are limited to the groundwater table and not the ponds themselves. The daily staff gauge readings in Ponds 1, 2, and 3 and the recorded water levels of Pond 1 show very little change throughout the one-month monitoring event. Throughout the monitoring event, the water level of Pond 4 was observed to be steadily decreasing regardless of discharges into the pond. It was initially thought that pond levels were going to be compared to daily discharge rates to estimate a vertical hydraulic conductivity of the pond, but a steady reduction in pond levels made that impractical. However, daily water levels were incorporated into the groundwater model to perform a transient calibration of site conditions.

7.1 Model Development

The model was conceptualized as a two layer, homogeneous, isotropic flow system. The upper layer of the model was created to represent the thin veneer of unconsolidated sediments found at the site and the containment berms surrounding the IWW ponds and pond bottoms. The lower layer was constructed to represent the karstic limestone aquifer that underlies the unconsolidated sediments. The model was constructed and solved by

the USGS modular finite difference modeling application MODLFOW (McDonald and Harbaugh 2000). The finite-difference grid consists of 182 rows and 280 columns of computational cells. The largest cells were 100 ft by 100 ft in the distal areas and the smallest were 10 ft by 10 ft in the immediate vicinity of the ponds.

Several types of boundary conditions were utilized in the simulation to constrain the numerical solution along the periphery of the model domain. Dirichlet-type (constant head) boundaries set to a specified head of 1 ft were placed along the western domain edge to simulate the Gulf of Mexico shoreline and hydraulically-connected intake and discharge canals. Cauchy-type general head boundary (GHB) conditions (head dependent flux) were specified at the northern and southern domain boundaries. Figure 6 presents the location of the boundary conditions and the grid spacing.

The von Neumann-type (specified flux) boundaries of recharge and evapotranspiration (ET) were input using two different schemes. In the non-sensitive, outlying areas, recharge is set equal to ET with a value of 2.19 inches per year. This technique, first developed by Denis and Motz (1998), allows recharge and ET to balance each other for areas with little or no data coverage. Net recharge was increased over the spatial extent of the 7.5 acre Pond 4 to simulate the application of plant effluent. During the simulations of the SWFWMD designed 24-hour, 100 year storm event of 11.5 inches, the tributary area was calculated to be the entire IWW pond area of 11 acres. Additionally, storm water discharge from coal units 1 and 2 was added to the discharge rate. To estimate the additional contribution of storm water contribution from Coal Units 1 and 2, average daily plant discharge rates were compared to discharge rates during rainfall events and the difference was calculated (Table 5). This increased hydraulic load was applied evenly over the entire 7.5 acres of Pond 4.

To account for the IWW ponds themselves, Cauchy-type lake boundaries were utilized. The ponds were conceptualized as lake cells to account for the water that the ponds convey to the underlying aquifer. The stage in the lake cells were set to vary between 0 and 10 ft above the bottom to allow for variation in effluent rates. Ponds 1 and 2 were numerically combined into one computational unit while Ponds 3 and 4 were kept separate. The pond bottom sediments in Ponds 1, 2, and 3 were specified with a 1ft thickness with a hydraulic conductivity of 0.033 ft/day while Pond 4 was specified with a 4 ft thickness and a conductivity of 0.255 ft/day. These values were developed during transient calibration of the field data collected during the month long mounding analysis. Pond bottom hydraulic conductivity values were improved during the transient calibration to become more conservative, yet representative site conditions. A summary of assigned parameters is included in Table 6.

The model top elevation was kept constant at 10 ft above mean sea level (msl). The bottom elevation in model layer 1 was set to a constant elevation of 5 ft below msl and in layer 2 to 50 ft below msl.

7.2 Simulations

The following simulations were completed to calibrate the model to site conditions as well as evaluate the effects of the proposed discharge increase on the IWW pond system.

- A steady state calibration was conducted using averaged head values in the monitoring wells. The steady state calibration was performed by manually modifying model parameters within expected ranges. Boundary conditions used for the predictive runs including canal stages and north and south boundary conditions were obtained from the steady state calibration runs.

- A transient calibration was performed focusing on the IWW pond system using water elevation data, inflow to pond rates, and daily IWW pond data from the monthly monitoring event described in Section 5.0 above. Heads obtained in the canals were used as known datasets whereas pond bed thickness and hydraulic conductivity values were manually calibrated by matching the elevation datasets obtained for the pond.

- Simulation of IWW ponds with inflow flow rate specified as the currently allocated 0.76 mgd (steady-state simulation).

- Simulation of IWW ponds with inflow flow rate of 0.76 mgd, and a 100-year, 24 hour storm event (transient simulation).

- Simulation of ponds with increased inflow flow rate set at 0.91 mgd (steady-state simulation).

- Simulation of ponds with increased inflow flow rate set at 0.91 mgd, and a 100-year, 24 hour storm event (transient simulation).

- Simulation of the maximum inflow the pond can handle before the water overtops at elevation 9 ft msl (steady-state simulation).

7.3 Results

The calibrated groundwater model simulations indicate that an influent flow rate of 0.91 mgd would raise the stage of Pond 4 to 6.7 ft msl and to a maximum stage of 7.2 msl during a 24-hour, 100 year storm event. The estimated maximum influent that IWW Pond 4 could accept with an additional input of the 24-hour, 100 year storm event would be approximately 1.2 mgd before the emergency overflow at 9 ft (NAVD-88) would be overtopped.

A sensitivity analysis was performed on the steady-state simulation with the increased inflow rate of 0.91 mgd. The following parameters were varied during the sensitivity analysis:

- hydraulic conductivity of the pond bed increased and decreased from the base value by 20%;
- hydraulic conductivity of layer 2 doubled and halved; and
- stages of canal and Gulf of Mexico boundaries decreased to 0 ft msl and increased to 2 ft msl.

Results from the predictive simulations discussed in Section 6.2 and the sensitivity analysis are provided in Table 7. Overall, the model appears to be most sensitive to the hydraulic conductivity assigned to the sand bottom of Pond 4.

7.4 Conclusions

A finite-difference groundwater flow model was created and calibrated to site conditions to conduct a mounding analysis of the IWW pond area for the CREC facility and estimate the stage of IWW Pond 4. The model was calibrated using historical regional and site geological data, as well as calculated water levels, plant effluent discharge rates, and IWW pond stage data that were collected over a period of one month. The results of the model simulations indicate that a reinstatement of the original permitted daily discharge rate of 0.91 mgd and a 100-year, 24 hour storm event would result in a stage elevation of 7.2 feet (NAVD-88). The modeling results also indicate that Pond 4 could support an influent rate up to 1.2 mgd and a 100-year, 24 hour storm event before the emergency overflow is overtopped at 9 ft (NAVD-88).

8.0 REFERENCES

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TABLES

Table 1
Pond 4 Stage Elevation and Associated Pond Volumes
SUPPLEMENTAL HYDROGEOLOGIC INVESTIGATION and GROUNDWATER MODELING EVALUATION -
Crystal River Energy Complex
Crystal River, Florida

Pond Stage (NAVD 88)	Approximate Pond Area (ac)	Associated Pond Volume (mg)
5	6.5	2.1
6	6.7	4.4
7	6.9	6.8
8	7.1	9.2
9	7.2	11.8

Notes:

NAVD 88 = North American Vertical Datum 1988

ac = acres

mg = millions of gallons

Table 3

Calculated Water Levels and Pond Stages

SUPPLEMENTAL HYDROGEOLOGIC INVESTIGATION and GROUNDWATER MODELING EVALUATION - Crystal River Energy Complex

Crystal River, Florida

Well No.	MWC-27		MWC-IF2		SG-1		SW-1		SG-2		SG-3	
Diameter (inches)	2		2		NA		2		NA		NA	
Well Depth (ft bls)	12.83		17.26		NA		NA		NA		NA	
Screen Interval (ft bls)	NA		NA		NA		NA		NA		NA	
TOC Elevation (ft NAVD 88)	10.08		10.58		NA		12.52		NA		NA	
Date	**DTW**	**ELEV**	**DTW**	**ELEV**	**Mark**	**ELEV**	**DTW**	**ELEV**	**Mark**	**ELEV**	**Mark**	**ELEV**
4/6/2010	9.31	0.77	10.45	0.13	NA	11.2	1.21	11.31	NA	11.30	NA	10.55
4/15/2010	9.39	0.69	10.39	0.19	NA	11.3	1.07	11.45	NA	11.20	NA	10.7
5/5/2010	9.02	1.06	9.96	0.62	NA	11.1	1.3	11.22	NA	11.20	NA	10.5

Well No.	SG-4		SW-4		SG-4R		SW-4R		SW-Intake		SW-Discharge	
Diameter (inches)	NA		2		NA		2		2		2	
Well Depth (ft bls)	NA		NA		NA		NA		NA		NA	
Screen Interval (ft bls)	NA		NA		NA		NA		NA		NA	
TOC Elevation (ft NAVD 88)	NA		9.82		1.70		7.55		10.32		3.52	
Date	**Mark**	**ELEV**	**DTW**	**ELEV**	**Mark**	**ELEV**	**DTW**	**ELEV**	**DTW**	**ELEV**	**DTW**	**ELEV**
4/6/2010	NA	5.25	4.4	5.42	NA	NA	NA	NA	10.6	-0.28	3.7	-0.18
4/15/2010	NA	NA	NA	NA	5.2	3.50	2.85	4.70	10	0.32	3.42	0.10
5/5/2010					4.8	3.10	3.35	4.20	10.31	0.01	3.54	-0.02

Notes:

DTW = depth to water

ft bls = feet below land surface

TOC = Top of Casing

NAVD 88 = North American Vertical Datum 1988

Elev = Elevation

NA = Not Available

Table 4

Slug Test Results and Average Horizontal Hydraulic Conductivity

SUPPLEMENTAL HYDROGEOLOGIC INVESTIGATION and GROUNDWATER MODELING EVALUATION - Crystal River Energy Complex

Crystal River, Florida

Well	Slug test	Method	ft/sec	ft/day	avg ft/day	Total average
MWC-27	1	BR	0.00017	14.688	18.72	19.22
	1	HV	0.0003	25.92		
	2	BR	0.00015	12.96		
	2	HV	0.00027	23.328		
	3	BR	0.00015	12.96		
	3	HV	0.00026	22.464		
MWC-IF2	1	BR	0.00016	13.824	19.73	
	1	HV	0.00026	22.464		
	2	BR	0.0002	17.28		
	2	HV	0.00027	23.328		
	3	BR	0.0002	17.28		
	3	HV	0.00028	24.192		

Notes:

ft/sec = feet per second

ft/day = feet per day

avg = average

BR = Bouwer-Rice method for unconfined aquifers (1976)

HV = Hvorselv method for unconfined aquifers (1951)

Table 5
Measured Plant Effluent Discharges (MGD)
SUPPLEMENTAL HYDROGEOLOGIC INVESTIGATION
and GROUNDWATER MODELING EVALUATION - Crystal River Energy Complex
Crystal River, Florida

Date	Total Measured Flow Rates (MGD)
4/6/2010	0.311
4/7/2010	0.439
4/8/2010	0.260
4/9/2010	0.261
4/10/2010	0.231
4/11/2010	0.453
4/12/2010	0.474
4/13/2010	0.581
4/14/2010	0.462
4/15/2010	0.492
4/16/2010	0.500
4/17/2010	0.465
4/18/2010	0.411
4/19/2010	0.490
4/20/2010	0.432
4/21/2010	0.386
4/22/2010	0.362
4/23/2010	0.329
4/24/2010	0.345
4/25/2010	0.377
4/26/2010	0.293
4/27/2010	0.274
4/28/2010	0.277
4/29/2010	0.430
4/30/2010	0.403
5/1/2010	0.344
5/2/2010	0.375
5/3/2010	0.363
5/4/2010	0.331
5/5/2010	0.334

Notes:
MGD = million gallons per day

Table 6
Calibrated Model Parameters
SUPPLEMENTAL HYDROGEOLOGIC INVESTIGATION and GROUNDWATER MODELING EVALUATION - Crystal River Energy Complex
Crystal River, Florida

CALIBRATED PARAMETERS				
Parameter	Zone/Reach	Layer	Value	Comments
K (x,y,z)	1	1	30, 30, 20 ft/day	
K (x,y,z)	2	2	400, 400, 400 ft/day	
porosity	1	1 and 2	0.3	
Sy	1	1 and 2	0.25	
Intake Canal	12	1 and 2	1 ft msl	Constant head
Discharge Canal	11	1 and 2	1.15 ft msl	Constant head
Sea Level	10	1 and 2	1 ft msl	Constant head
Top BC	20	1 and 2	sloping left 4.5 to 1	GHB
Bottom BC	22	1 and 2	sloping left 4.5 to 1	GHB
Right BC	---	---	---	No flow
Pond K	4	1	0.255 ft/day	Lake Package
Pond bed thickness	4	1	4 ft	Lake Package

Notes:

k = hydraulic conductivity in feet per day

Sy = specific yield

BC = boudary condition

GHB = general head boundary

Table 7

Predictive Simulation and Sensitivity Simulation Results

SUPPLEMENTAL HYDROGEOLOGIC INVESTIGATION and GROUNDWATER MODELING EVALUATION - Crystal River Energy Complex

Crystal R'ver, Florida

PREDICTIVE SIMULATION RESULTS				
Simulation #	Name	Description	Simulation set up	Result- highest lake elevation (NAVD 88)
1	076_MGD	present day permitted discharge	1 SP: 1 SS	5.8
2	076_100	present day permitted discharge + 100 yr storm	3 SPs: 1 SS, 2 Trans (1 day), 3 SS	6.2
3	091_MGD	proposed permitted discharge	1 SP: 1 SS	6.7
4	091_100	proposed day permitted discharge + 100 yr storm	3 SPs: 1 SS, 2 Trans (1 day), 3 SS	7.2
5	Max_MGD	maximum discharge: 1.27 MGD	1 SP: 1 SS	9.0
6	max_100	maximum discharge with 100 yr storm: 1.22 MGD	3 SPs: 1 SS, 2 Trans (1 day), 3 SS	9.0

SENSITIVITY SIMULATION RESULTS				
Simulation #	Name	Description	Simulation set up	Result- highest lake elevation (NAVD 88)
1	Kp_0208	K pond changed to 0.8 of base value at 0.208 ft/day	1 SP: 1 SS	7.9
2	Kp_0312	K pond changed to 1.2 of base value at 0.312 ft/day	1 SP: 1 SS	5.9
3	Kx_800	K layer 2 (limestone) doubled to 800 ft/day	1 SP: 1 SS	6.3
4	Kx_200	K layer 2 (limestone) halved to 200 ft/day	1 SP: 1 SS	7.6
5	Canal_0	Canal and SL at 0 ft	1 SP: 1 SS	5.7
6	Canal_2	Canal and SL at 2 ft	1 SP: 1 SS	7.6

Notes:

SS = steady state

Trans = Transient

SP = stress period

KP = hydraulic conductivity of pond (feet per day)

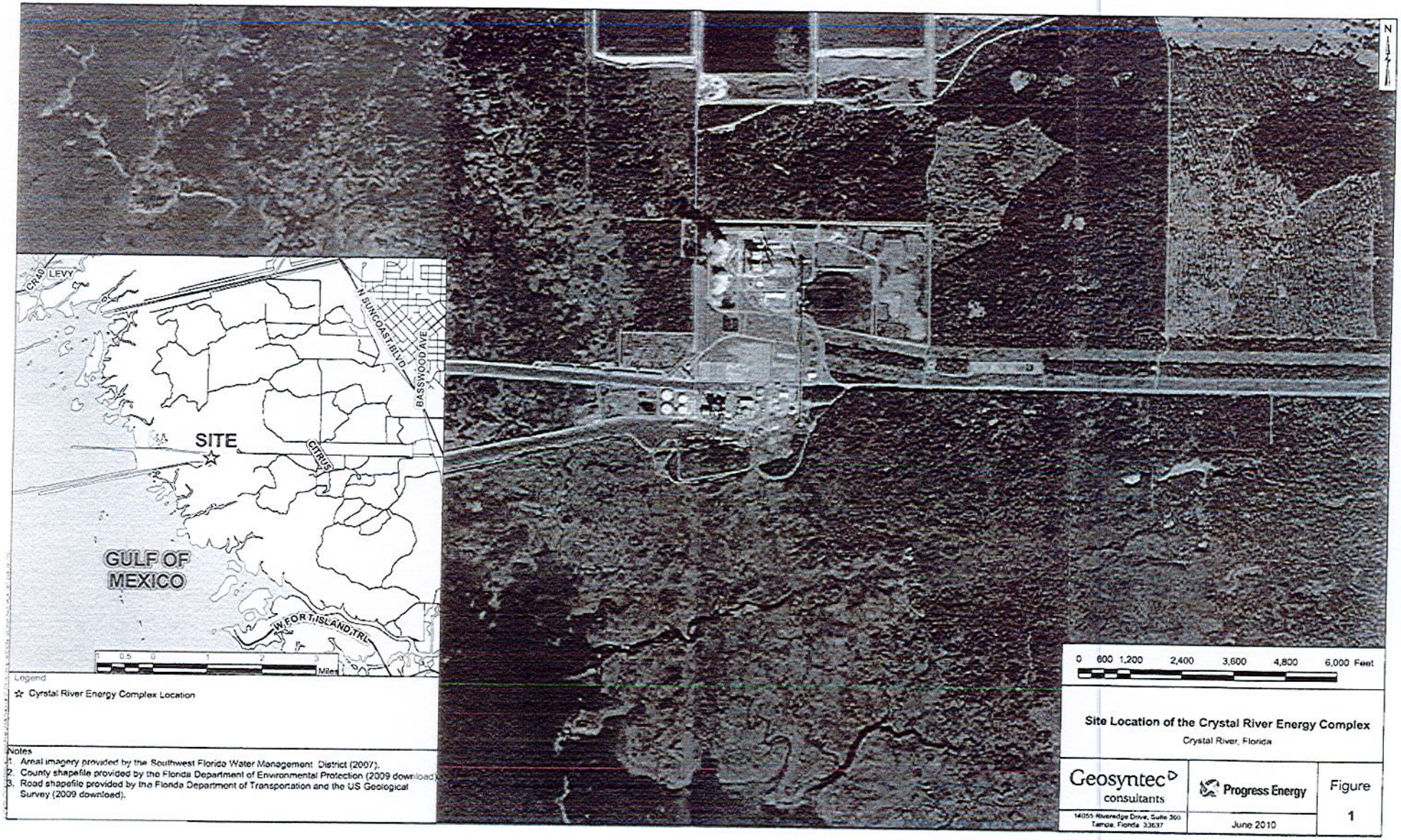
KX = horizontal hydraulic conductivity in x direction (feet per day)

MGD = million gallons per day

SL = slope

YR = year

NAVD 88 = North American Vertical Datum 1988



Legend

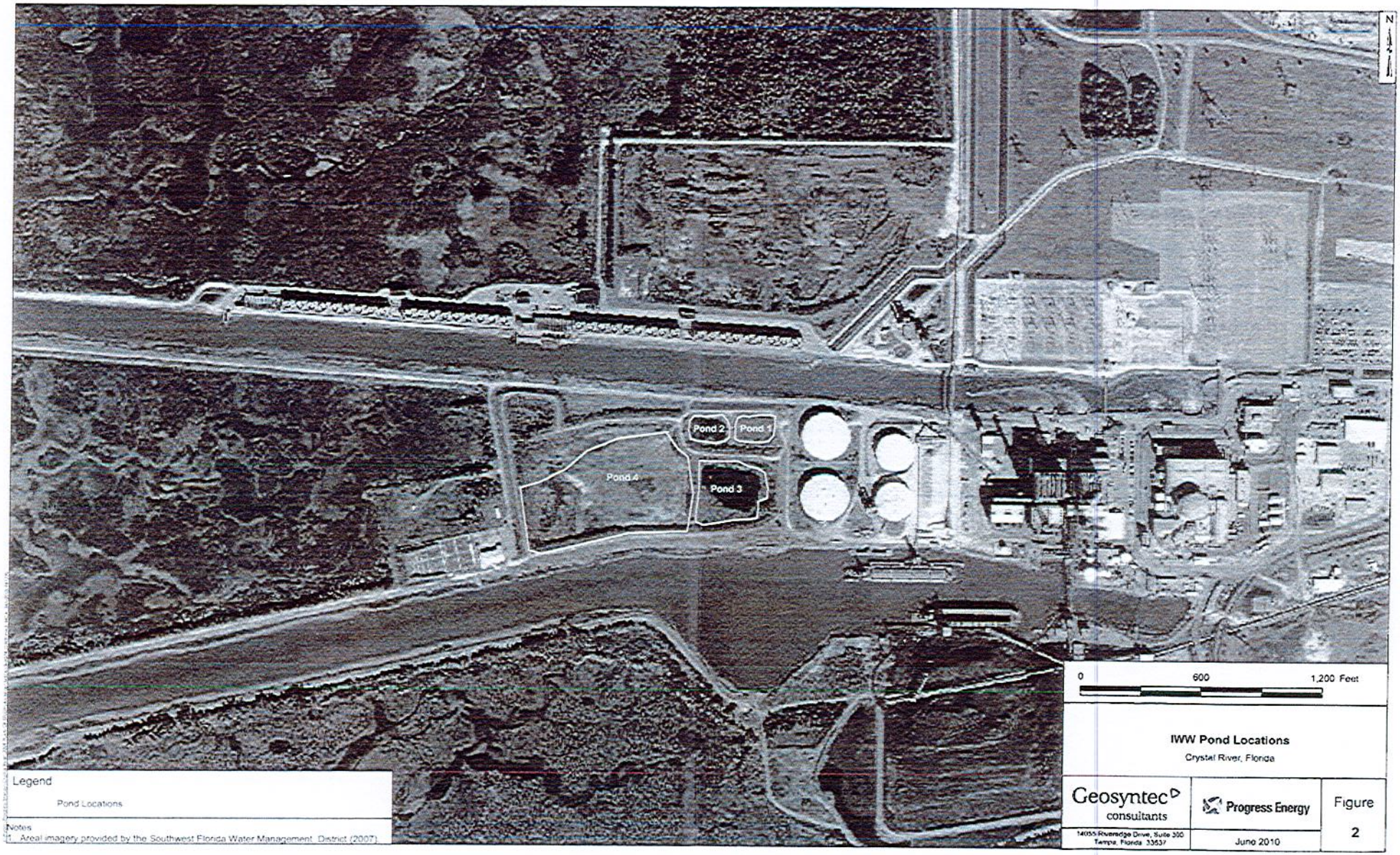
☆ Cyrstal River Energy Complex Location

Notes
1. Areal imagery provided by the Southwest Florida Water Management District (2007).
2. County shapefile provided by the Florida Department of Environmental Protection (2009 download).
3. Road shapefile provided by the Florida Department of Transportation and the US Geological Survey (2009 download).

Site Location of the Crystal River Energy Complex

Crystal River, Florida

Geosyntec consultants 14055 Riveredge Drive, Suite 300 Tampa, Florida 33637	Progress Energy June 2010	Figure 1



Legend

Pond Locations

Notes
1. Areal imagery provided by the Southwest Florida Water Management District (2007)

IWW Pond Locations

Crystal River, Florida

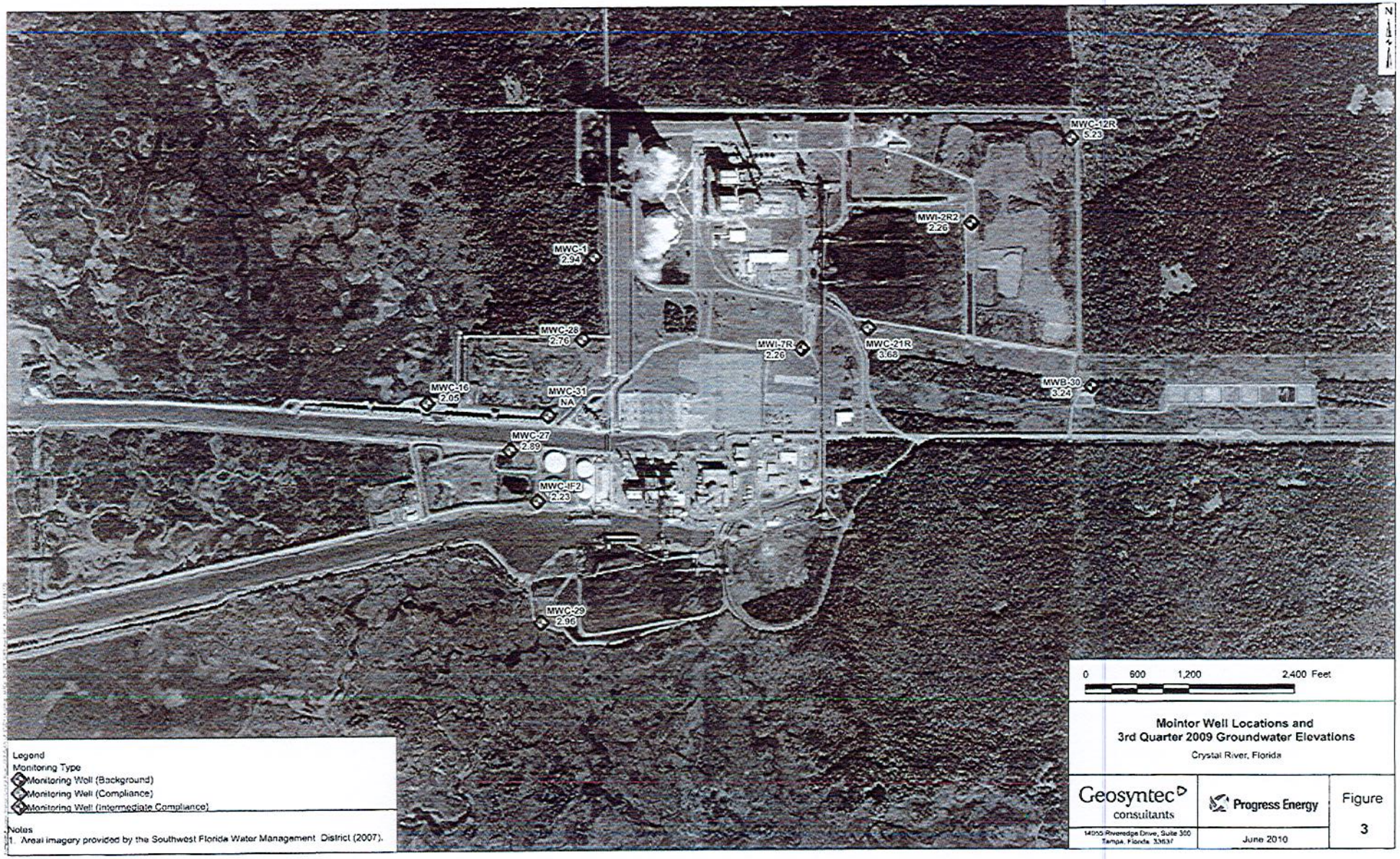
Geosyntec consultants

14055 Riverside Drive, Suite 300
Tampa, Florida 33637

Progress Energy

June 2010

Figure 2



Legend
Monitoring Type
Monitoring Well (Background)
Monitoring Well (Compliance)
Monitoring Well (Intermediate Compliance)

Notes
1. Areal imagery provided by the Southwest Florida Water Management District (2007).

Mointor Well Locations and 3rd Quarter 2009 Groundwater Elevations

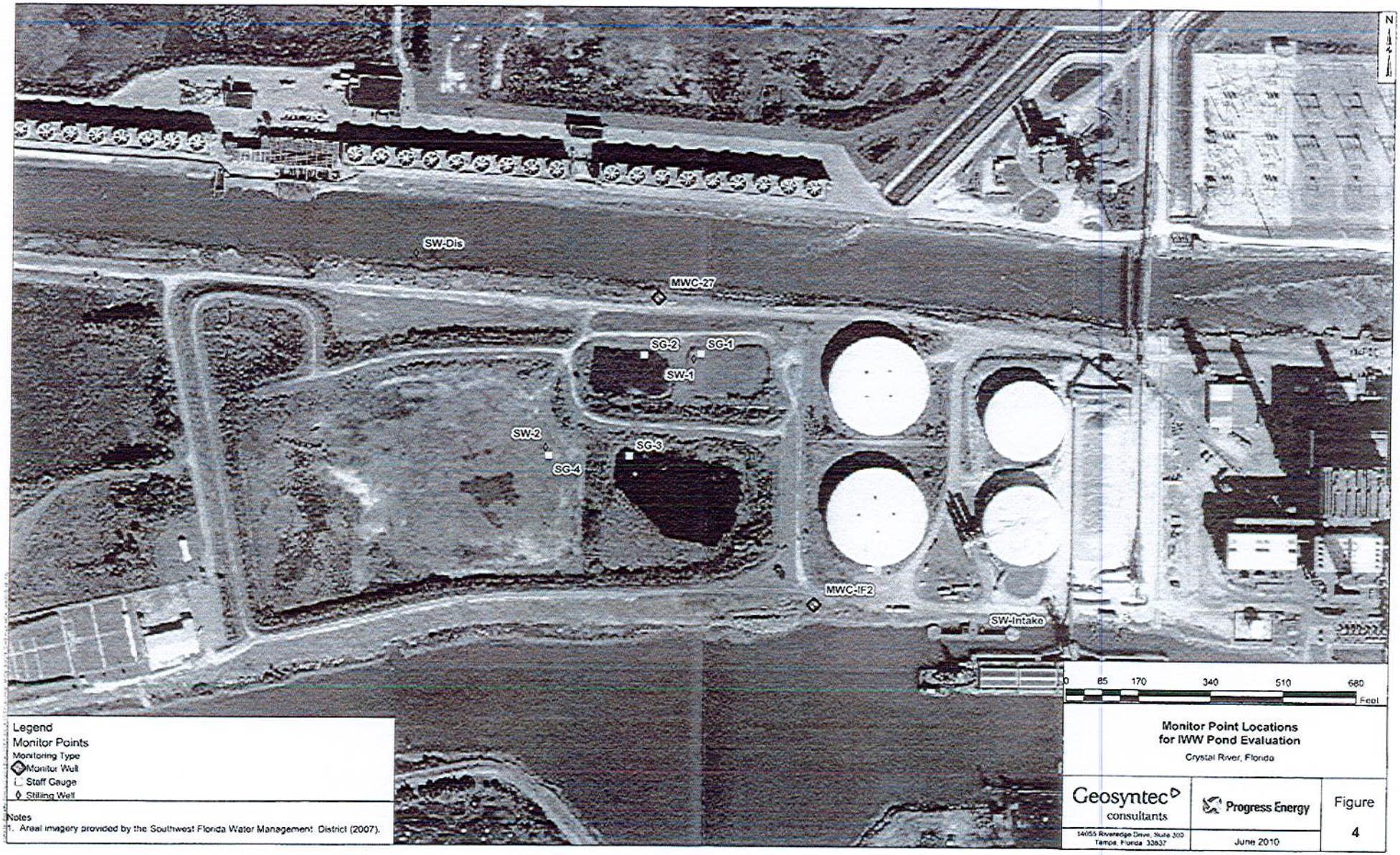
Crystal River, Florida

Geosyntec consultants
14050 Riveredge Drive, Suite 300
Tampa, Florida 33637

Progress Energy

June 2010

Figure 3



Notes
1. Areal imagery provided by the Southwest Florida Water Management District (2007).

Monitor Point Locations for IWW Pond Evaluation

Crystal River, Florida

Geosyntec consultants
14055 Riveredge Drive, Suite 300
Tampa, Florida 33637

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Figure 4

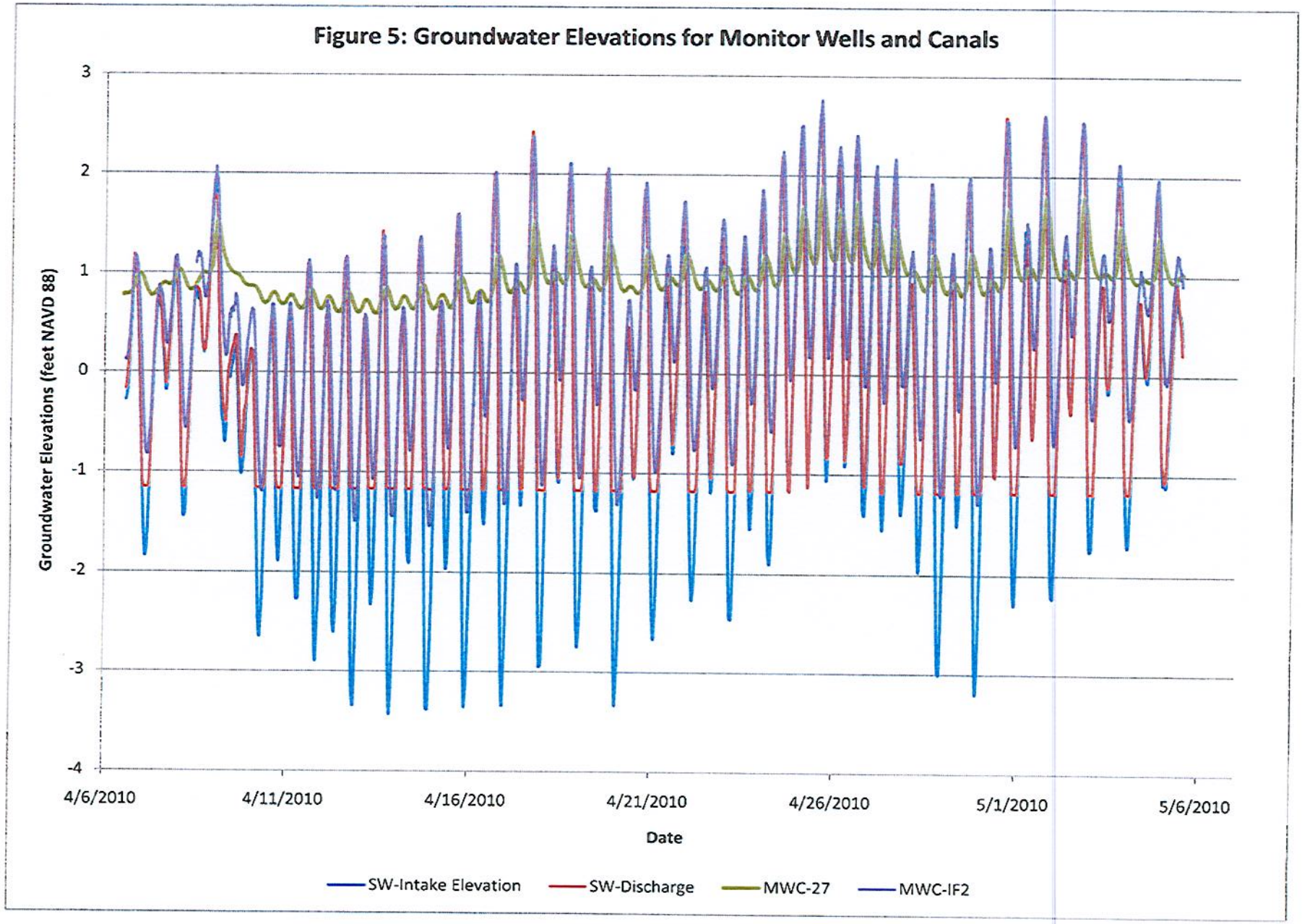
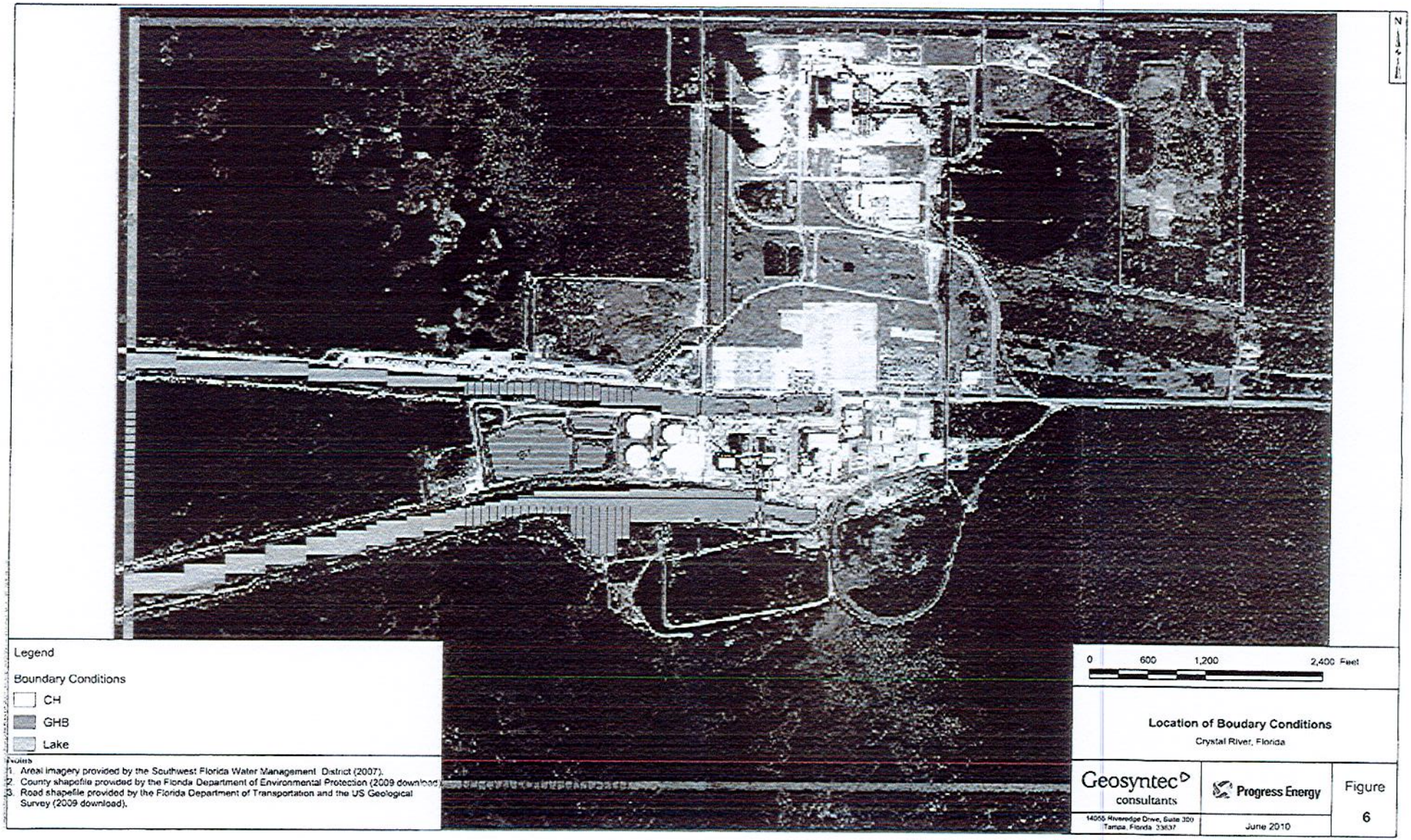


Figure 5: Groundwater Elevations for Monitor Wells and Canals
Groundwater Elevations (feet NAVD 88)
3
2
1
0
-1
-2
-3
-4
4/6/2010
4/11/2010
4/16/2010
4/21/2010
4/26/2010
5/1/2010
5/6/2010
Date
SW-Intake Elevation
SW-Discharge
MWC-27
MWC-IF2



Legend

Boundary Conditions

- CH
- GHB
- Lake

Notes

1. Areal imagery provided by the Southwest Florida Water Management District (2007).
2. County shapefile provided by the Florida Department of Environmental Protection (2009 download).
3. Road shapefile provided by the Florida Department of Transportation and the US Geological Survey (2009 download).

Location of Boudary Conditions

Crystal River, Florida

Geosyntec consultants

14055 Riveredge Drive, Suite 300
Tampa, Florida 33637

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June 2010

Figure 6

APPENDIX A

Falling Head Permeability Test Results

ATTERBERG LIMITS

AS RECEIVED WATER CONTENT	
Tare No.	
Wt. Wet Soil & Tare (gm)	256.34
Wt. Dry Soil & Tare (gm)	244.73
Wt. of Tare (gm)	51.77
Wt. of Water (gm)	11.61
Weight of Dry Soil (gm)	192.96
Moisture Content (%)	6.02

PROJECT NAME	PGN/C.R. UNITS 4&5 - CLEAN AIR PPSA/FL
PROJECT NUMBER:	083-89520
SAMPLE ID:	Citrus Spring #2
TYPE	Bulk

4 OR 3 POINT ATTERBERG

	PLASTIC LIMIT DETERMINATION			LIQUID LIMIT DETERMINATION			
Number of Blows							
Weight of Wet Soil & Tare (gm)							
Weight of Dry Soil & Tare (gm)							
Weight of Tare (gm)							
Weight of Water (gm)							
Weight of Dry Soil (gm)							
Water Content %							

PLASTIC LIMIT (PL) [ ]

LIQUID LIMIT (4 PTS) [ ] (3 PTS) [ ]

PLASTICITY INDEX (4 PTS) [ ] (3 PTS) [ ]

LIQUIDITY INDEX (4PTS) [ ] (3 PTS) [ ]

4-POINTS

3-POINTS

ONE POINT ATTERBERG

	PLASTIC LIMITS			LIQUID LIMITS			TRIAL 1	TRIAL 2
Number of Blows						BLOWS:		
Weight of Wet Soil & Tare (gm)								
Weight of Dry Soil & Tare (gm)								
Weight of Tare (gm)								
Weight of Water (gm)						K VALUE:		
Weight of Dry Soil (gm)								
Water Content %								

PLASTIC LIMIT (PL) [ ]

LIQUID LIMIT (LL) [ ]

PLASTICITY INDEX (PI) [ ]

LIQUIDITY INDEX (LI) [ ]

FOR NON-PLASTIC / OR OVEN DRIED SPECIMEN

	PLASTIC LIMITS			LIQUID LIMITS		TRIAL 1	TRIAL 2
Number of Blows							
Weight of Wet Soil & Tare (gm)							
Weight of Dry Soil & Tare (gm)							
Weight of Tare (gm)							
Weight of Water (gm)							
Weight of Dry Soil (gm)							
Water Content %							

PLASTIC LIMIT (PL) NP

LIQUID LIMIT (LL) NP [ ]

PLASTICITY INDEX (PI) NP

LIQUIDITY INDEX (LI) NP

Golder Associates Inc.

AS RECEIVED WATER CONTENT

HYDROMETER DATA ENTRY SHEET

Tare No.	
Wt. Wet Soil & Tare (gm)	256.34
Wt. Dry Soil & Tare (gm)	244.73
Wt. of Tare (gm)	51.77
Wt. of Water (gm)	11.61
Weight of Dry Soil (gm)	192.96
Moisture Content (%)	6.02

MONTH AND YEAR	JUNE 2009
PROJECT NAME	PGN C.R. UNITS 4&5 - CLEAN AIR PPSA/FL
PROJECT NUMBER:	083-89520
SAMPLE ID:	Citrus Spring #2 Depth -
TYPE	Bulk

Description: Yellowish Brown, FINE SAND, little clayey silt, trace fine gravel.

(SP-SM)

HYDROSCOPIC MOISTURE FOR SIEVE SAMPLE

Wt. Soil & Tare (gm)	43.83	256.34	Method - A (Wet preparation)
Dry Soil & Tare (gm)	43.78	244.73	Method - A (Dry preparation)
Tare Weight (gm)	1.82	51.77	Method -B (Wet preparation)
Moisture Content (%)	0.12	6.02	Method -B (Dry preparation)

LL	
PL	
PI	
LI	

TEST BY	PR/SW/TJ
DATE SET UP	6/1/09

Total Weight of Sample Used For Sieve Analysis Corrected for Hydroscopic Moisture

Wt. + Tare (gm)	18897.0 (before separating on the #4 sieve)
Tare Weight (gm)	0.00
Total Weight (gm)	17824.5

HYDROMETER ANALYSIS

Specific Gravity (ass'd)	2.65
Specific Gravity (tested)	
Amount Dispersing Agent (ml)	125.00
Type Dispersion Device	Mechanical
Length of Dispersion Period	1 Minute

cobbles	0.00	0.00
coarse gravel	0.00	
fine gravel	0.05	0.05
coarse sand	0.00	
medium sand	2.91	
fine sand	88.28	91.19
fines	8.76	
	100.00	

PLUS #4 MATERIAL SIEVE — Tare Weight: 0.00

	(Wt. + Tare)	% RETAINED	% PASSING
12.0"	0.00	0.0	100.0
3.0"	0.00	0.0	100.0
2.5"	0.00	0.0	100.0
2.0"	0.00	0.0	100.0
1.5"	0.00	0.0	100.0
1.0"	0.00	0.0	100.0
0.75"	0.00	0.0	100.0
0.50"	0.00	0.0	100.0
0.375"	4.57	0.0	100.0
#4	8.85	0.0	100.0

BACK SIEVE — Tare Weight: 0.00

				% PASSING
#10	0.00	0.0	0.00	100.0
#20	0.02	0.0	0.03	99.9
#40	1.69	1.7	2.91	97.0
#60	13.47	13.5	23.22	76.7
#100	40.48	40.5	69.79	30.2
#200	52.92	52.9	91.24	8.8

WEIGHT OF SAMPLE USED FOR HYDROMETER TEST

Wt. of Sample Wet or Dry (gm): 58.07

DATE	TIME	READING	TEMP	HYD. COR.
6/2/2009	9:48	R	T	Cc
6/2/2009	9:50	12.0	23.00	7.00
6/2/2009	9:53	11.5	23.00	7.00
6/2/2009	10:03	11.0	23.00	7.00
6/2/2009	10:18	10.5	23.00	7.00
6/2/2009	10:48	10.0	23.00	7.00
6/2/2009	13:58	10.0	23.00	7.00
6/3/2009	9:48	10.0	23.00	7.00

(mm)	%Finer
0.035	8.62
0.022	7.75
0.013	6.89
0.009	6.03
0.007	5.17
0.003	5.17
0.001	5.17

!!!!!

2.65

5

WEIGHT OF SAMPLE USED FOR HYDROMETER TEST

Calculated Dry Wt. used in test (gm)	58.00
Hydrometer Bulb Number	704004
%Pass #4 Sieve for whole sample	99.9503

HYDROMETER CALCULATIONS

ET (min)	TEMP COR K	READING R	READING C	EFFECTIVE LENGTH	A
2.00	0.013	12.00	5.00	14.3	1.00
5.00	0.013	11.50	4.50	14.5	1.00
15.00	0.013	11.00	4.00	14.5	1.00
30.00	0.013	10.50	3.50	14.7	1.00
60.00	0.013	10.00	3.00	14.7	1.00
250.00	0.013	10.00	3.00	14.7	1.00
1440.00	0.013	10.00	3.00	14.7	1.00

	X-AXIS	Y-AXIS
12.0"	304.800	100.0
3.0"	75.000	100.0
2.5"	63.500	100.0
2.0"	50.000	100.0
1.5"	37.500	100.0
1.0"	25.000	100.0
0.75"	19.000	100.0
0.50"	12.700	100.0
0.375"	9.500	100.0
#4	4.750	100.0
#10	2.000	100.0
#20	0.850	99.9
#40	0.425	97.0
#60	0.250	76.7
#100	0.150	30.2
#200	0.075	8.8
	0.0353	8.6
	0.0225	7.8
	0.0130	6.9
	0.0092	6.0
	0.0065	5.2
	0.0032	5.2
	0.0013	5.2

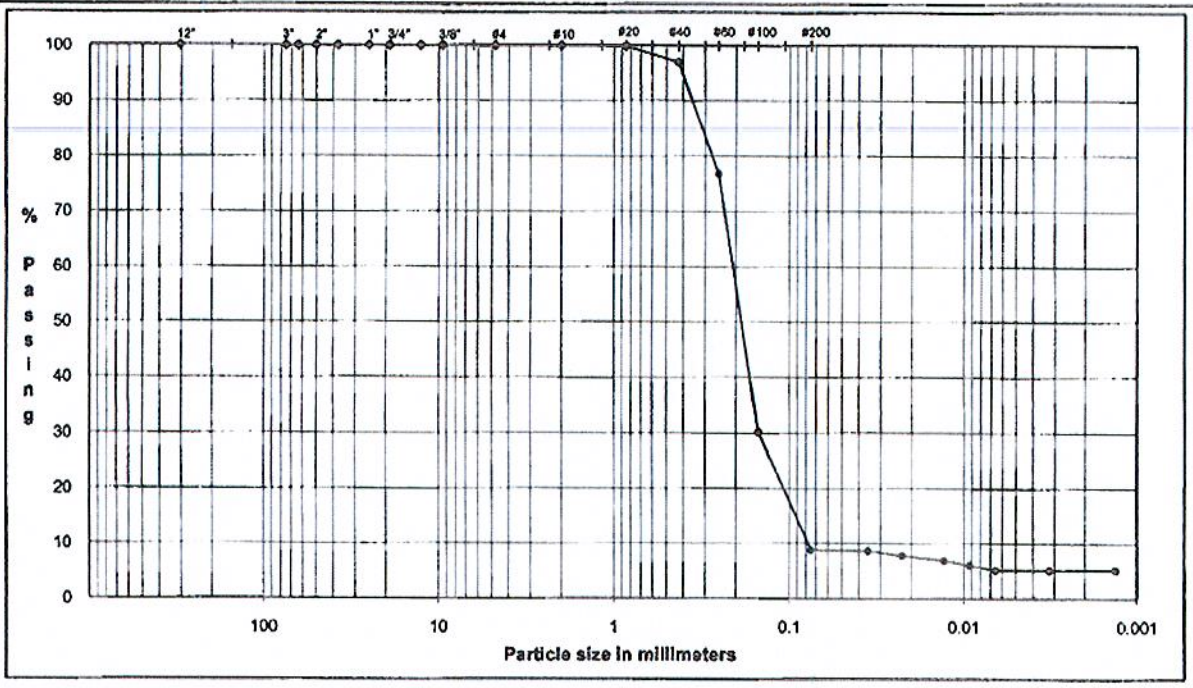
Check By:_____

JUNE 2009 083-89520

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: PGN/C.R. UNITS 4&5 - CLEAN AIR PPSA/FL
SAMPLE ID: Citrus Spring #2 Depth: -
TYPE: Bulk



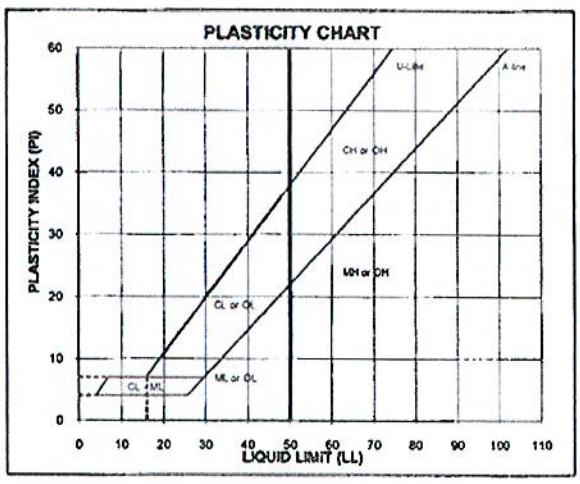
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.00
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.00
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.05
#10	2.00	100.0	Coarse Sand	0.00
#20	0.85	99.9		
#40	0.43	97.0	Medium Sand	2.91
#60	0.25	76.7		
#100	0.15	30.2		
#200	0.075	8.8	Fine Sand	88.28

Hydrometer Analysis

(mm)	%Finer		
0.035	8.6		
0.022	7.8		
0.013	6.9	Fines	
0.0092	6.0	Silt or Clay	8.76
0.0065	5.2		
0.0032	5.2		
0.0013	5.2		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
6.0				

LL (oven-dried) / < 0.75 = OR/SAND (OL/OH)	

DESCRIPTION: Yellowish Brown, FINE SAND, little clayey silt, trace fine gravel.

USCS: (SP-SM)

TECH	PR/SW/TJ
DATE	6/1/09
CHECK	
REVIEW	

MOISTURE DENSITY CURVES
ASTM D 698 & 1557

PROJECT TITLE	PGN/C.R. UNITS 4&5 - CLEAN AIR PPSA/FL		
PROJECT NUMBER	083-89520		
SAMPLE IDENTITY	Citrus Spring #2		-
SAMPLE TYPE	Bulk		

TEST TYPE: ASTM D 698 — Method A

Mold Number	2
Mold Weight (gm)	2028.00
Mold Diameter (in.)	3.999
Mold Height (in.)	4.586
Mold Volume (cu.ft.)	0.0333

TYPE COMPACTOR: Mechanical

PREPARATION: Wet Method

TYPE PROCTOR: Standard

5.5 -lbf. Rammer with 12 inch drop

Method A: 20% OR LESS RETAINED ON #4

Method B: > 20% RETAINED ON #4 AND 20% OR LESS RETAINED ON 3/8"

Method C: > 20% RETAINED ON 3/8" AND < 30% RETAINED ON 3/4"

WATER CONTENT		COARSE FRACTION	TOTAL SAMPLE
Wt Tare & Soil	(W1)		256.34
Wt Tare & Soil	(W2)		244.73
Wt Tare	(W3)		51.77
Wt Moisture	(W4=W1-W2)		11.61
Wt Dry Soil	(W5=W2-W3)		192.96
Water Content (dec)	(wc=W4/W5)		0.0602
Water Content (%)	(W4/W5)*100		6.02%

Total weight before processing and percent retained

Total weight, wet (coarse & fine)	18897.00
Total weight, dry (coarse & fine)	17824.53
Weight retained on #4 sieve (wet)	8.85
Weight retained on 3/8" sieve (wet)	
Weight retained on 3/4" sieve (wet)	
Percent retained on #4 sieve (dry)	0.05%
Percent retained on 3/8" sieve (dry)	
Percent retained on 3/4" sieve (dry)	

POINT RESULTS (FINE)		1	2	3	4	5	6	7
Wt. Soil & Mold	(W1)	3730.00	3812.00	3870.00	3819.00			
Weight of Mold	(W2)	2028.00	2028.00	2028.00	2028.00			
Wt. of Wet Soil	(W3=W1-W2)	1702.00	1784.00	1842.00	1791.00			
Wet Density, wd (pcf)	(W3/453.6*Vm)	112.57	117.99	121.82	118.45			
WATER CONTENTS								
Wt. Tare & Soil	(W4)	683.80	1880.41	1944.63	1881.69			
Wt. Tare & Soil	(W5)	655.95	1717.77	1710.82	1608.16			
Wt. Tare	(W6)	109.42	107.91	108.93	108.75			
Wt. Moisture	(W7=W4-W5)	27.85	162.64	233.81	273.53			
Wt. Dry Soil	(W8=W5-W6)	546.53	1609.86	1601.89	1499.41			
Water Content (%)	(W7/W8)*100	5.10%	10.10%	14.60%	18.24%			
Dry Density (pcf)	(wd/(1+wc))	107.1	107.2	106.3	100.2			

Maximum Dry Density (pcf)	107.9
Optimum Moisture Content (%)	10.9
Corrected Maximum Dry Density (pcf)	
Corrected Optimum Moisture (%)	

DESCRIPTION: Yellowish Brown, FINE SAND, little clayey silt, trace fine gravel.

USCS: (SP-SM)

Specific Gravity And Absorption of Coarse Aggregate - ASTM C 127

Weight of Oven Dry Sample (gm)	A			
Weight of Saturated-Surface-Dry (gm)	B			
Weight of Saturated Sample in Water (gm)	C			
Absorption of Oversize Particles (%)	[(B-A)/A]*100			
Bulk Specific Gravity	A/(B-C)			

AS-RECEIVED MOISTURE CONTENT: 6.02%

AVERAGE ABSORPTION

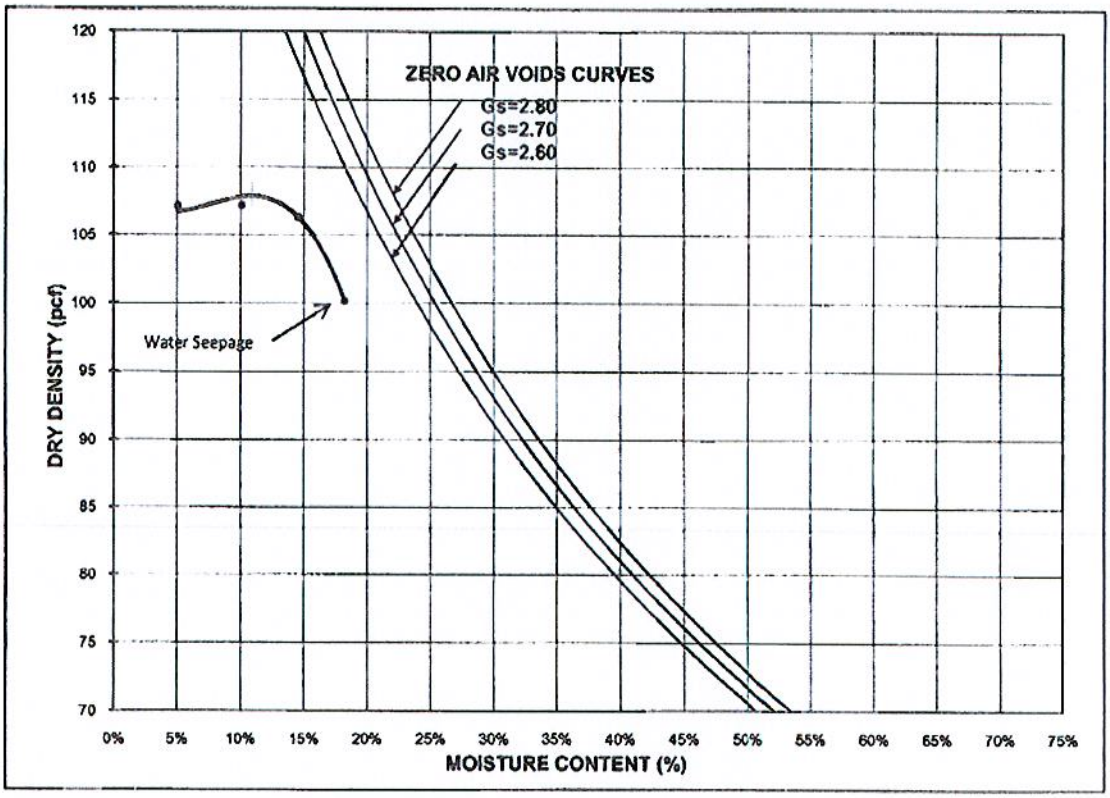
AVERAGE BULK SPECIFIC GRAVITY

TECH	BW
DATE	6/1/09
CHECK	
REVIEW	

MOISTURE / DRY DENSITY CURVE
ASTM D 698 Method A

Mechanical	Standard	Wet Method

PROJECT NAME: PGN/C.R. UNITS 4&5 - CLEAN AIR PPSA/FL
PROJECT NUMBER: 083-89520
SAMPLE ID: Citrus Spring #2 DEPTH: - SAMPLE TYPE: Bulk



COMPACTION POINTS		
Specimen Number	Dry Density (pcf)	Moisture Content (%)
1	107.1	5.1%
2	107.2	10.1%
3	106.3	14.6%
4	100.2	18.2%

Maximum Dry Density (pcf)	107.9
Optimum Moisture (%)	10.9
Corrected Maximum Dry Density (pcf)	
Corrected Optimum Moisture (%)	
As-Received Moisture Content	6.0%
% Retained on # 4 sieve	0.0%
% Retained on 3/8" sieve	
% Retained on 3/4" sieve	

DESCRIPTION: Yellowish Brown, FINE SAND, little clayey silt, trace fine gravel.

USCS: (SP-SM)

CHECK
REVIEW

FLEXIBLE WALL TRIAXIAL PERMEABILITY
ASTM D 5084
METHOD C, FALLING HEAD W/INCREASING TAIL WATER PRESSURE

PROJECT TITLE	PGN/C.R. UNITS 4&5 - CLEAN AIR PPSA/FL		Using Pipettes Only	YES	
PROJECT NUMBER	083-89520		Using Pipettes & Burettes	NO	
SAMPLE ID	Citrus Spring #2	-	BOARD# 3	TECH	TW
SAMPLE TYPE	Bulk		CELL # 3	DATE	6/4/09

COMMENTS: The sample was remolded to 94.4% of the Maximum Dry Density and OPTM +0.0%(using ASTM D698). * Sample was too soft to take final measurements

Sample Data, Initial	
Height, inches	3.000
Diameter, inches	2.790
Area, cm^2	39.44
Volume, cm^3	300.55
Mass, g	543.90
Moisture Content, %	10.94
Dry Density, pcf	101.78
Spec. Gravity	2.649
Volume Solids, cm^3	185.07
Volume Voids, cm^3	115.48
Void Ratio	0.62
Saturation	46.5%

B-Value,f	0.95
Cell Pres	102.0
Bot. Pres.	100.0
Top Pres.	100.0
Head, cm	0.00
Max. Grad.	3.20
Min. Grad.	0.68
Max. E.S.	2.00
Min. E.S.	2.00

Sample Data, Final		
Height, inches	3.000	*
Diameter, inches	2.790	*
Area, cm^2	39.44	
Volume, cm^3	300.55	
Mass, g	590.00	
Moisture Content %	20.35	
Dry Density, pcf	101.78	
Saturation	86.4%	
Inflow Volume per (1 cc)	1.00	
Outflow Volume per (1 cc)	1.00	

PERMEANT: Deaired Tap Water

Water Contents	Initial	Final
Wt soil&tare, i	543.90	577.31
Wt soil&tare, f	490.25	481.11
Wt Tare	0.00	8.30
Wt Moisture Lost	53.65	96.20
Wt Dry Soil	490.25	472.81
Water Content	10.94%	20.35%

DESCRIPTION: Yellowish Brown, FINE SAND, little clayey silt, trace fine gravel.

USCS: (SP-SM)

TIME FUNCTION			READINGS			TIME IN MINUTES & SECONDS						VOLUME		PERMEABILITY
DATE	HOUR	MIN	Inflow (cc)	Outflow (cc)	Temp.	dt (min)	dt (sec)	dt, acc (sec)	Head (cm)	(H1/H2) (inc.)	Gradient	Inflow (cc)	Outflow (cc)	@ 20 Degrees C (cm/sec)
06/04/09	9	56.0	0.0	25.0	22.4	0.0	0.0	0	24.42		3.20	0.00	0.00	0.0
06/04/09	9	56.5	3.3	21.5	22.4	0.5	30	30	17.79	1.37	2.33	3.30	3.50	9.7E-04
06/04/09	9	57.0	5.7	19.2	22.4	0.5	30	60	13.21	1.35	1.73	2.40	2.30	9.1E-04
06/04/09	9	57.5	7.5	17.3	22.4	0.5	30	90	9.60	1.38	1.26	1.80	1.90	9.7E-04
06/04/09	9	58.0	8.8	16.0	22.4	0.5	30	120	7.07	1.36	0.93	1.30	1.30	9.4E-04
06/04/09	9	58.5	9.8	15.1	22.4	0.5	30	150	5.22	1.35	0.68	1.00	0.90	9.3E-04
06/04/09	10	7.0	0.0	25.0	22.4	8.5	510	660	24.42	0.21	3.20	0.00	0.00	-
06/04/09	10	7.5	3.3	21.6	22.4	0.5	30	690	17.89	1.37	2.35	3.30	3.40	9.5E-04
06/04/09	10	8.0	5.7	19.2	22.4	0.5	30	720	13.21	1.35	1.73	2.40	2.40	9.3E-04 *
06/04/09	10	8.5	7.5	17.3	22.4	0.5	30	750	9.60	1.38	1.26	1.80	1.90	9.7E-04 *
06/04/09	10	9.0	8.8	16.0	22.4	0.5	30	780	7.07	1.36	0.93	1.30	1.30	9.4E-04 *
06/04/09	10	9.5	9.8	15.1	22.4	0.5	30	810	5.22	1.35	0.68	1.00	0.90	9.3E-04 *

Inflow Rate	0.0242
Outflow Rate	0.0244
Outflow/Inflow Ratio	1.01

PERMEABILITY REPORTED AS 9.4E-04 cm/sec

DATE 6/4/09

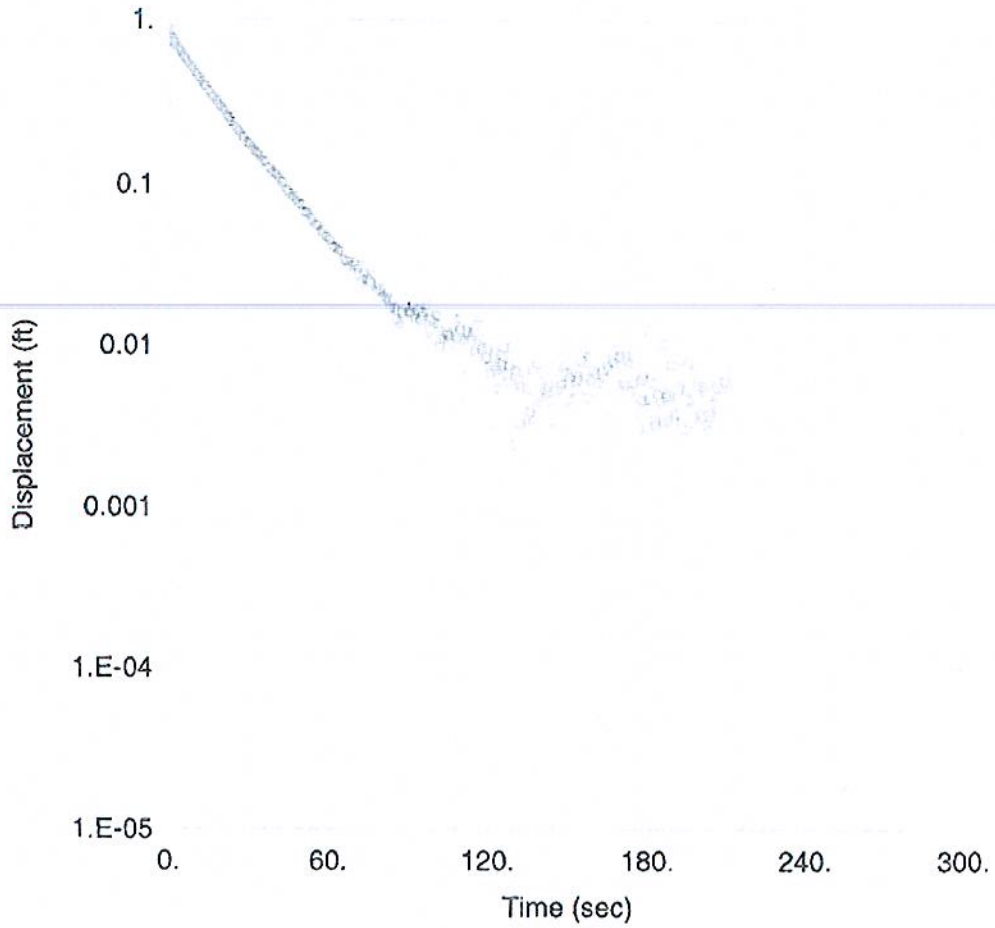
CHECK

REVIEW

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

APPENDIX B

Slug Test Analysis



SLUG 3

Data Set: J:\...\MW-IF2 S3_BR.aqt
Date: 06/16/10 Time: 16:40:29

PROJECT INFORMATION

Company: Geosyntec
Client: Progress Energy Florida
Project: FW1819
Test Location: Crystal River, FL
Test Well: MW-IF2
Test Date: 4/6/2010

AQUIFER DATA

Saturated Thickness: 6.8 ft
Anisotropy Ratio (Kz/Kr): 1.

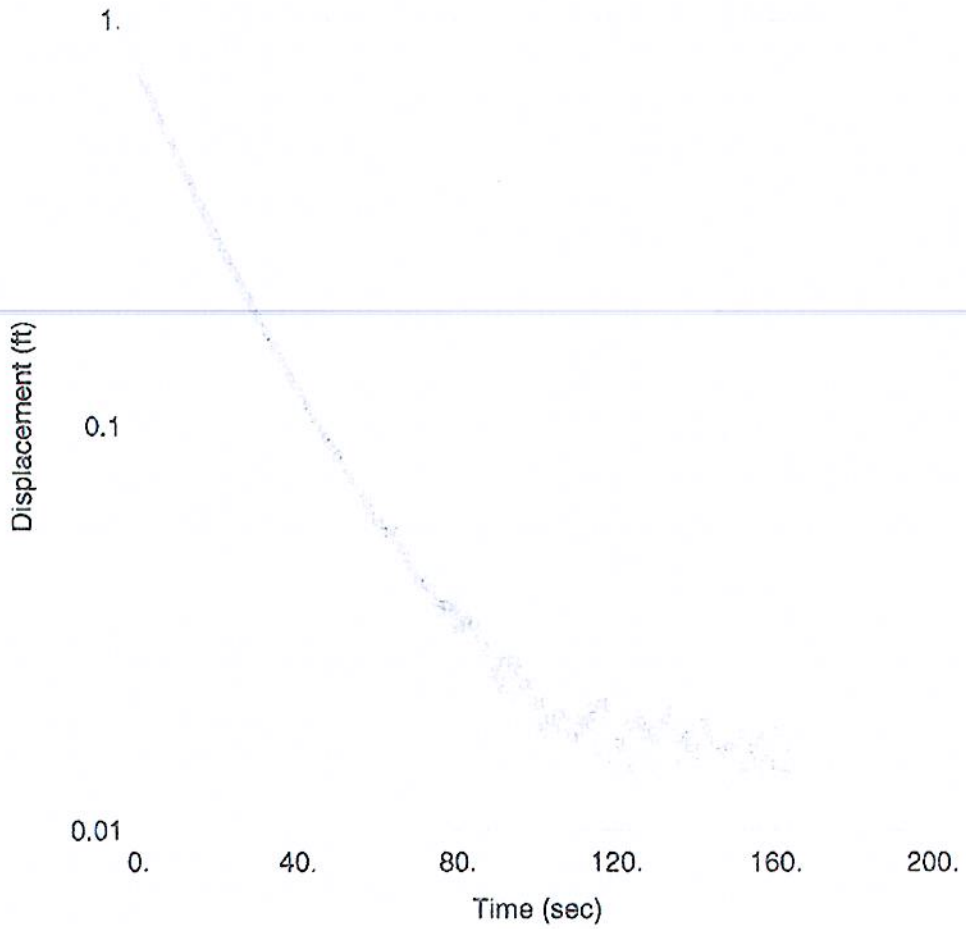
WELL DATA (MW-IF2)

Initial Displacement: 0.86 ft
Wellbore Radius: 0.167 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.167 ft
Well Skin Radius: 0.5 ft
Total Well Penetration Depth: 6.8 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0001971 ft/sec
y0 = 0.7796 ft



SLUG 1

Data Set: J:\...\MW-IF2 S1_BR.aqt
Date: 06/16/10 Time: 16:41:39

PROJECT INFORMATION

Company: Geosyntec
Client: Progress Energy Florida
Project: FW1829
Test Location: Crystal River, FL
Test Well: MW-IF2
Test Date: 4/6/2010

AQUIFER DATA

Saturated Thickness: 17.25 ft
Anisotropy Ratio (Kz/Kr): 1.

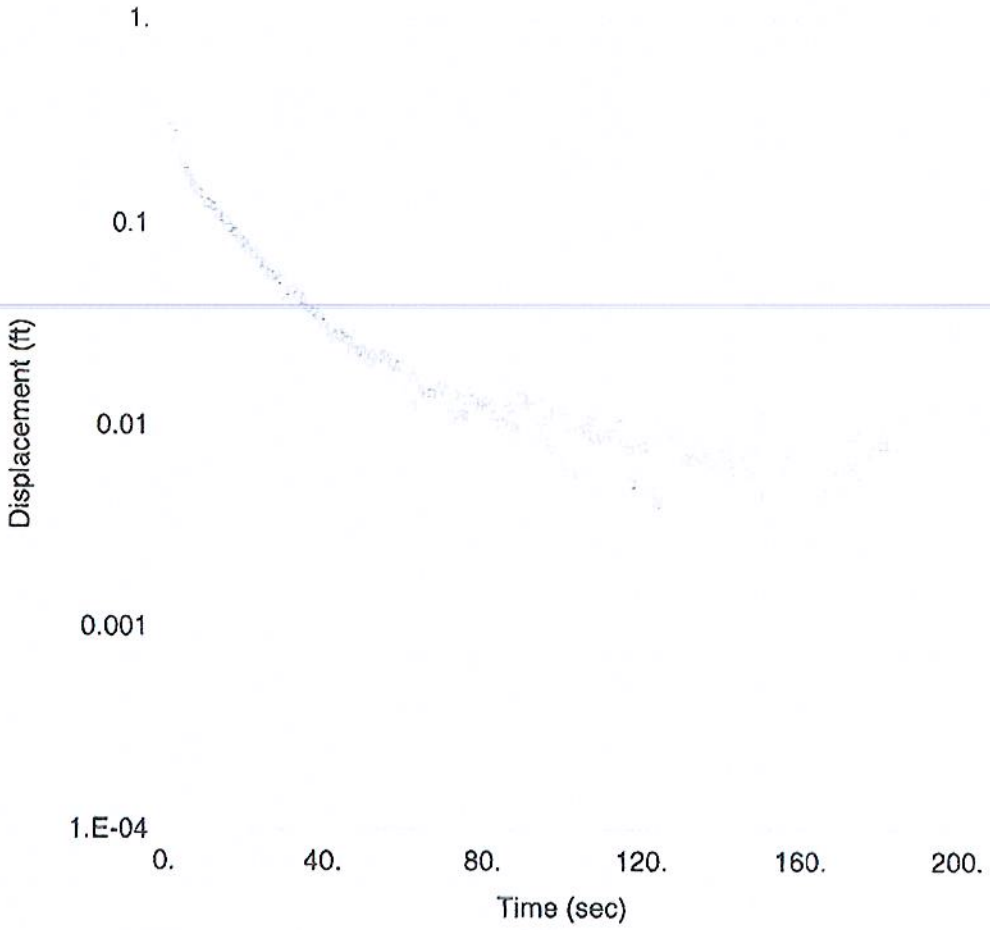
WELL DATA (MW-IF2)

Initial Displacement: 0.83 ft
Wellbore Radius: 0.167 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.167 ft
Well Skin Radius: 0.5 ft
Total Well Penetration Depth: 6.8 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0001585 ft/sec
y0 = 0.7398 ft



SLUG-3

Data Set: J:\...\MW-27 S3_HV.aqt
Date: 06/16/10 Time: 16:41:43

PROJECT INFORMATION

Company: Geosyntec
Client: Progress Energy Florida
Project: FW1829
Test Location: Crystal River, FL
Test Well: MW-27
Test Date: 4/6/2010

AQUIFER DATA

Saturated Thickness: 3. ft
Anisotropy Ratio (Kz/Kr): 1.

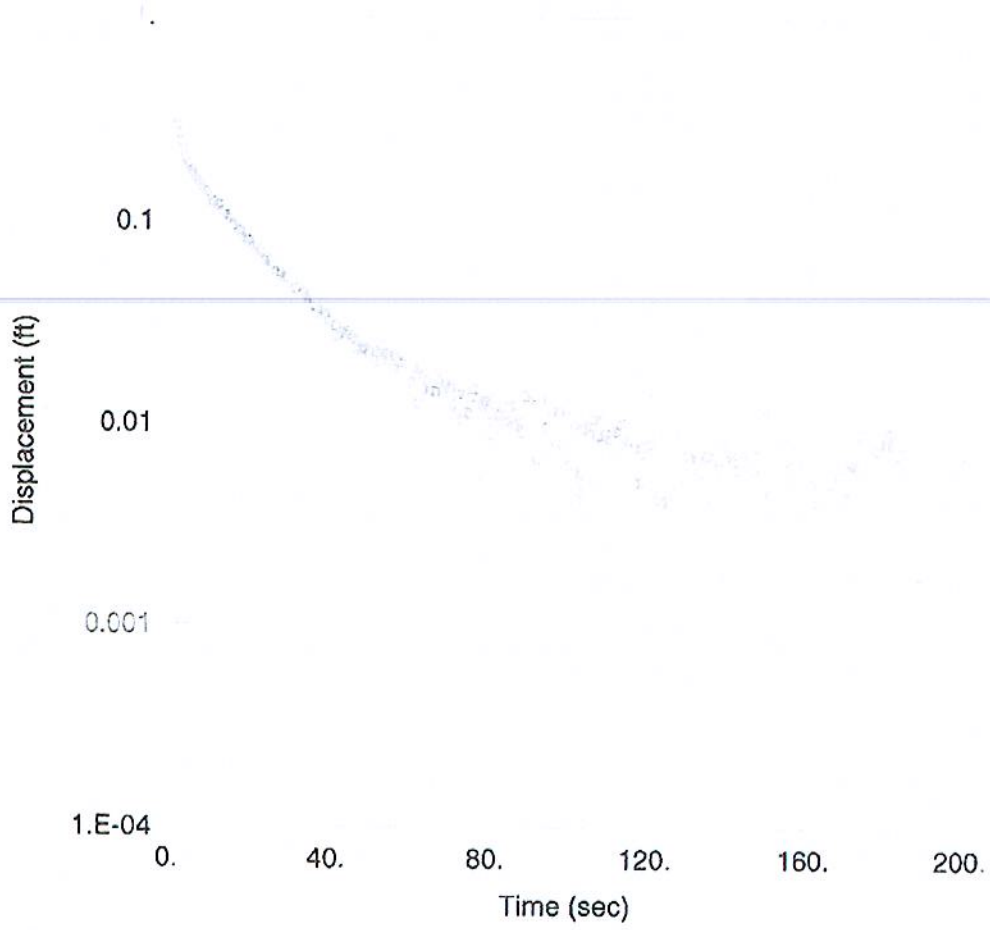
WELL DATA (MW-27)

Initial Displacement: 0.62 ft
Wellbore Radius: 0.167 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.167 ft
Well Skin Radius: 0.5 ft
Total Well Penetration Depth: 3. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 0.0002556 ft/sec
y0 = 0.2122 ft



Data Set: J:\...\MW-27 S3_BR.aqt
Date: 06/16/10 Time: 16:41:47

PROJECT INFORMATION

Company: Geosyntec
Client: Progress Energy Florida
Project: FW1829
Test Location: Crystal River, FL
Test Well: MW-27
Test Date: 4/6/2010

AQUIFER DATA

Saturated Thickness: 3. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-27)

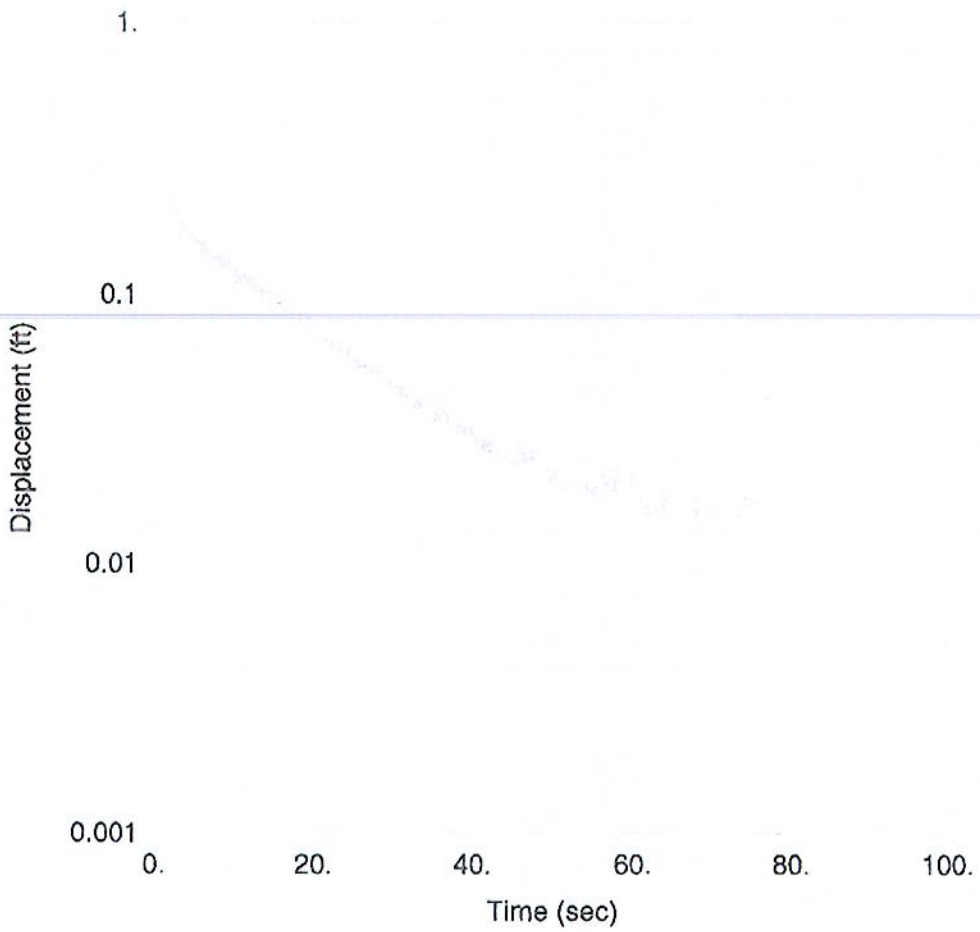
Initial Displacement: 0.62 ft
Wellbore Radius: 0.167 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3

Casing Radius: 0.167 ft
Well Skin Radius: 0.5 ft
Total Well Penetration Depth: 3. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0001532 ft/sec
y0 = 0.2253 ft



SLUG 2

Data Set: J:\...\MW-27 S2_HV.aqt
Date: 06/16/10 Time: 16:41:51

PROJECT INFORMATION

Company: Geosyntec
Client: Progress Energy Florida
Project: FW1829
Test Location: Crystal River, FL
Test Well: MW-27
Test Date: 4/6/2010

AQUIFER DATA

Saturated Thickness: 3. ft
Anisotropy Ratio (Kz/Kr): 1.

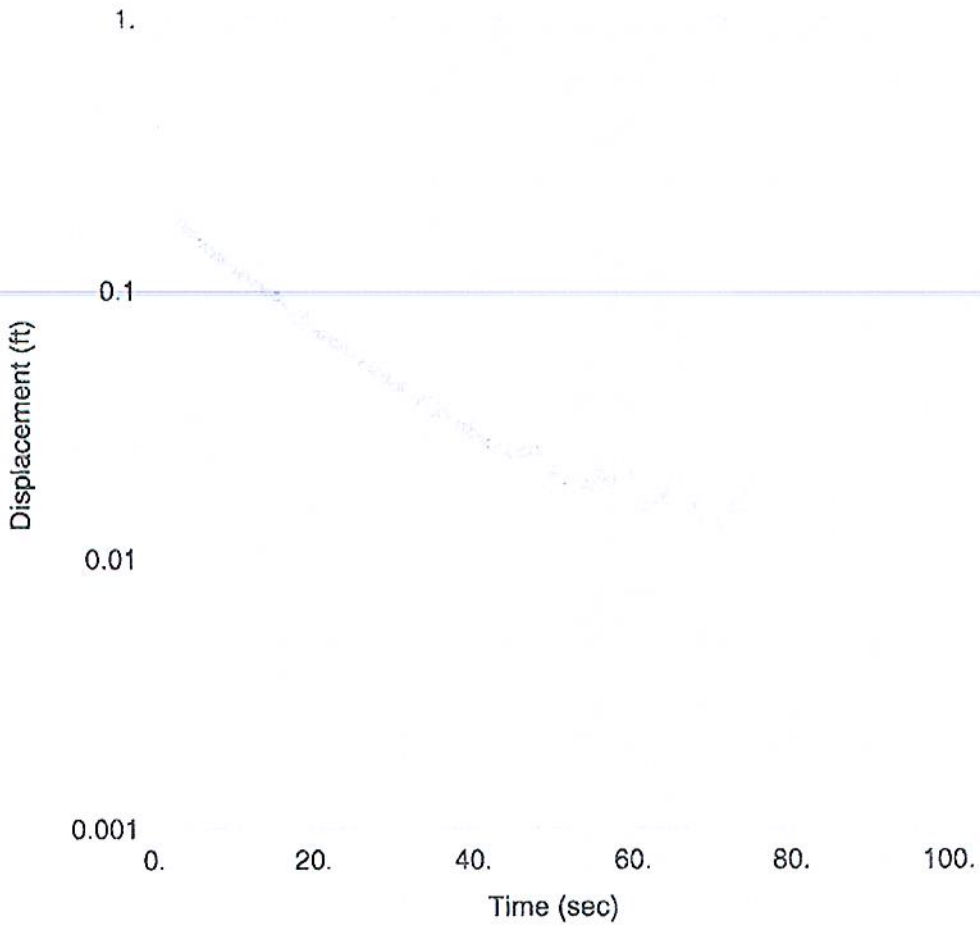
WELL DATA (MW-27)

Initial Displacement: 0.5 ft
Wellbore Radius: 0.167 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.167 ft
Well Skin Radius: 0.5 ft
Total Well Penetration Depth: 3. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 0.0002681 ft/sec
y0 = 0.2004 ft



SLUG 2

Data Set: J:\...\MW-27 S2_BR.aqt
Date: 06/16/10 Time: 16:41:54

PROJECT INFORMATION

Company: Geosyntec
Client: Progress Energy Florida
Project: FW1829
Test Location: Crystal River, FL
Test Well: MW-27
Test Date: 4/6/2010

AQUIFER DATA

Saturated Thickness: 3. ft
Anisotropy Ratio (Kz/Kr): 1.

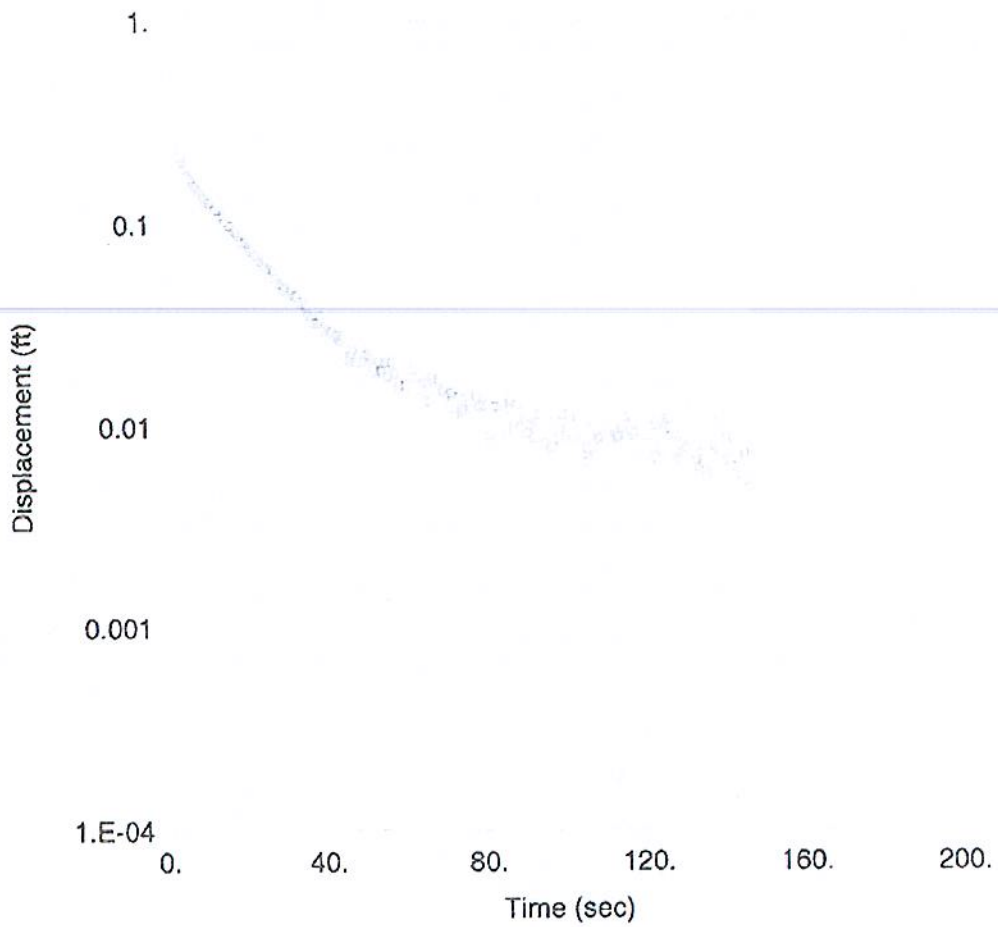
WELL DATA (MW-27)

Initial Displacement: 0.5 ft
Wellbore Radius: 0.167 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.167 ft
Well Skin Radius: 0.5 ft
Total Well Penetration Depth: 3. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0001529 ft/sec
y0 = 0.2018 ft



SLUG 1

Data Set: J:\...\MW-27 S1_HV.aqt
Date: 06/16/10 Time: 16:41:58

PROJECT INFORMATION

Company: Geosyntec
Client: Progress Energy Florida
Project: FW1829
Test Location: Crystal River, Fl
Test Well: MW-27
Test Date: 4/6/2010

AQUIFER DATA

Saturated Thickness: 3. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-27)

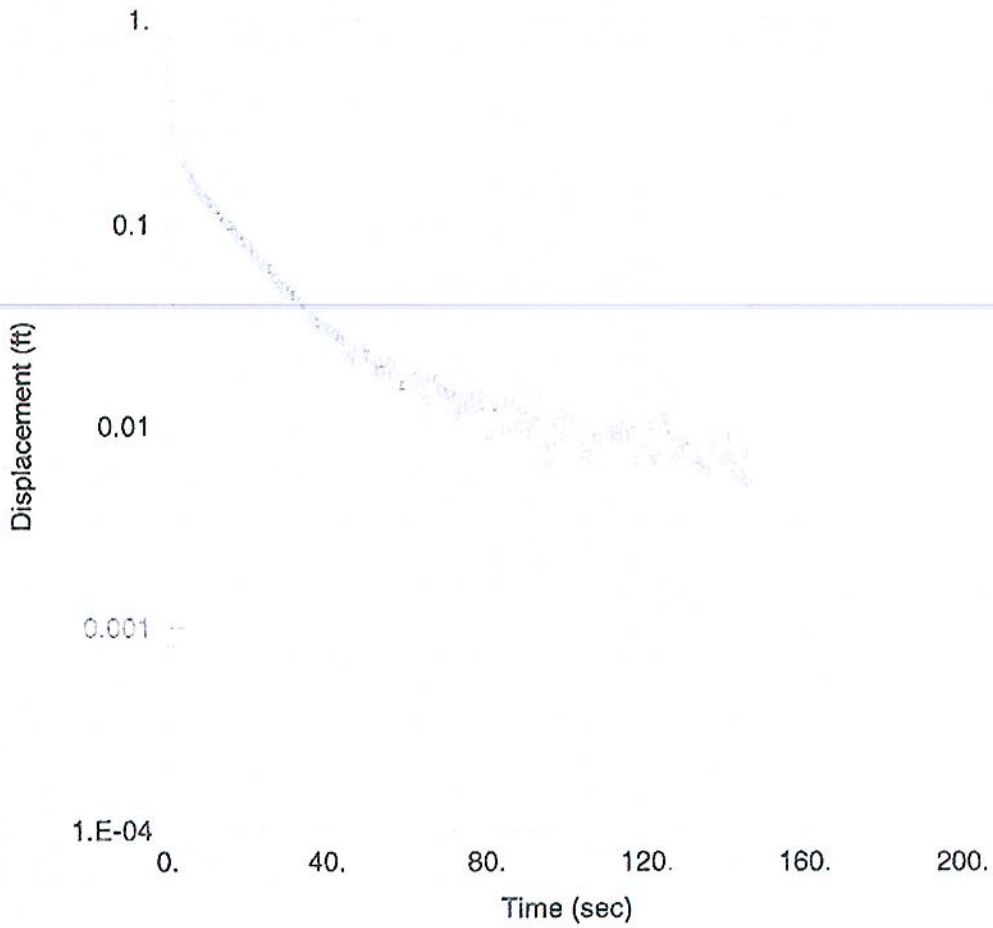
Initial Displacement: 0.56 ft
Wellbore Radius: 0.167 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3

Casing Radius: 0.167 ft
Well Skin Radius: 0.5 ft
Total Well Penetration Depth: 3. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 0.0002972 ft/sec
y0 = 0.24 ft



SLUG 1

Data Set: J:\...\MW-27 S1_BR.aqt
Date: 06/16/10 Time: 16:42:02

PROJECT INFORMATION

Company: Geosyntec
Client: Progress Energy Florida
Project: FW1829
Test Location: Crystal River, Fl
Test Well: MW-27
Test Date: 4/6/2010

AQUIFER DATA

Saturated Thickness: 3. ft
Anisotropy Ratio (Kz/Kr): 1.

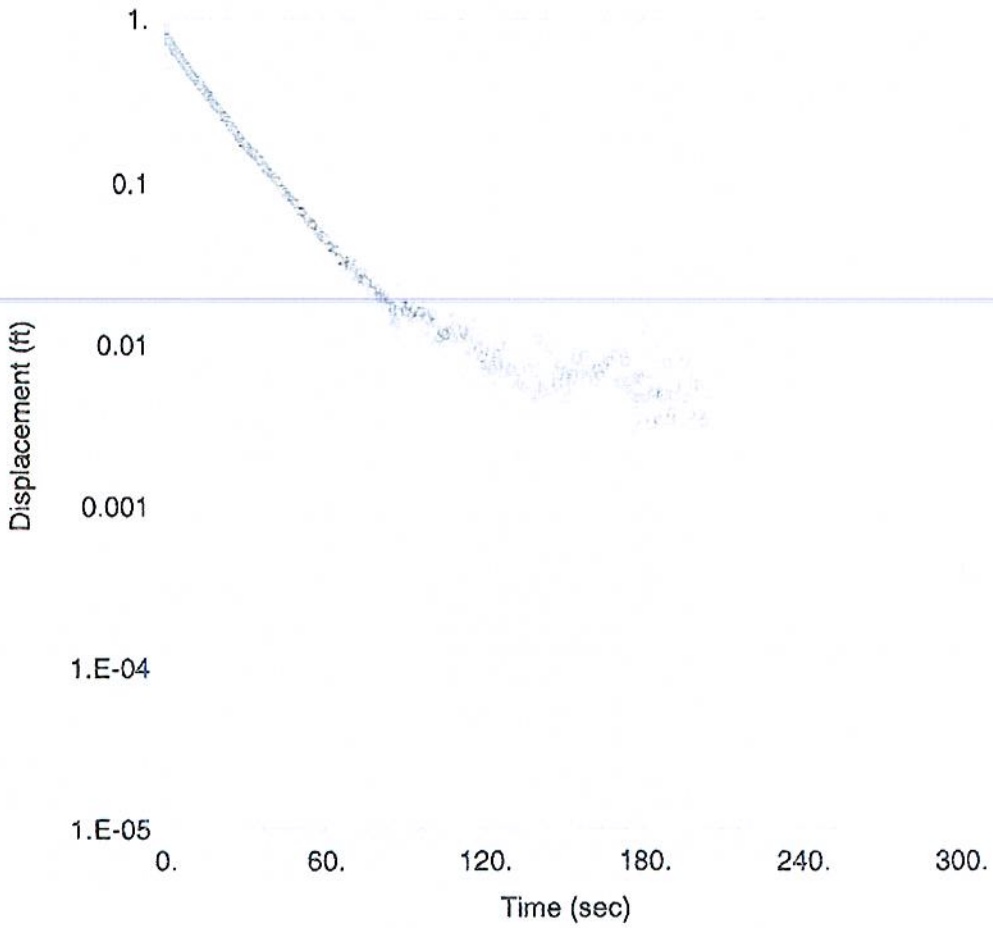
WELL DATA (MW-27)

Initial Displacement: 0.56 ft
Wellbore Radius: 0.167 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.167 ft
Well Skin Radius: 0.5 ft
Total Well Penetration Depth: 3. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0001724 ft/sec
y0 = 0.2398 ft



SLUG 3

Data Set: J:\...\MW-IF2 S3_HV.aqt
Date: 06/16/10 Time: 16:42:06

PROJECT INFORMATION

Company: Geosyntec
Client: Progress Energy Florida
Project: FW1819
Test Location: Crystal River, FL
Test Well: MW-IF2
Test Date: 4/6/2010

AQUIFER DATA

Saturated Thickness: 6.8 ft
Anisotropy Ratio (Kz/Kr): 1.

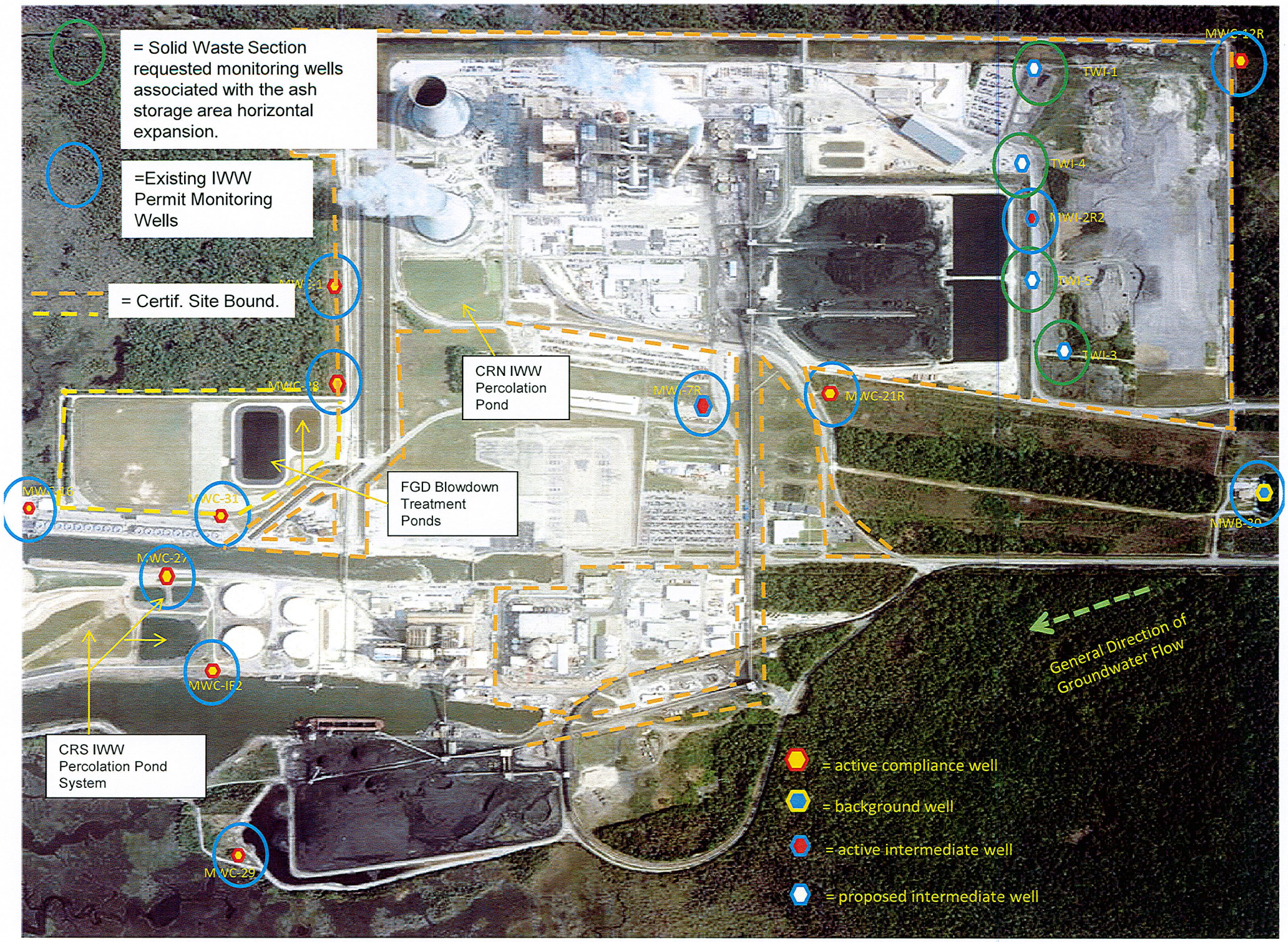
WELL DATA (MW-IF2)

Initial Displacement: 0.86 ft
Wellbore Radius: 0.167 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.167 ft
Well Skin Radius: 0.5 ft
Total Well Penetration Depth: 6.8 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 0.0002796 ft/sec
y0 = 0.7796 ft


= Solid Waste Section requested monitoring wells associated with the ash storage area horizontal expansion.
=Existing IWW Permit Monitoring Wells
= Certif. Site Bound.
CRN IWW Percolation Pond
FGD Blowdown Treatment Ponds
CRS IWW Percolation Pond System
MWC-12R
TWI-1
TWI-4
MWI-2R2
TWI-5
TWI-3
MWC-21R
MWC-7R
MWC-8
MWC-31
MWC-27
MWC-IF2
MWC-29
General Direction of Groundwater Flow
= active compliance well
= background well
= active intermediate well
= proposed intermediate well

FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION
Southwest District Office
13051 North Telecom Parkway
Temple Terrace, Florida 33637-0926

Charlie Crist
Governor

Jeff Kottkamp
Lt. Governor

Michael W. Sole
Secretary

STATE OF FLORIDA
INDUSTRIAL WASTEWATER FACILITY PERMIT

PERMITTEE:
Progress Energy Florida, Inc.
P. O. Box 14042 MAC PEF-903
St. Petersburg, FL 33701-5501

PERMIT NUMBER: FLA016960
PA FILE NUMBER: FLA016960-002-IW1N/NR
ISSUANCE DATE: January 9, 2007
PA FILE NUMBER: FLA016960-006-IWB/MR
REVISION DATE: November 17, 2009
EXPIRATION DATE: January 8, 2012

RESPONSIBLE AUTHORITY:

Mr. Larry E. Hatcher
Plant Manager
Larry.Hatcher@pgnmail.com

FACILITY:

Crystal River Energy Complex
15760 West Powerline Street
Crystal River, FL 34428
Citrus County

Latitude: 28° 57' 27" N Longitude: 82° 42' 36" W

This permit is issued under the provisions of Chapter 403, Florida Statutes (F.S.) and applicable rules of the Florida Administrative Code (F.A.C.). This permit is accompanied by an Administrative Order pursuant to Paragraphs 403.088(2) (e) and (f), Florida Statutes. Compliance with Administrative Order AO-114-SW is a specific requirement of this permit. The above named permittee is hereby authorized to operate the facilities shown on the application and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

The Crystal River Energy Complex is a steam electric power generation facility consisting of five units. Units 1, 2 4, and 5 are coal-fired while Unit #3 is a nuclear-powered unit. Units 3, 4 and 5 are certified pursuant to Power Plant Siting Act.

WASTEWATER TREATMENT:

The neutralized wastes are discharged into a percolation pond system consisting of three ponds. Ponds #1 and #2 are operated in parallel. The ponds act as settling basins and the settled effluent from either pond is routed to Pond #3 which overflows into an area called "South Pond Expansion" (7.16 acres) for percolation. The South Pond Expansion area has the capability to hold the wastewater as well as direct rainfall resulting from a 25-year 24-hour storm in the 13.6-acre pond catchment area. The sources of wastewater include power plant equipment drains, laboratory drains, floor drains, neutralized regeneration wastes from the demineralizer resin beds, wastewater from the water treatment process (carbon and media filter backwash, and lime sludge) boiler blowdown, boiler drains (chemical cleanings), air pre-heater wash drains, sewage treatment plant effluents, stormwater drainage from the transformer area, blowdown from the Flue Gas Desulfurization, precipitator washes, boiler washes, cooling water blowdown, and reverse osmosis/micro filtration concentrate.

EFFLUENT DISPOSAL:

Land Application:

An existing 0.76 MGD monthly average daily flow (MADF) land application system (G-001) consisting of percolation pond. Land application system G-001 is located approximately at latitude 28° 57' 27" N, longitude 82° 42' 36" W.

IN ACCORDANCE WITH: The limitations, monitoring requirements and other conditions as set forth in Part I through Part VIII on pages 3 through 19 of this permit.

I. Effluent Limitations and Monitoring Requirements

A. Surface Water Discharges

1. This section is not applicable to this facility.

B. Underground Injection Control Systems

1. This section is not applicable to this facility.

C. Land Application Systems

1. During the period beginning on the issuance date and lasting through the expiration date of this permit, the permittee is authorized to discharge process wastewater, non process wastewater, power plant equipment drains, laboratory drains, floor drains, neutralized regeneration wastes from the demineralizer resin beds, wastewater from the water treatment process (carbon and media filter backwash, and lime sludge) boiler blowdown, boiler drains (chemical cleanings), air pre-heater wash drains, sewage treatment plant effluents, stormwater drainage from the transformer area, blowdown from the Flue Gas Desulfurization, precipitator washes, boiler washes, cooling water blowdown, and reverse osmosis/micro filtration concentrate to Land Application System G-001, a percolation pond. Such discharge shall be limited and monitored by the permittee as specified below and reported in accordance with condition I.E.1.:

	Discharge Limitations			Monitoring Requirements		
Parameters (units)	**Monthly Average**	**Daily Maximum**	**Daily Minimum**	**Monitoring Frequency**	**Sample Type**	**Sample Point**
Flow (MGD)	0.76	Report	--	Daily	Calculated	FLW-3
Flow (MGD)	--	Report	--	Daily	Meter	FLW-1
Flow (MGD)	--	Report	--	Daily	Meter	FLW-2
Water Level Relative to NGVD	--	Report See Cond. I.C.5	--	Weekly	In-situ	OTH-1
Water Level Relative to NGVD	--	Report See Cond. I.C.5	--	Weekly	In-situ	OTH-2
Water Level Relative to NGVD	--	Report See Cond. I.C.5	--	Weekly	In-situ	OTH-3
pH (SU)	--	Report	Report	Quarterly	In-situ	EFF-1 EFF-2
Solids, Total Dissolved (TDS) (MG/L)	--	Report	--	Quarterly	Grab	EFF-1 EFF-2

PERMITTEE: Progress Energy Florida, Inc. PA FILE NUMBER: FLA016960-006-IWB/MR
FACILITY: Crystal River Energy Complex

	Discharge Limitations			Monitoring Requirements		
Parameters (units)	**Monthly Average**	**Daily Maximum**	**Daily Minimum**	**Monitoring Frequency**	**Sample Type**	**Sample Point**
Specific Conductance (UMHO/CM)	--	Report	--	Quarterly	In-situ	EFF-1 EFF-2
Oil and Grease (MG/L)	--	Report	--	Quarterly	Grab	EFF-1 EFF-2
Nitrogen, Nitrate, Total (as N) (MG/L)	--	Report	--	Quarterly	Grab	EFF-1 EFF-2
Chloride (as Cl) (MG/L)	--	Report	--	Quarterly	Grab	EFF-1 EFF-2
Cyanide, Total (MG/L)	--	Report	--	Quarterly	Grab	EFF-1 EFF-2
Alpha, Gross Particle Activity (PCI/L)	--	Report	--	Quarterly	Grab	EFF-1 EFF-2
Radium 226 + Radium 228, Total (PCI/L)	--	Report	--	Quarterly	Grab	EFF-1 EFF-2
Antimony, Total Recoverable (UG/L)	--	Report	--	Quarterly	Grab	EFF-1 EFF-2
Arsenic, Total Recoverable (UG/L)	--	Report	--	Quarterly	Grab	EFF-1 EFF-2
Beryllium, Total Recoverable (UG/L)	--	Report	--	Quarterly	Grab	EFF-1 EFF-2
Boron, Total Recoverable (MG/L)	--	Report	--	Quarterly	Grab	EFF-1 EFF-2
Cadmium, Total Recoverable (UG/L)	--	Report	--	Quarterly	Grab	EFF-1 EFF-2
Copper, Total Recoverable (MG/L)	--	Report	--	Quarterly	Grab	EFF-1 EFF-2
Chromium, Total Recoverable (MG/L)	--	Report	--	Quarterly	Grab	EFF-1 EFF-2

	Discharge Limitations			Monitoring Requirements		
Parameters (units)	**Monthly Average**	**Daily Maximum**	**Daily Minimum**	**Monitoring Frequency**	**Sample Type**	**Sample Point**
Iron, Total Recoverable (MG/L)	--	Report	--	Quarterly	Grab	EFF-1 EFF-2
Lead, Total Recoverable (UG/L)	--	Report	--	Quarterly	Grab	EFF-1 EFF-2
Mercury, Total Recoverable (UG/L)	--	Report	--	Quarterly	Grab	EFF-1 EFF-2
Nickel, Total Recoverable (UG/L)	--	Report	--	Quarterly	Grab	EFF-1 EFF-2
Selenium, Total Recoverable (UG/L)	--	Report	--	Quarterly	Grab	EFF-1 EFF-2
Sodium, Total Recoverable (MG/L)	--	Report	--	Quarterly	Grab	EFF-1 EFF-2
Thallium, Total Recoverable (UG/L)	--	Report	--	Quarterly	Grab	EFF-1 EFF-2
Zinc, Total Recoverable (MG/L)	--	Report	--	Quarterly	Grab	EFF-1 EFF-2

2. Effluent samples shall be taken at the monitoring site locations listed in permit condition I.C.1 and as described below:

Sample Point	Description of Monitoring Location
FLW-3	The sum of FLW-1 and FLW-2
FLW-1	The sum of all flows to percolation pond system not including the FGD blow down.
FLW-2	Flow from the FGD blow down into evaporation/percolation pond #3
EFF-2	Effluent from the FGD treatment system. At discharge pipe into evaporation/percolation pond #3
EFF-1	At discharge pipe into the active pond, either the East Pond or West Pond. Ponds will be rotated on a yearly basis, or as necessary.

Sample Point	Description of Monitoring Location
OTH-1	Staff gauge located in Pond#1.
OTH-2	Staff gauge located in Pond#2.
OTH-3	Staff gauge located in Pond#3.

3. The permittee shall contact and request authorizations from the Department's Southwest District Office, prior to placing into service any backup/ emergency treatment system for the FGD blow down. (i.e. Filter press). The request shall provide details and specification for the proposed system and operational details along with the expected duration.

4. All flow measurement devices shall be calibrated at least once every 12 months or based on the manufacturer requirements.

5. Water levels in ponds 1, 2 & 3 shall be recoded weekly on the part B DMRs. The part B DMRs shall be submitted quarterly in accordance to the schedule in section I.E.1

D. Other Methods of Disposal or Recycling

1. There shall be no discharge of industrial wastewater from this facility to ground or surface waters, except as authorized by this permit.

E. Other Limitations and Monitoring and Reporting Requirements

1. Monitoring requirements under this permit are effective on the first day of the second month following permit issuance. Until such time, the permittee shall continue to monitor and report in accordance with previously effective permit requirements, if any. During the period of operation authorized by this permit, the permittee shall complete and submit to the Southwest District Office Discharge Monitoring Reports (DMRs) in accordance with the frequencies specified by the REPORT type (i.e., monthly, toxicity, quarterly, semiannual, annual, etc.) indicated on the DMR forms attached to this permit. Monitoring results for each monitoring period shall be submitted in accordance with the associated DMR due dates below.

REPORT Type on DMR	Monitoring Period	DMR Due Date
Monthly or Toxicity	first day of month – last day of month	28th day of following month
Quarterly	January 1 - March 31 April 1 – June 30 July 1 – September 30 October 1 – December 31	April 28 July 28 October 28 January 28
Semiannual	January 1 – June 30 July 1 – December 31	July 28 January 28
Annual	January 1 – December 31	January 28

DMRs shall be submitted for each required monitoring period including months of no discharge.

The permittee shall make copies of the attached DMR form(s) and shall submit the original completed DMR form(s) to the address specified below: (Please submit a copy of the DMR to the Southwest District Office)

Originals to:
Department of Environmental Protection
Wastewater Compliance Evaluation Section
Mail Station 3551
Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Copies to:
FDEP-Southwest District
Industrial Wastewater Program
Southwest District Office
13051 North Telecom Parkway
Temple Terrace, FL 33637-0926
Facsimile (813) 632-7662

2. Unless specified otherwise in this permit, all reports and notifications required by this permit, including twenty-four hour notifications, shall be submitted to or reported to the Southwest District Office at the address specified below:

   Southwest District Office
   13051 North Telecom Parkway
   Temple Terrace, FL 33637-0926
   Phone Number - (813) 632-7600
   FAX Number - (813) 632-7662 (All FAX copies shall be followed by original copies.)

3. All reports and other information shall be signed in accordance with requirements of Rule 62-620.305, F.A.C.

4. The permittee shall provide safe access points for obtaining representative samples which are required by this permit.

5. If there is no discharge from the facility on a day scheduled for sampling, the sample shall be collected on the day of the next discharge.

6. Any bypass of the treatment facility which is not included in the monitoring specified in sections I.A, I.B, I.C, or I.D, is to be monitored for flow and all other required parameters. For parameters other than flow, at least one grab sample per day shall be monitored. Daily flow shall be monitored or estimated, as appropriate, to obtain reportable data. All monitoring results shall be reported on the appropriate DMR.

II. Industrial Sludge/Solids Management Requirements

1. The method of sludge/solids use or disposal by this facility is a Class I or II solid waste landfill.

2. The permittee shall be responsible for proper treatment, management, use or land application of its sludges/solids. *[62-620.320(6)]*

3. Disposal of sludge/solids in a solid waste management facility permitted by the Department shall be in accordance with the requirements of Chapter 62-701, F.A.C.

4. Storage, transportation, and disposal of sludge/solids characterized as hazardous waste shall be in accordance with the requirements of Chapter 62-730, F.A.C.

5. The permittee shall maintain records available for inspection by the Department at the permitted facility, as follows:
   a. Quantity of sludge/solids generated;
   b. Quantity of sludge/solids transported for treatment and/or disposal;
   c. Name and location of the site(s) to which sludge/solids is transported;

d. If a person other than the permittee is responsible for sludge/solids transportation, treatment, and/or disposal, the permittee shall also keep records of the name and address of each transporter, and copies of all shipping manifests.

[62-620.320(6)]

III. Ground Water Monitoring Requirements

A. Construction Requirements

1. The permittee shall give at least 72-hours notice to the Department's Southwest District Office, prior to the installation of any monitoring wells detailed in this permit.

2. The QUARTERLY sampling and analysis of all new ground water monitoring wells shall begin upon proper completion of the GWMP well system in accordance with condition III.B.1. The wells shall be sampled for the parameters identified in Permit Condition III.B.3 and in accordance to the Department's "Standard Operating Procedures For Laboratory Operations and Sample Collection Activities," DEP-SOP-001/01, FS 2200 Ground water Sampling, January 1, 2002.

3. Prior to construction of new ground water monitoring wells, a soil boring shall be made at each new monitoring well location in order to establish the well depth and screen interval.

4. Within thirty days after completion of construction of the ground water monitoring wells, a properly scaled figure depicting monitor well locations (active and abandoned) with identification numbers shall be submitted. The figure shall also include (or attached) the monitoring well, top of casing and ground surface elevations referenced to National Geodetic Vertical Datum (NGVD) to the nearest 0.1 foot, along with monitor well location latitude and longitude to the nearest 0.1 second.

5. Within thirty days after completion of construction of the ground water monitoring wells, well completion reports shall be sent to the Industrial Wastewater Section, FDEP Southwest District Office. The information is to be submitted on the attached form for each well, DEP Form 62-522.900(3), Monitor Well Completion Report.

6. In Districts where applicable, within 30 days of completion of construction of new ground water monitor wells, the Department requests that the permittee submit the following information for each monitor well :
   a. A copy of the Florida Water Management District (WMD) , State of Florida Permit Application to Construct, Repair, Modify or Abandon a Well, Form 41.10-410(1), and

   b. A copy of the WMD Well Completion Report, Form 41.10-410(2), 62-610.412(2)(b)

B. Operational Requirements

1. During the period of operation authorized by this permit, the permittee shall continue to sample ground water at the existing monitoring wells identified in item III.B.2 below, in accordance with this permit and the approved ground water monitoring plan prepared in accordance with Rule 62-522.600 F.A.C. Within 90 days of placing the new or modified wastewater facility into operation, or installation of new monitoring wells, whichever occurs sooner, the permittee shall begin sampling ground water at the new monitoring wells identified in item III.B.2 below, in accordance with this permit and the approved ground water monitoring plan.

2. The following monitoring wells shall be sampled for Land Application System G-001:

Monitoring Well ID	Alternate Well Name and/or Description of Monitoring Location	Depth (Feet)	Aquifer Monitored	New or Existing
MWB-30	Background Well	20	Upper Floridan	Existing
MWC-1	Compliance Monitoring Well	20	Upper Floridan	Existing
MWI-2R2	Intermediate Monitor Well		Upper Floridan	Existing
MWI-7R	Intermediate Monitor Well (Relocated)	20	Upper Floridan	Existing
MWC-12R	Compliance Monitor Well	20	Upper Floridan	Existing
MWC-16	Compliance Monitor Well	21.1	Upper Floridan	Existing
MWC-21R	Compliance Monitor Well	20	Upper Floridan	Existing
MWC-27	Compliance Monitor Well	33	Upper Floridan	Existing
MWC-28	Compliance Monitor Well	20	Upper Floridan	Existing
MWC-29	Compliance Monitor Well	20	Upper Floridan	Existing
MWC-IF2	Compliance Monitor Well	14	Upper Floridan	Existing
MWC-31	Compliance Monitor Well	20	Upper Floridan	New

MWB = Background; MWI = Intermediate; MWC = Compliance; MWP = Piezometer

3. The monitor wells specified in Condition III.B.2 shall be sampled for the parameters listed below:

Parameter Name	Compliance Well Limit	Units	Sample Type	Monitoring Frequency
Radium 226 and 228	5.0	PCI/L	Grab	Quarterly
Copper, Total Recoverable	Report	MG/L	Grab	Quarterly
Chloride (as Cl)	Report	MG/L	Grab	Quarterly
Iron, Total Recoverable	Report	MG/L	Grab	Quarterly
Nitrogen, Nitrate, Total (as N)	10.0	MG/L	Grab	Quarterly
pH*	Report	SU	Grab	Quarterly
Sodium, Total Recoverable	160	MG/L	Grab	Quarterly
Solids, Total Dissolved (TDS)	Report	MG/L	Grab	Quarterly
Specific Conductance*	Report	MMHOS/CM	In-situ	Quarterly
Turbidity*	Report	NTU	In-situ	Quarterly
Water Level Relative to NGVD	Report	FEET	In-situ	Quarterly
Alpha, Gross Particle Activity	15.0	PCI/L	Grab	Quarterly
Antimony, Total Recoverable	6.0	UG/L	Grab	Quarterly
Arsenic, Total Recoverable	10.0	UG/L	Grab	Quarterly
Boron, Total Recoverable	Report	MG/L	Grab	Quarterly

Parameter Name	Compliance Well Limit	Units	Sample Type	Monitoring Frequency
Barium, Total Recoverable	2.0	MG/L	Grab	Quarterly
Beryllium, Total Recoverable	4.0	UG/L	Grab	Quarterly
Cadmium, Total Recoverable	5.0	UG/L	Grab	Quarterly
Mercury, Total Recoverable	2.0	UG/L	Grab	Quarterly
Selenium, Total Recoverable	50.0	UG/L	Grab	Quarterly
Chromium, Total Recoverable	100.0	UG/L	Grab	Quarterly
Lead, Total Recoverable	15.0	UG/L	Grab	Quarterly
Nickel, Total Recoverable	100.0	UG/L	Grab	Quarterly
Thallium, Total Recoverable	2.0	UG/L	Grab	Quarterly
Oxygen, Dissolved (DO)*	Report	MG/L	In-situ	Quarterly
Zinc, Total Recoverable	Report	MG/L	Grab	Quarterly
Fluoride, Total (as F)	Report	MG/L	Grab	Quarterly
Cyanide, Total	0.2	MG/L	Grab	Quarterly
Temperature, Water*	Report	°F	In-situ	Quarterly

* The field parameters shall be sampled per DEP–SOP-001/01, FS 2200 Groundwater Sampling, Figure FS 2200-2 Groundwater Purging Procedure and recorded on Form FD 9000-24, Groundwater Sampling Log (both documents attached to this permit). The sampling logs shall be submitted with each groundwater Part D DMR. The field parameters to be reported on Part D of GW DMR shall be the last sample recorded on FD 9000-24.

4. For the land application system for G-001, all ground water quality criteria specified in Chapter 62-520, F.A.C., shall be met at the edge of the zone of discharge. The zone of discharge for this project is the lateral extent of the upland environment on the property, where ground water is discharging to the marine environment.

5. The permittee's discharge to ground water shall not cause a violation of water quality standards for ground waters at the boundary of the zone of discharge in accordance with Rules 62-520.400 and 62-520.420, F.A.C.

6. The permittee's discharge to ground water shall not cause a violation of the minimum criteria for ground water specified in Rule 62-520.400, F.A.C., within the zone of discharge.

7. If the concentration for any constituent listed in Permit Condition III.B.3 in the natural background quality of the ground water is greater than the stated maximum, or in the case of pH is also less than the minimum, the representative background quality shall be the prevailing standard.

8. Water levels shall be recorded prior to evacuating the well for sample collection. Elevation references shall include the top of the well casing and land surface at each well site (NGVD allowable) at a precision of plus or minus 0.01 feet.

9. Ground water monitoring wells shall be purged prior to sampling to obtain a representative sample.

10. Analyses shall be conducted on un-filtered samples, unless filtered samples have been approved by the Department as being more representative of ground water conditions.

11. If a monitoring well becomes damaged or cannot be sampled for some reason, the permittee shall notify the Department immediately and a written report shall follow within seven days detailing the circumstances and remedial measures taken or proposed. Repair or replacement of monitoring wells shall be approved in advance by the Department.

12. All piezometers and monitoring wells not part of the approved ground water monitoring plan are to be plugged and abandoned in accordance with Rule 62-532.500(4), F.A.C., unless there is intent for their future use.

13. Ground water monitoring test results shall be submitted on Part D of DEP Form 62-620.910(10) (attached) and shall be submitted to the address specified in I.E.3. Results shall be submitted with the DMR for each month listed in the following schedule.

SAMPLE PERIOD	REPORT DUE DATE
January - March	April 28
April - June	July 28
July - September	October 28
October - December	January 28

IV. Other Land Application Requirements

1. This section is not applicable to this facility.

V. Operation and Maintenance Requirements

A. Treatment and Disposal Facilities

1. The permittee shall ensure that the operation of this facility is as described in the application and supporting documents.

2. The operation of the pollution control facilities described in this permit shall be under the supervision of a person who is qualified by formal training and/or practical experience in the field of water pollution control.

B. Record keeping Requirements:

1. The permittee shall maintain the following records on the site of the permitted facility and make them available for inspection:

   a. Records of all compliance monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, including, if applicable, a copy of the laboratory certification showing the certification number of the laboratory, for at least three years from the date the sample or measurement was taken;

   b. Copies of all reports, other than those required in items a. and f. of this section, required by the permit for at least three years from the date the report was prepared, unless otherwise specified by Department rule;

   c. Records of all data, including reports and documents used to complete the application for the permit for at least three years from the date the application was filed, unless otherwise specified by Department rule;

   d. A copy of the current permit;

e. A copy of any required record drawings;

f. Copies of the logs and schedules showing plant operations and equipment maintenance for three years from the date on the logs or schedule.

VI. Schedules

1. The permittee shall achieve compliance with the other conditions of this permit as follows:

   Operational level attained Issuance Date of permit

2. No later than 14 calendar days following a date identified in the schedule(s) of compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by an identified date, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

3. A Best Management Practices (BMP) Plan shall be prepared and implemented in accordance with Part VII of this permit and the following schedule:

Action Item		Scheduled Completion Date
1	Continue implementing the existing BMP Plan and updated accordingly for the FGD Treatment as needed.	Within ninety (90) days of the start up of the FGD system.

4. The following implementation steps shall be completed in accordance with the following schedule:

Implementation Steps		Scheduled Completion Date
1	Installation of a staff gauge in pond #1, pond #2 and evaporation/percolation pond #3	Within ninety (90) days of revision date.
2	Notify the Department when installation of the staff gauges is completed.	Within thirty (30) days after installation.
3	The permittee shall notify the Department when the Flue Gas Desulfurization system (FGD) will be placed into operation.	Provide 72-hours notice prior to start up.
4	Installation of the proposed groundwater monitoring well MWC-31	Within ninety (90) days of revision date.

5. In accordance with sections 403.088(2) (e) and (f), F.S., a compliance schedule for this facility is contained in Administrative Order AO-114-SW that is hereby incorporated by reference.

VII. Other Specific Conditions

A. Specific Conditions Applicable to All Permits

1. Drawings, plans, documents or specifications submitted by the permittee, not attached hereto, but retained on file at the Southwest District Office, are made a part hereof.

2. Where required by Chapter 471 (P.E.) or Chapter 492 (P.G.) F.S., applicable portions of reports to be submitted under this permit, shall be signed and sealed by the professional(s) who prepared them.

3. This permit satisfies Industrial Wastewater program permitting requirements only and does not authorize operation of this facility prior to obtaining any other permits required by local, state or federal agencies.

4. The permittee shall provide verbal notice to the Department as soon as practical after discovery of a sinkhole within an area for the management or application of wastewater or sludge. The permittee shall immediately implement measures appropriate to control the entry of contaminants, and shall detail these measures to the Department in a written report within 7 days of the sinkhole discovery.

B. Specific Conditions Related to Construction

This section is not applicable to this facility

C. Duty to Reapply

1 The permittee shall apply for renewal of this permit at least 180 days before the expiration date of the permit using the appropriate forms listed in Rule 62-620.910, F.A.C., including submittal of the appropriate processing fee set forth in Rule 62-4.050, F.A.C. The existing permit shall not expire until the Department has taken final action on the application renewal in accordance with the provisions of 62-620.335(3) and (4), F.A.C.

D. Specific Conditions Related to Existing Manufacturing, Commercial, Mining, and Silviculture Wastewater Facilities or Activities

1. Existing manufacturing, commercial, mining, and silvicultural wastewater facilities or activities that discharge into surface waters shall notify the Department as soon as they know or have reason to believe:

   a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following levels
      (1) One hundred micrograms per liter,
      (2) Two hundred micrograms per liter for acrolein and acrylonitrile; five hundred micrograms per liter for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter for antimony, or
      (3) Five times the maximum concentration value reported for that pollutant in the permit application.

   b. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following levels
      (1) Five hundred micrograms per liter,
      (2) One milligram per liter for antimony, or

(3) Ten times the maximum concentration value reported for that pollutant in the permit application.

E. Specific Conditions Related to Best Management Practices

1. **BMP Plan:**

For purposes of this part, the terms "pollutant" or "pollutants" refer to any substance listed as toxic under Section 307(a)(1) of the Clean Water Act (the "Act"), oil, as defined in Section 311(a)(1) of the Act, and any substance listed as hazardous under Section 311 of the Act. The permittee shall develop and implement a Best Management Practices (BMP) plan which prevents, or minimizes, the potential for the release of pollutants from ancillary activities, including material storage areas; plant site runoff; in-plant transfer, process and material handling areas; loading and unloading operations; and sludge and waste disposal areas, to the waters of the State through plant site runoff; spillage or leaks; sludge or waste disposal; or drainage from raw material storage.

2. **Implementation:**

The BMP plan shall be developed and implemented in accordance with the schedule contained in Part VI of this permit.

3. **General Requirements:**

The BMP plan shall:

a. Be documented in narrative form, and shall include any necessary plot plans, drawings or maps.

b. Establish specific objectives for the control of pollutants.

(1) Each facility component or system shall be examined for its potential for causing a release of significant amounts of pollutants to waters of the State due to equipment failure, improper operation, natural phenomena such as rain or snowfall, etc.

(2) Where experience indicates a reasonable potential for equipment failure (e.g., a tank overflow or leakage), natural conditions (e.g., precipitation), or other circumstances to result in significant amounts of pollutants reaching surface waters, the plan should include a prediction of the direction, rate of flow, and total quantity of pollutants which could be discharged from the facility as a result of each condition or circumstance.

c. Establish specific best management practices to meet the objectives identified under paragraph (b) of this subsection, addressing each component or system capable of causing a release of significant amounts of pollutants to the waters of the State, and identifying specific preventative or remedial measures to be implemented.

d. Be reviewed by plant engineering staff and plant manager.

4. **Documentation:**

The permittee shall maintain the BMP plan at the facility and shall make the plan available to the Department upon request.

5. **BMP Plan Modification:**

The permittee shall amend the BMP plan whenever there is a change in the facility or change in the operation of the facility which materially increases the potential for the ancillary activities to result in a discharge of significant amounts of pollutants.

6. **Modification for Ineffectiveness:**

If the BMP plan proves to be ineffective in achieving the general objective of preventing the release of significant amounts of pollutants to surface waters and the specific objectives and requirements under paragraphs (b) and (c) of item 3, the permit shall be subject to modification pursuant to rule 62-620.325, F.A.C., to incorporate revised BMP requirements.

F. Reopener Clause

1. The permit shall be revised, or alternatively, revoked and reissued in accordance with the provisions contained in Rules 62-620.325 and 62-620.345, F.A.C., if applicable, or to comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2) and 307(a)(2) of the Clean Water Act (the Act), as amended, if the effluent standards, limitations, or water quality standards so issued or approved:

   a. Contains different conditions or is otherwise more stringent than any condition in the permit/or;

   b. Controls any pollutant not addressed in the permit.

   The permit as revised or reissued under this paragraph shall also contain any other requirements of the Act then applicable.

2. The permit may be reopened to adjust effluent limitations or monitoring requirements should future Water Quality Based Effluent Limitation determinations, water quality studies, DEP approved changes in water quality standards, or other information show a need for a different limitation or monitoring requirement.

3. The Department may develop a Total Maximum Daily Load (TMDL) during the life of the permit. Once a TMDL has been established and adopted by rule, the Department shall revise this permit to incorporate the final findings of the TMDL.

VIII. General Conditions

1. The terms, conditions, requirements, limitations and restrictions set forth in this permit are binding and enforceable pursuant to Chapter 403, F.S. Any permit noncompliance constitutes a violation of Chapter 403, F.S., and is grounds for enforcement action, permit termination, permit revocation and reissuance, or permit revision. *[62-620.610(1), F.A.C.]*

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications or conditions of this permit constitutes grounds for revocation and enforcement action by the Department. *[62-620.610(2), F.A.C.]*

3. As provided in subsection 403.087(7), F.S., the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor authorize any infringements of federal, state, or local laws or regulations. This permit is not

a waiver of or approval of any other Department permit or authorization that may be required for other aspects of the total project which are not addressed in this permit. *[62-620.610(3), F.A.C.]*

4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title. *[62-620.610(4), F.A.C.]*

5. This permit does not relieve the permittee from liability and penalties for harm or injury to human health or welfare, animal or plant life, or property caused by the construction or operation of this permitted source; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department. The permittee shall take all reasonable steps to minimize or prevent any discharge, reuse of reclaimed water, or residuals use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. *[62-620.610(5), F.A.C.]*

6. If the permittee wishes to continue an activity regulated by this permit after its expiration date, the permittee shall apply for and obtain a new permit. *[62-620.610(6), F.A.C.]*

7. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control, and related appurtenances, that are installed and used by the permittee to achieve compliance with the conditions of this permit. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to maintain or achieve compliance with the conditions of the permit. *[62-620.610(7), F.A.C.]*

8. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit revision, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition. *[62-620.610(8), F.A.C.]*

9. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, including an authorized representative of the Department and authorized EPA personnel, when applicable, upon presentation of credentials or other documents as may be required by law, and at reasonable times, depending upon the nature of the concern being investigated, to
   a. Enter upon the permittee's premises where a regulated facility, system, or activity is located or conducted, or where records shall be kept under the conditions of this permit;
   b. Have access to and copy any records that shall be kept under the conditions of this permit;
   c. Inspect the facilities, equipment, practices, or operations regulated or required under this permit; and
   d. Sample or monitor any substances or parameters at any location necessary to assure compliance with this permit or Department rules. *[62-620.610(9), F.A.C.]*

10. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data, and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except as such use is proscribed by Section 403.111, Florida Statutes, or Rule 62-620.302, F.A.C. Such evidence shall only be used to the extent that it is consistent with the Florida Rules of Civil Procedure and applicable evidentiary rules. *[62-620.610(10), F.A.C.]*

11. When requested by the Department, the permittee shall within a reasonable time provide any information required by law which is needed to determine whether there is cause for revising, revoking and reissuing, or terminating this permit, or to determine compliance with the permit. The permittee shall also provide to the Department upon request copies of records required by this permit to be kept. If the permittee becomes aware

of relevant facts that were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be promptly submitted or corrections promptly reported to the Department. *[62-620.610(11), F.A.C.]*

12. Unless specifically stated otherwise in Department rules, the permittee, in accepting this permit, agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance; provided however, the permittee does not waive any other rights granted by Florida Statutes or Department rules. A reasonable time for compliance with a new or amended surface water quality standard, other than those standards addressed in Rule 62-302.500, F.A.C., shall include a reasonable time to obtain or be denied a mixing zone for the new or amended standard. *[62-620.610(12), F.A.C.]*

13. The permittee, in accepting this permit, agrees to pay the applicable regulatory program and surveillance fee in accordance with Rule 62-4.052, F.A.C. *[62-620.610(13), F.A.C.]*

14. This permit is transferable only upon Department approval in accordance with Rule 62-620.340, F.A.C. The permittee shall be liable for any noncompliance of the permitted activity until the Department approves the transfer. *[62-620.610(14), F.A.C.]*

15. The permittee shall give the Department written notice at least 60 days before inactivation or abandonment of a wastewater facility and shall specify what steps will be taken to safeguard public health and safety during and following inactivation or abandonment. *[62-620.610(15), F.A.C.]*

16. The permittee shall apply for a revision to the Department permit in accordance with Rule 62-620.300, F.A.C., and the Department of Environmental Protection Guide to Wastewater Permitting at least 90 days before construction of any planned substantial modifications to the permitted facility is to commence or with Rule 62-620.325(2), F.A.C., for minor modifications to the permitted facility. A revised permit shall be obtained before construction begins except as provided in Rule 62-620.300, F.A.C. *[62-620.610(16), F.A.C.]*

17. The permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. The permittee shall be responsible for any and all damages which may result from the changes and may be subject to enforcement action by the Department for penalties or revocation of this permit. The notice shall include the following information:
    a. A description of the anticipated noncompliance;
    b. The period of the anticipated noncompliance, including dates and times; and
    c. Steps being taken to prevent future occurrence of the noncompliance. *[62-620.610(17), F.A.C.]*

18. Sampling and monitoring data shall be collected and analyzed in accordance with Rule 62-4.246, Chapters 62-160 and 62-601, F.A.C., and 40 CFR 136, as appropriate.
    a. Monitoring results shall be reported at the intervals specified elsewhere in this permit and shall be reported on a Discharge Monitoring Report (DMR), DEP Form 62-620.910(10), or as specified elsewhere in the permit.
    b. If the permittee monitors any contaminate more frequently than required by the permit, using Department approved test procedures, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.
    c. Calculations for all limitations which require averaging of measurements shall use an arithmetic mean unless otherwise specified in this permit.
    d. Except as specifically provided in Rule 62-160.300, F.A.C., any laboratory test required by this permit shall be performed by a laboratory that has been certified by the Department of Health Environmental Laboratory Certification Program (DOH ELCP). Such certification shall be for the matrix, test method and analyte(s) being measured to comply with this permit. For domestic wastewater facilities, testing for parameters listed in Rule 62-160.300(4), F.A.C., shall be conducted under the direction of a certified operator.

e. Field activities including on-site tests and sample collection shall follow the applicable standard operating procedures described in DEP-SOP-001/01 adopted by reference in Chapter 62-160, F.A.C.
f. Alternate field procedures and laboratory methods may be used where they have been approved in accordance with Rules 62-160.220 and 62-160.330, F.A.C. *[62-620.610(18), F.A.C.]*

19. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule detailed elsewhere in this permit shall be submitted no later than 14 days following each schedule date. *[62-620.610(19), F.A.C.]*

20. The permittee shall report to the Department's Southwest District Office any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within five days of the time the permittee becomes aware of the circumstances. The written submission shall contain: a description of the noncompliance and its cause; the period of noncompliance including exact dates and time, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.
    a. The following shall be included as information which must be reported within 24 hours under this condition:
        (1) Any unanticipated bypass which causes any reclaimed water or effluent to exceed any permit limitation or results in an unpermitted discharge,
        (2) Any upset which causes any reclaimed water or the effluent to exceed any limitation in the permit,
        (3) Violation of a maximum daily discharge limitation for any of the pollutants specifically listed in the permit for such notice, and
        (4) Any unauthorized discharge to surface or ground waters.
    b. Oral reports as required by this subsection shall be provided as follows:
        (1) For unauthorized releases or spills of untreated or treated wastewater reported pursuant to subparagraph a.(4) that are in excess of 1,000 gallons per incident, or where information indicates that public health or the environment will be endangered, oral reports shall be provided to the Department by calling the STATE WARNING POINT TOLL FREE NUMBER (800) 320-0519, as soon as practical, but no later than 24 hours from the time the permittee becomes aware of the discharge. The permittee, to the extent known, shall provide the following information to the State Warning Point:
            (a) Name, address, and telephone number of person reporting;
            (b) Name, address, and telephone number of permittee or responsible person for the discharge;
            (c) Date and time of the discharge and status of discharge (ongoing or ceased);
            (d) Characteristics of the wastewater spilled or released (untreated or treated, industrial or domestic wastewater);
            (e) Estimated amount of the discharge;
            (f) Location or address of the discharge;
            (g) Source and cause of the discharge;
            (h) Whether the discharge was contained on-site, and cleanup actions taken to date;
            (i) Description of area affected by the discharge, including name of water body affected, if any; and
            (j) Other persons or agencies contacted.
        (2) Oral reports, not otherwise required to be provided pursuant to subparagraph b.(1) above, shall be provided to Department's Southwest District Office within 24 hours from the time the permittee becomes aware of the circumstances.
    c. If the oral report has been received within 24 hours, the noncompliance has been corrected, and the noncompliance did not endanger health or the environment, the Department's Southwest District Office shall waive the written report. *[62-620.610(20), F.A.C.]*

21. The permittee shall report all instances of noncompliance not reported under Conditions VIII.17., 18. and 19. of this permit at the time monitoring reports are submitted. This report shall contain the same information required by Condition VIII.20. of this permit. *[62-620.610(21), F.A.C.]*

22. Bypass Provisions.
    a. Bypass is prohibited, and the Department may take enforcement action against a permittee for bypass, unless the permittee affirmatively demonstrates that:
        (1) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage; and
        (2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance; and
        (3) The permittee submitted notices as required under Condition VIII.22.b. of this permit.
    b. If the permittee knows in advance of the need for a bypass, it shall submit prior notice to the Department, if possible at least 10 days before the date of the bypass. The permittee shall submit notice of an unanticipated bypass within 24 hours of learning about the bypass as required in Condition VIII.20. of this permit. A notice shall include a description of the bypass and its cause; the period of the bypass, including exact dates and times; if the bypass has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent recurrence of the bypass.
    c. The Department shall approve an anticipated bypass, after considering its adverse effect, if the permittee demonstrates that it will meet the three conditions listed in Condition VIII.22 a.(1) through (3) of this permit.
    d. A permittee may allow any bypass to occur which does not cause reclaimed water or effluent limitations to be exceeded if it is for essential maintenance to assure efficient operation. These bypasses are not subject to the provision of Condition VIII.22.a. through c. of this permit. *[62-620.610(22), F.A.C.]*

23. Upset Provisions
    a. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed contemporaneous operating logs, or other relevant evidence that:
        (1) An upset occurred and that the permittee can identify the cause(s) of the upset;
        (2) The permitted facility was at the time being properly operated;
        (3) The permittee submitted notice of the upset as required in Condition VIII.20. of this permit; and
        (4) The permittee complied with any remedial measures required under Condition VIII.5. of this permit.
    b. In any enforcement proceeding, the burden of proof for establishing the occurrence of an upset rests with the permittee.
    c. Before an enforcement proceeding is instituted, no representation made during the Department review of a claim that noncompliance was caused by an upset is final agency action subject to judicial review. *[62-620.610(23), F.A.C.]*

Executed in Hillsborough County, Florida.

STATE OF FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION

Jeffry S. Greenwell, P.E.
Water Facilities Administrator
Southwest District

Florida Department of
Environmental Protection

Southwest District Office
13051 North Telecom Parkway
Temple Terrace, Florida 33637-0926

Charlie Crist
Governor

Jeff Kottkamp
Lt. Governor

Michael W. Sole
Secretary

STATE OF FLORIDA
DOMESTIC WASTEWATER FACILITY PERMIT

PERMITTEE:
Progress Energy Florida, Inc.

RESPONSIBLE AUTHORITY:

Progress Energy Florida, Inc.
Bernie M. Cumbie, Plant Manager
15760 Powerline Street, MAC CN77
Crystal River, FL 34428-6708
(352) 563-4484

FACILITY:

Progress Energy - Crystal River Units 4 & 5 WWTF
15760 Powerline Street, MAC CN77
Crystal River, FL 34428-6708
Citrus County
Latitude: 28° 57' 55" N Longitude: 82° 41' 57" W

PERMIT NUMBER: FLA011862
PA FILE NUMBER: FLA011862-002-DW3P/NR
ISSUANCE DATE: May 17, 2007
EXPIRATION DATE: May 16, 2012

This permit is issued under the provisions of Chapter 403, Florida Statutes, and applicable rules of the Florida Administrative Code. The above named permittee is hereby authorized to operate the facilities shown on the application and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

TREATMENT FACILITIES:

Operation of an existing 0.020 MGD 3-Month Average Daily Flow (3MADF), Type III, extended aeration domestic wastewater treatment plant consisting of: two anoxic basins of 10,000 gallons total volume, six aeration basins of 24,000 gallons total volume, two clarifiers of 5,700 gallons total volume and 103 square feet of surface area, one chlorine contact chamber of 1,600 gallons, and two digesters of 8,000 gallons. This plant is operated to provide secondary treatment with basic disinfection.

REUSE:

Land Application: An existing 0.020 MGD 12-Month Average Daily Flow (12MADF) permitted capacity Part IV rapid-rate land application system (R-001). R-001 consists of a single cell Rapid Infiltration Basin (RIB) of 13,184 square feet of bottom surface area. R-001 is located approximately at latitude 28° 57' 55" N, longitude 82° 41' 57" W.

IN ACCORDANCE WITH: The limitations, monitoring requirements and other conditions set forth in Pages 1 through 16 of this permit.

I. RECLAIMED WATER AND EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

A. Reuse and Land Application Systems

1. During the period beginning on the issuance date and lasting through the expiration date of this permit, the permittee is authorized to direct reclaimed water to Reuse System R-001. Such reclaimed water shall be limited and monitored by the permittee as specified below and reported in accordance with condition I.B.8:

			Reclaimed Water Limitations				Monitoring Requirements			
Parameter	Units	Max/Min	Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location Site Number	Notes
Flow, to R-001	MGD	Maximum	0.020	Report	-	-	5 Days/Week	Flow meter and totalizer	FLW-01	See Cond.I.A.3
BOD, Carbonaceous 5 day, 20C	MG/L	Maximum	20.0	30.0	-	60.0	Monthly	Grab	EFA-01	
Solids, Total Suspended	MG/L	Maximum	20.0	30.0	-	60.0	Monthly	Grab	EFA-01	
pH	SU	Range	-	-	-	6.0 to 8.5	5 Days/Week	Grab	EFA-01	
Coliform, Fecal	#/100ML	Maximum	200	-	-	800	Monthly	Grab	EFA-01	See Cond.I.A.4
Total Chlorine Residual (For Disinfection)	MG/L	Minimum	-	-	-	0.5	5 Days/Week	Grab	EFA-01	See Cond.I.A.5
Nitrogen, Nitrate, Total (as N)	MG/L	Maximum	-	-	-	12.0	Monthly	Grab	EFA-01	

2. Reclaimed water samples shall be taken at the monitoring site locations listed in Permit Condition I. A. 1. and as described below:

Monitoring Location	Description of Monitoring Location
EFA-01	Effluent sampling point after treatment and prior to Reuse system R-001.
FLW-01	Flow meter and totalizer located at V –notch weir in the chlorine contact chamber.

3. A flow meter shall be utilized to measure flow and calibrated at least annually. *[62-601.200(17) and .500(6)]*

4. The arithmetic mean of the monthly fecal coliform values collected during an annual period shall not exceed 200 per 100 mL of reclaimed water sample. The geometric mean of the fecal coliform values for a minimum of 10 samples of reclaimed water, each collected on a separate day during a period of 30 consecutive days (monthly), shall not exceed 200 per 100 mL of sample. Any one sample shall not exceed 800 fecal coliform values per 100 mL of sample. *[62-610.510 and 62-600.440(4)(c)]*

5. A minimum of 0.5 mg/L total chlorine residual must be maintained for a minimum contact time of 15 minutes based on peak hourly flow. *[62-610.510 and 62-600.440(4)(b)]*

B. Other Limitations and Monitoring and Reporting Requirements

1. During the period beginning on the issuance date and lasting through the expiration date of this permit, the treatment facility shall be limited and monitored by the permittee as specified below and reported in accordance with condition I.B.8:

			Limitations				Monitoring Requirements			
Parameter	Units	Max/Min	Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location Site Number	Notes
Flow, Total Plant	MGD	Maximum	0.020 3MADF	Report	-	-	5 Days/Week	Flow meter and totalizer	FLW-01	See Cond.I.B.2, 5
Percent Capacity, (3MADF/Permitted Capacity) x 100	%	Maximum	-	Report	-	-	Monthly	Calculation	FLW-01	
BOD, Carbonaceous 5 day, 20C	MG/L	Maximum	-	Report	-	-	Annually[1]	Grab	INF-01	See Cond.I.B.4
Solids, Total Suspended	MG/L	Maximum	-	Report	-	-	Annually[1]	Grab	INF-01	See Cond.I.B.4

1 – The annual sample shall be taken in the month of February.

2. Samples shall be taken at the monitoring site locations listed in Permit Condition I. B. 1 and as described below:

Monitoring Location	Description of Monitoring Location
FLW-01	Flow meter and totalizer located at V –notch weir in the chlorine contact chamber.
INF-01	Influent sampling point prior to treatment and ahead of the return activated sludge line.

3. The three-month average daily flow to the treatment plant shall not exceed 0.020 MGD.

4. Influent samples shall be collected so that they do not contain digester supernatant or return activated sludge, or any other plant process recycled waters. *[62-601.500(4)]*

5. A flow meter shall be utilized to measure flow and calibrated at least annually. *[62-601.200(17) and .500(6)]*

6. Parameters which must be monitored as a result of a surface water discharge shall be analyzed using a sufficiently sensitive method in accordance with 40 CFR Part 136. Parameters which must be monitored as a result of a ground water discharge (i.e., underground injection or land application system) shall be analyzed in accordance with Chapter 62-601, F.A.C. All monitoring shall be representative of the monitored activity. *[62-620.610(18)]*

7. The permittee shall provide safe access points for obtaining representative influent, reclaimed water, and effluent samples which are required by this permit. *[62-601.500(5)]*

8. Monitoring requirements under this permit are effective on the first day of the second month following permit issuance. Until such time, the permittee shall continue to monitor and report in accordance with previously effective permit requirements, if any. During the period of operation authorized by this permit, the permittee shall complete and submit to the Department Discharge Monitoring Reports (DMRs) in accordance with the frequencies specified by the REPORT type (i.e., monthly, toxicity, quarterly, semiannual, annual, etc.) indicated on the DMR forms attached to this permit. Monitoring results for each monitoring period shall be submitted in accordance with the associated DMR due dates below.

REPORT Type	Monitoring Period	Due Date
Monthly or Toxicity	first day of month – last day of month	28th day of following month
Quarterly	January 1 - March 31 April 1 – June 30 July 1 – September 30 October 1 – December 31	April 28 July 28 October 28 January 28
Semiannual	January 1 – June 30 July 1 – December 31	July 28 January 28
Annual	January 1 – December 31	March 28

DMRs shall be submitted for each required monitoring period including months of no discharge. The permittee shall make copies of the attached DMR and shall submit the completed DMR to the

Department postmarked by the 28th of the month following the month of operation at the addresses specified below:

Originals to:
Florida Department of Environmental Protection
Wastewater Compliance Evaluation Section, Mail Station 3551
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Copies to:
Florida Department of Environmental Protection
Domestic Wastewater Program
Southwest District Office
13051 N. Telecom Parkway
Temple Terrace, FL 33637-0926

[62-620.610(18)] [62-601.300(1),(2), and (3)]

9. Unless specified otherwise in this permit, all reports and other information required by this permit, including 24-hour notifications, shall be submitted to or reported to, as appropriate, the Department's Southwest District Office at the address specified below:

Southwest District Office
13051 N. Telecom Parkway
Temple Terrace, FL 33637-0926

Phone Number - 813-632-7600
FAX Number - 813-632-7662
Email – DWSWD@DEP.STATE.FL.US

All FAX copies shall be followed by original copies. All reports and other information shall be signed in accordance with the requirements of Rule 62-620.305, F.A.C. *[62-620.305]*

II. RESIDUALS MANAGEMENT REQUIREMENTS

1. The method of residuals use or disposal by this facility is transport to a Residual Management Facility or disposal in a Class I or II solid waste landfill. Transportation of the residuals to an alternative RMF does not require a permit modification, however, use of an alternative RMF requires a copy of the agreement pursuant to Rule 62-640.880(1)(c), F.A.C., along with a written notification to the Department at least 30 days before transport of the residuals.

2. The permittee shall be responsible for proper treatment, management, use, and land application or disposal of its residuals. *[62-640.300(5)]*

3. The permittee shall not be held responsible for treatment, management, use, or land application violations that occur after its residuals have been accepted by a permitted residuals management facility with which the source facility has an agreement in accordance with Rule 62-640.880(1)(c), F.A.C., for further treatment, management, use or land application. *[62-640.300(5)]*

4. Disposal of residuals, septage, and other solids in a solid waste landfill, or disposal by placement on land for purposes other than soil conditioning or fertilization, such as at a monofill, surface impoundment, waste pile, or dedicated site, shall be in accordance with Chapter 62-701, F.A.C. *[62-640.100(6)(k)3&4]*

5. If the permittee intends to accept residuals from other facilities, a permit revision is required pursuant to Rule 62-640.880(2)(d), F.A.C. *[62-640.880(2)(d)]*

6. The permittee shall keep hauling records to track the transport of residuals between facilities. The hauling records shall contain the following information:

Required of Source Facility	Required of RMF
1. Date and Time Shipped	1. Date and Time Received
2. Amount of Residuals Shipped	2. Amount of Residuals Received
3. Degree of Treatment (if applicable)	3. Name and ID Number of Source Facility
4. Name and ID Number of Residuals Management Facility or Treatment Facility	4. Signature of Hauler
5. Signature of Responsible Party at Source Facility	5. Signature of Responsible Party at Residuals Management Facility or Treatment Facility
6. Signature of Hauler and Name of Hauling Firm	

These records shall be kept for five years and shall be made available for inspection upon request by the Department. A copy of the hauling records information maintained by the source facility shall be provided upon delivery of the residuals to the residuals management facility or treatment facility. The RMF permittee shall report to the Department within 24 hours of discovery any discrepancy in the quantity of residuals leaving the source facility and arriving at the residuals management facility or treatment facility. *[62-640.880(4)]*

III. GROUND WATER REQUIREMENTS

Section III is not applicable to this facility.

IV. ADDITIONAL REUSE AND LAND APPLICATION REQUIREMENTS

Part IV Rapid-Rate Land Application System (R-001)

1. All ground water quality criteria specified in Chapter 62-520, F.A.C., shall be met at the edge of the zone of discharge. The zone of discharge for this project shall extend horizontally 100 feet from the application site or to the facility's property line, whichever is less, and vertically to the base of the surficial aquifer. *[62-520.200(23)] [62-522.400 and 62-522.410]*

2. Advisory signs shall be posted around the site boundaries to designate the nature of the project area *[62-610.518]*

3. The annual average hydraulic loading rate to the rapid infiltration basin(s) shall be limited to a maximum of 2.4 inches per day (as applied to the entire bottom area). *[62-610.523(3)]*

4. Rapid infiltration basins shall be routinely maintained to control vegetation growth and to maintain percolation capability by scarification or removal of deposited solids. Basin bottoms shall be maintained to be level. *[62-610.523(6) and (7)]*

5. Routine aquatic weed control and regular maintenance of storage pond embankments and access areas are required. *[62-610.514 and 62-610.414]*

6. Overflows from emergency discharge facilities on storage ponds or on infiltration ponds, basins, or trenches shall be reported as an abnormal event to the Department's Southwest District Office within 24 hours of an occurrence. The provisions of Rule 62-610.800(9), F.A.C., shall be met. *[62-610.800(9)]*

V. OPERATION AND MAINTENANCE REQUIREMENTS

1. During the period of operation authorized by this permit, the wastewater facilities shall be operated under the supervision of an operator certified in accordance with Chapter 62-602, F.A.C. In accordance with Chapter 62-699, F.A.C., this facility is a Category III, Class D facility and, at a minimum, operators with appropriate certification must be on the site as follows:

   A Class D or higher operator for 3 nonconsecutive days/week for 1½ hour/week. The lead operator must be a Class D operator, or higher. *[62-620.630(3)] [62-699.310] [62-610.462]*

   [62-620.630(3)] [62-699.310] [62-610.462]

2. An operator meeting the lead operator classification level of the plant shall be available during all periods of plant operation. "Available" means able to be contacted as needed to initiate the appropriate action in a timely manner. Daily checks of the plant shall be performed by the permittee or his representative or agent 5 days per week. On those days when the facility is not staffed by a certified operator, the permittee shall ensure that Flow, pH, Total Chlorine Residual (For Disinfection) are monitored in accordance with Part I of this permit. *[62-699.311(1)]*

3. The application to renew this permit shall include an updated capacity analysis report prepared in accordance with Rule 62-600.405, F.A.C. *[62-600.405(5)]*

4. The application to renew this permit shall include a detailed operation and maintenance performance report prepared in accordance with Rule 62-600.735, F.A.C. *[62-600.735(1)]*

5. The permittee shall maintain the following records and make them available for inspection on the site of the permitted facility:

   a. Records of all compliance monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation and a copy of the laboratory certification showing the certification number of the laboratory, for at least three years from the date the sample or measurement was taken;

   b. Copies of all reports required by the permit for at least three years from the date the report was prepared;

   c. Records of all data, including reports and documents, used to complete the application for the permit for at least three years from the date the application was filed;

d. Monitoring information, including a copy of the laboratory certification showing the laboratory certification number, related to the residuals use and disposal activities for the time period set forth in Chapter 62-640, F.A.C., for at least three years from the date of sampling or measurement;

e. A copy of the current permit;

f. A copy of the current operation and maintenance manual as required by Chapter 62-600,. F.A.C.;

g. A copy of the facility record drawings;

h. Copies of the licenses of the current certified operators; and

i. Copies of the logs and schedules showing plant operations and equipment maintenance for three years from the date of the logs or schedules. The logs shall, at a minimum, include identification of the plant; the signature and certification number of the operator(s) and the signature of the person(s) making any entries; date and time in and out; specific operation and maintenance activities; tests performed and samples taken; and major repairs made. The logs shall be maintained on-site in a location accessible to 24-hour inspection, protected from weather damage, and current to the last operation and maintenance performed.

[62-620.350]

VI. SCHEDULES

Section VI is not applicable to this facility.

VII. INDUSTRIAL PRETREATMENT PROGRAM REQUIREMENTS

This facility is not required to have a pretreatment program at this time. *[62-625.500]*

VIII. OTHER SPECIFIC CONDITIONS

1. The permittee shall apply for renewal of this permit at least 180 days before the expiration date of the permit using the appropriate forms listed in Rule 62-620.910, F.A.C., including submittal of the appropriate processing fee set forth in Rule 62-4.050, F.A.C. The existing permit shall not expire until the Department has taken final action on the application renewal in accordance with the provisions of 62-620.335(3) and (4), F.A.C. *[62-620.335(1)-(4)]*

2. Florida water quality criteria and standards shall not be violated as a result of any discharge or land application of reclaimed water or residuals from this facility. *[62-610.850(1)(a) and (2)(a)]*

3. In the event that the treatment facilities or equipment no longer function as intended, are no longer safe in terms of public health and safety, or odor, noise, aerosol drift, or lighting adversely affects neighboring developed areas at the levels prohibited by Rule 62-600.400(2)(a), F.A.C., corrective action (which may include additional maintenance or modifications of the permitted facilities) shall be taken by the permittee. Other corrective action may be required to ensure compliance with rules of the Department. Additionally, the treatment, management, use or land application of residuals shall not cause a violation of the odor prohibition in Rule 62-296.320(2), F.A.C. *[62-600.410(8) and 62-640.400(6)]*

4. The deliberate introduction of stormwater in any amount into collection/transmission systems designed solely for the introduction and conveyance of domestic/industrial wastewater; or the deliberate introduction of stormwater into collection/transmission systems designed for the introduction or conveyance of combinations of storm and domestic/industrial wastewater in amounts which may reduce the efficiency of pollutant removal by the treatment plant is prohibited, except as provided by Rule 62-610.472, F.A.C. *[62-604.130(3)]*

5. Collection/transmission system overflows shall be reported to the Department in accordance with Permit Condition IX. 20. *[62-604.550] [62-620.610(20)]*

6. The operating authority of a collection/transmission system and the permittee of a treatment plant are prohibited from accepting connections of wastewater discharges which have not received necessary pretreatment or which contain materials or pollutants other than normal domestic wastewater constituents:

   a. Which may cause fire or explosion hazards; or

   b. Which may cause excessive corrosion or other deterioration of wastewater facilities due to chemical action or pH levels; or

   c. Which are solid or viscous and obstruct flow or otherwise interfere with wastewater facility operations or treatment; or

   d. Which result in the wastewater temperature at the introduction of the treatment plant exceeding 40°C or otherwise inhibiting treatment; or

   e. Which result in the presence of toxic gases, vapors, or fumes that may cause worker health and safety problems.

   [62-604.130(54)]

7. The treatment facility, storage ponds, rapid infiltration basins, and/or infiltration trenches shall be enclosed with a fence or otherwise provided with features to discourage the entry of animals and unauthorized persons. *[62-610.518(1)] [and 62-600.400(2)(b)]*

8. Screenings and grit removed from the wastewater facilities shall be collected in suitable containers and hauled to a Department approved Class I landfill or to a landfill approved by the Department for receipt/disposal of screenings and grit. *[62-701.300(1)(a)]*

9. The Permittee shall provide verbal notice to the Department as soon as practical after discovery of a sinkhole within an area for the management or application of wastewater, wastewater residuals (sludges), or reclaimed water. The Permittee shall immediately implement measures appropriate to control the entry of contaminants, and shall detail these measures to the Department in a written report within 7 days of the sinkhole discovery. *[62-4.070(3)]*

10. The permittee shall provide adequate notice to the Department of the following:

    a. Any new introduction of pollutants into the facility from an industrial discharger which would be subject to Chapter 403, F.S., and the requirements of Chapter 62-620, F.A.C. if it were directly discharging those pollutants; and

b. Any substantial change in the volume or character of pollutants being introduced into that facility by a source which was identified in the permit application and known to be discharging at the time the permit was issued.

Adequate notice shall include information on the quality and quantity of effluent introduced into the facility and any anticipated impact of the change on the quantity or quality of effluent or reclaimed water to be discharged from the facility.

[62-620.625(2)]

IX. GENERAL CONDITIONS

1. The terms, conditions, requirements, limitations and restrictions set forth in this permit are binding and enforceable pursuant to Chapter 403, Florida Statutes. Any permit noncompliance constitutes a violation of Chapter 403, Florida Statutes, and is grounds for enforcement action, permit termination, permit revocation and reissuance, or permit revision. *[62-620.610(1)]*

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviations from the approved drawings, exhibits, specifications or conditions of this permit constitutes grounds for revocation and enforcement action by the Department. *[62-620.610(2)]*

3. As provided in Subsection 403.087(6), F.S., the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor authorize any infringement of federal, state, or local laws or regulations. This permit is not a waiver of or approval of any other Department permit or authorization that may be required for other aspects of the total project which are not addressed in this permit. *[62-620.610(3)]*

4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title. *[62-620.610(4)]*

5. This permit does not relieve the permittee from liability and penalties for harm or injury to human health or welfare, animal or plant life, or property caused by the construction or operation of this permitted source; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department. The permittee shall take all reasonable steps to minimize or prevent any discharge, reuse of reclaimed water, or residuals use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. *[62-620.610(5)]*

6. If the permittee wishes to continue an activity regulated by this permit after its expiration date, the permittee shall apply for and obtain a new permit. *[62-620.610(6)]*

7. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control, and related appurtenances, that are installed and used by the permittee to achieve compliance with the conditions of this permit. This provision includes the operation of backup or auxiliary

facilities or similar systems when necessary to maintain or achieve compliance with the conditions of the permit. *[62-620.610(7)]*

8. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit revision, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition. *[62-620.610(8)]*

9. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, including an authorized representative of the Department and authorized EPA personnel, when applicable, upon presentation of credentials or other documents as may be required by law, and at reasonable times, depending upon the nature of the concern being investigated, to:

   a. Enter upon the permittee's premises where a regulated facility, system, or activity is located or conducted, or where records shall be kept under the conditions of this permit;

   b. Have access to and copy any records that shall be kept under the conditions of this permit;

   c. Inspect the facilities, equipment, practices, or operations regulated or required under this permit; and

   d. Sample or monitor any substances or parameters at any location necessary to assure compliance with this permit or Department rules.

   [62-620.610(9)]

10. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data, and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except as such use is proscribed by Section 403.111, Florida Statutes, or Rule 62-620.302, Florida Administrative Code. Such evidence shall only be used to the extent that it is consistent with the Florida Rules of Civil Procedure and applicable evidentiary rules. *[62-620.610(10)]*

11. When requested by the Department, the permittee shall within a reasonable time provide any information required by law which is needed to determine whether there is cause for revising, revoking and reissuing, or terminating this permit, or to determine compliance with the permit. The permittee shall also provide to the Department upon request copies of records required by this permit to be kept. If the permittee becomes aware of relevant facts that were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be promptly submitted or corrections promptly reported to the Department. *[62-620.610(11)]*

12. Unless specifically stated otherwise in Department rules, the permittee, in accepting this permit, agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance; provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules. A reasonable time for compliance with a new or amended surface water quality standard, other than those standards addressed in Rule 62-302.300, F.A.C., shall include a reasonable time to obtain or be denied a mixing zone for the new or amended standard. *[62-620.610(12)]*

13. The permittee, in accepting this permit, agrees to pay the applicable regulatory program and surveillance fee in accordance with Rule 62-4.052, F.A.C. *[62-620.610(13)]*

14. This permit is transferable only upon Department approval in accordance with Rule 62-620.340, F.A.C. The permittee shall be liable for any noncompliance of the permitted activity until the transfer is approved by the Department. *[62-620.610(14)]*

15. The permittee shall give the Department written notice at least 60 days before inactivation or abandonment of a wastewater facility and shall specify what steps will be taken to safeguard public health and safety during and following inactivation or abandonment. *[62-620.610(15)]*

16. The permittee shall apply for a revision to the Department permit in accordance with Rules 62-620.300 and the Department of Environmental Protection Guide to Wastewater Permitting at least 90 days before construction of any planned substantial modifications to the permitted facility is to commence or with Rule 62-620.325(2) for minor modifications to the permitted facility. A revised permit shall be obtained before construction begins except as provided in Rule 62-620.300, F.A.C. *[62-620.610(16)]*

17. The permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. The permittee shall be responsible for any and all damages which may result from the changes and may be subject to enforcement action by the Department for penalties or revocation of this permit. The notice shall include the following information:

    a. A description of the anticipated noncompliance;

    b. The period of the anticipated noncompliance, including dates and times; and

    c. Steps being taken to prevent future occurrence of the noncompliance.

    [62-620.610(17)]

18. Sampling and monitoring data shall be collected and analyzed in accordance with Rule 62-4.246, Chapters 62-160 and 62-601, F.A.C., and 40 CFR 136, as appropriate.

    a. Monitoring results shall be reported at the intervals specified elsewhere in this permit and shall be reported on a Discharge Monitoring Report (DMR), DEP Form 62-620.910(10), or as specified elsewhere in the permit.

    b. If the permittee monitors any contaminant more frequently than required by the permit, using Department approved test procedures, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.

    c. Calculations for all limitations which require averaging of measurements shall use an arithmetic mean unless otherwise specified in this permit.

    d. Except as specifically provided in Rule 62-160.300, F.A.C., any laboratory test required by this permit shall be performed by a laboratory that has been certified by the Department of Health Environmental Laboratory Certification Program (DOH ELCP). Such certification shall be for the matrix, test method and analyte(s) being measured to comply with this permit. For domestic wastewater facilities, testing for parameters listed in Rule 62-160.300(4), F.A.C., shall be conducted under the direction of a certified operator.

e. Field activities including on-site tests and sample collection shall follow the applicable standard operating procedures described in DEP-SOP-001/01 adopted by reference in Chapter 62-160, F.A.C.

f. Alternate field procedures and laboratory methods may be used where they have been approved in accordance with Rules 62-160.220 and 62-160.330, F.A.C.

[62-620.610(18)]

19. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule detailed elsewhere in this permit shall be submitted no later than 14 days following each schedule date. *[62-620.610(19)]*

20. The permittee shall report to the Department any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within five days of the time the permittee becomes aware of the circumstances. The written submission shall contain: a description of the noncompliance and its cause; the period of noncompliance including exact dates and time, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

a. The following shall be included as information which must be reported within 24 hours under this condition:

1. Any unanticipated bypass which causes any reclaimed water or effluent to exceed any permit limitation or results in an unpermitted discharge,

2. Any upset which causes any reclaimed water or the effluent to exceed any limitation in the permit,

3. Violation of a maximum daily discharge limitation for any of the pollutants specifically listed in the permit for such notice, and

4. Any unauthorized discharge to surface or ground waters.

b. Oral reports as required by this subsection shall be provided as follows:

1. For unauthorized releases or spills of treated or untreated wastewater reported pursuant to subparagraph a.4 that are in excess of 1,000 gallons per incident, or where information indicates that public health or the environment will be endangered, oral reports shall be provided to the Department by calling the **STATE WARNING POINT TOLL FREE NUMBER (800) 320-0519**, as soon as practical, but no later than 24 hours from the time the permittee becomes aware of the discharge. The permittee, to the extent known, shall provide the following information to the State Warning Point:

a) Name, address, and telephone number of person reporting;

b) Name, address, and telephone number of permittee or responsible person for the discharge;

c) Date and time of the discharge and status of discharge (ongoing or ceased);

d) Characteristics of the wastewater spilled or released (untreated or treated, industrial or domestic wastewater);

e) Estimated amount of the discharge;

f) Location or address of the discharge;

g) Source and cause of the discharge;

h) Whether the discharge was contained on-site, and cleanup actions taken to date;

i) Description of area affected by the discharge, including name of water body affected, if any; and

j) Other persons or agencies contacted.

2. Oral reports, not otherwise required to be provided pursuant to subparagraph b.1 above, shall be provided to the Department within 24 hours from the time the permittee becomes aware of the circumstances.

c. If the oral report has been received within 24 hours, the noncompliance has been corrected, and the noncompliance did not endanger health or the environment, the Department shall waive the written report.

[62-620.610(20)]

21. The permittee shall report all instances of noncompliance not reported under Permit Conditions IX. 18. and 19. of this permit at the time monitoring reports are submitted. This report shall contain the same information required by Permit Condition IX. 20 of this permit. *[62-620.610(21)]*

22. Bypass Provisions.

a. Bypass is prohibited, and the Department may take enforcement action against a permittee for bypass, unless the permittee affirmatively demonstrates that:

1. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage, and

2. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

3. The permittee submitted notices as required under Permit Condition IX. 22. b. of this permit.

b. If the permittee knows in advance of the need for a bypass, it shall submit prior notice to the Department, if possible at least 10 days before the date of the bypass. The permittee shall submit notice of an unanticipated bypass within 24 hours of learning about the bypass as required in Permit Condition IX. 20. of this permit. A notice shall include a description of the bypass and its cause; the period of the bypass, including exact dates and times; if the bypass has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent recurrence of the bypass.

c. The Department shall approve an anticipated bypass, after considering its adverse effect, if the permittee demonstrates that it will meet the three conditions listed in Permit Condition IX. 22. a. 1. through 3. of this permit.

d. A permittee may allow any bypass to occur which does not cause reclaimed water or effluent limitations to be exceeded if it is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Permit Condition IX. 22. a. through c. of this permit.

{62-620.610(22)}

23. Upset Provisions

a. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed contemporaneous operating logs, or other relevant evidence that:

1. An upset occurred and that the permittee can identify the cause(s) of the upset;

2. The permitted facility was at the time being properly operated;

3. The permittee submitted notice of the upset as required in Permit Condition IX. 20. of this permit; and

4. The permittee complied with any remedial measures required under Permit Condition IX. 5. of this permit.

b. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

c. Before an enforcement proceeding is instituted, no representation made during the Department review of a claim that noncompliance was caused by an upset is final agency action subject to judicial review.

{62-620.610(23)}

Executed in Hillsborough County, Florida.

STATE OF FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION

Jeffry S. Greenwell, P.E.
Water Facilities Administrator
Southwest District
13051 N. Telecom Parkway
Temple Terrace, FL 33637-0926

DEPARTMENT OF ENVIRONMENTAL PROTECTIC DISCHARGE MONITORING REPORT - PART A

When Completed mail this report to: Department of Environmental Protection, Wastewater Compliance Evaluation Section, MS 3551, 2600 Blair Stone Road, Tallahassee, FL 32399-2400

PERMITTEE NAME: Progress Energy Florida, Inc.
MAILING ADDRESS: 15760 Powerline Street, MAC CN77
Crystal River, FL 34452-6708

PERMIT NUMBER: FLA011862

LIMIT: Final
CLASS SIZE: N/A

REPORT GROUP: Monthly Domestic

FACILITY LOCATION: Progress Energy -Crystal River Unit 4 & 5 WWTP
15760 Powerline Street, MAC CN77
Crystal River, FL 34428- 6708

COUNTY: Citrus

MONITORING GROUP NUMBER: R-001
MONITORING GROUP DESC: RIB (R-001), including Influent

NO DISCHARGE TO R-001. ☐
MONITORING PERIOD From _____ To _____

Parameter		Quantity or Loading		Units	Quality or Concentration			Units	No. Ex.	Frequency of Analysis	Sample Type
Flow, To R-001	Sample Measurement										
PARM Code 50050 Y Mon.Site No. FLW-01	Permit Requirement	0.020 (12MADF)		MGD						Monthly	Calculation
Flow, To R-001	Sample Measurement										
PARM Code 50050 1 Mon.Site No. FLW-01	Permit Requirement	Report (Mo.Avg.)		MGD						5 Days/Week	Elapsed Time Meter ?,
BOD, Carbonaceous 5 day, 20C	Sample Measurement										
PARM Code 80082 Y Mon.Site No. EFA-01	Permit Requirement				20.0 (Mo.Avg.)			mg/L		Monthly	Calculation
BOD, Carbonaceous 5 day, 20C	Sample Measurement										
PARM Code 80082 A Mon.Site No. EFA-01	Permit Requirement				30.0 (Mo.Avg.)		60.0 (Max.)	mg/L		Monthly	Grab
Solids, Total Suspended	Sample Measurement										
PARM Code 00530 Y Mon.Site No. EFA-01	Permit Requirement				20.0 (Mo.Avg.)			mg/L		Monthly	Calculation
Solids, Total Suspended	Sample Measurement										
PARM Code 00530 A Mon.Site No. EFA-01	Permit Requirement				30.0 (Mo.Avg.)		60.0 (Max.)	mg/L		Monthly	Grab

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

NAME/TITLE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	TELEPHONE NO	DATE (YYMMDD)

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here):

DISCHARGE MONITORING REPORT - PART A (Continued)

FACILITY Progress Energy-Crystal River Units 4 & 5 WWTF
Citrus County

MONITORING GROUP NUMBER R-003
MONITORING PERIOD From _____ To _____

PERMIT NUMBER FLA011862

Parameter		Quantity or Loading		Units	Quality or Concentration			Units	No. Ex.	Frequency of Analysis	Sample Type
pH	Sample Measurement										
PARM Code 00406 A Mon.Site No. EFA-01	Permit Requirement				6.0 (Min.)		8.5 (Max.)	SU		5 Days/Week	Grab
Coliform, Fecal	Sample Measurement										
PARM Code 74055 Y Mon.Site No. EFA-01	Permit Requirement				200 (Ar.Avg.)			#/100mL		Monthly	Calculation
Coliform, Fecal	Sample Measurement										
PARM Code 74055 A Mon.Site No. EFA-01	Permit Requirement				Report (Mo.Geo.Mean)		800 (Max.)	#/100mL		Monthly	Grab
Total Chlorine Residual (For Disinfection)	Sample Measurement										
PARM Code 50060 A Mon.Site No. EFA-01	Permit Requirement				0.5 (Min.)			mg/L		5 Days/Week	Grab
Nitrogen, Nitrate, Total (as N)	Sample Measurement										
PARM Code 00620 A Mon.Site No. EFA-01	Permit Requirement						12.0 (Max.)	mg/L		Monthly	Grab
	Sample Measurement										
	Permit Requirement										
Flow, Total Plant	Sample Measurement										
PARM Code 50050 Q Mon.Site No. FLW-01	Permit Requirement	0.020 (3MADF)		MGD						Monthly	Calculation
Percent Capacity, (3MADF/Permitted Capacity) x 100	Sample Measurement										
PARM Code 00180 1 Mon.Site No. FLW-01	Permit Requirement				Report			%		Monthly	Calculation
BOD, Carbonaceous 5 day, 20C	Sample Measurement										
PARM Code 80082 G Mon.Site No. INF-01	Permit Requirement				Report			mg/L		Annually (February)	Grab
Solids, Total Suspended	Sample Measurement										
PARM Code 00530 G Mon.Site No. INF-01	Permit Requirement				Report			mg/L		Annually (February)	Grab
	Sample Measurement										
	Permit Requirement										

PA File No. FLA011862-002-DW3P/NR
DEP Form 62-620.910(10), Effective November 29, 1994

DAILY SAMPLE RESULTS - PART B (R-001)

Permit Number FLA011862 Facility: Progress Energy-Crystal River Units 4 & 5 WWTP
Monitoring Period From _____ To: _____ County: Citrus

	Flow (MGD) R-001 & Total Plant	CBOD5 (mg/L)	TSS (mg/L)	Fecal Coliform Bacteria (#/100mL)	pH (SU)	TCR (For Disinfect.) (mg/L)	Nitrogen, Nitrate, Total (as N) (mg/L)	Notes
Code	50050	80082	00530	74055	00406	50060	00620	
Mon. Site	FLW-01	EFA-01	EFA-01	EFA-01	EFA-01	EFA-01	EFA-01	
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
Total								
Mo. Avg								

PLANT STAFFING:

Day Shift Operator Class: _____ Certificate No: _____ Name: _____

Evening Shift Operator Class: _____ Certificate No: _____ Name: _____

Shift Operator Class: _____ Certificate No: _____ Name: _____

Lead Operator Class: _____ Certificate No: _____ Name: _____

INSTRUCTIONS FOR COMPLETING THE WASTE WATER DISCHARGE MONITORING REPORT

Read these instructions as well as the SUPPLEMENTAL INSTRUCTIONS FOR COMPLETING THE WASTEWATER DISCHARGE MONITORING REPORT before completing the DMR. Hard copies and/or electronic copies of the required parts of the DMR were provided with the permit. All required information shall be completed in full and typed or printed in ink. A signed, original DMR shall be mailed to the address printed on the DMR by the 28th of the month following the monitoring period. The DMR shall not be submitted before the end of the monitoring period.

The DMR consists of three parts--A, B, and D--all of which may or may not be applicable to every facility. Facilities may have one or more Part A's for reporting effluent or reclaimed water data. All domestic wastewater facilities will have a Part B for reporting daily sample results. Part D is used for reporting ground water monitoring well data.
When results are not available, the following codes should be used on parts A and D of the DMR and an explanation provided where appropriate. Note: Codes used on Part B for raw data are different.

CODE	DESCRIPTION/INSTRUCTIONS
ANC	Analysis not conducted.
DRY	Dry Well
FLD	Flood disaster.
IFS	Insufficient flow for sampling.
LS	Lost sample.
MNR	Monitoring not required this period.

CODE	DESCRIPTION/INSTRUCTIONS
NOD	No discharge from/to site.
OPS	Operations were shutdown so no sample could be taken.
OTH	Other. Please enter an explanation of why monitoring data were not available.
SEF	Sampling equipment failure.

When reporting analytical results that fall below a laboratory's reported method detection limits or practical quantification limits, the following instructions should be used:

1. Results greater than or equal to the PQL shall be reported as the measured quantity.
2. Results less than the PQL and greater than or equal to the MDL shall be reported as the laboratory's MDL value. These values shall be deemed equal to the MDL when necessary to calculate an average for that parameter and when determining compliance with permit limits.
3. Results less than the MDL shall be reported by entering a less than sign ("<") followed by the laboratory's MDL value, e.g. < 0.001. A value of one-half the MDL or one-half the effluent limit, whichever is lower, shall be used for that sample when necessary to calculate an average for that parameter. Values less than the MDL are considered to demonstrate compliance with an effluent limitation.

PART A -DISCHARGE MONITORING REPORT (DMR)

Part A of the DMR is comprised of one or more sections, each having its own header information. Facility information is preprinted in the header as well as the monitoring group number, whether the limits and monitoring requirements are interim or final, and the required submittal frequency (e.g. monthly, annually, quarterly, etc.). Submit Part A based on the required reporting frequency in the header and the instructions shown in the permit. The following should be completed by the permittee or authorized representative:

No Discharge From Site: Check this box if no discharge occurs and, as a result, there are no data or codes to be entered for all of the parameters on the DMR for the entire monitoring group number, however, if the monitoring group includes other monitoring locations (e.g., influent sampling), the "NOD" code should be used to individually denote those parameters for which there was no discharge.
Monitoring Period: Enter the month, day, and year for the first and last day of the monitoring period (i.e. the month, the quarter, the year, etc.) during which the data on this report were collected and analyzed.
Sample Measurement: Before filling in sample measurements in the table, check to see that the data collected correspond to the limit indicated on the DMR (i.e. interim or final) and that the data correspond to the monitoring group number in the header. Enter the data or calculated results for each parameter on this row in the non-shaded area above the limit. Be sure the result being entered corresponds to the appropriate statistical base code (e.g. annual average, monthly average, single sample maximum, etc.) and units.
No. Ex.: Enter the number of sample measurements during the monitoring period that exceeded the permit limit for each parameter in the non-shaded area. If none, enter zero.
Frequency of Analysis: The shaded areas in this column contain the minimum number of times the measurement is required to be made according to the permit. Enter the actual number of times the measurement was made in the space above the shaded area.
Sample Type: The shaded areas in this column contain the type of sample (e.g. grab, composite, continuous) required by the permit. Enter the actual sample type that was taken in the space above the shaded area.
Signature: This report must be signed in accordance with Rule 62-620.305, F.A.C. Type or print the name and title of the signing official. Include the telephone number where the official may be reached in the event there are questions concerning this report. Enter the date when the report is signed.
Comment and Explanation of Any Violations: Use this area to explain any exceedances, any upset or by-pass events, or other items which require explanation. If more space is needed, reference all attachments in this area.

PART B - DAILY SAMPLE RESULTS

Monitoring Period: Enter the month, day, and year for the first and last day of the monitoring period (i.e. the month, the quarter, the year, etc.) during which the data on this report were collected and analyzed.
Daily Monitoring Results: Transfer all analytical data from your facility's laboratory or a contract laboratory's data sheets for all day(s) that samples were collected. Record the data in the units indicated. Table 1 in Chapter 62-160, F.A.C., contains a complete list of all the data qualifier codes that your laboratory may use when reporting analytical results. However, when transferring numerical results onto Part B of the DMR, only the following data qualifier codes should be used and an explanation provided where appropriate.

CODE	DESCRIPTION/INSTRUCTIONS
<	The compound was analyzed for but not detected.
A	Value reported is the mean (average) of two or more determinations.
J	Estimated value, value not accurate.
Q	Sample held beyond the actual holding time.
Y	Laboratory analysis was from an unpreserved or improperly preserved sample.

Add the results to get the Total and divide by the number of days in the month to get the Monthly Average.
Plant Staffing: List the name, certificate number, and class of all state certified operators operating the facility during the monitoring period. Use additional sheets as necessary

PART D - GROUND WATER MONITORING REPORT

Monitoring Period: Enter the month, day, and year for the first and last day of the monitoring period (i.e. the month, the quarter, the year, etc.) during which the data on this report were collected and analyzed.
Date Sample Obtained: Enter the date the sample was taken. Also, check whether or not the well was purged before sampling.
Time Sample Obtained: Enter the time the sample was taken.
Sample Measurement: Record the results of the analysis. If the result was below the minimum detection limit, indicate that.
Detection Limits: Record the detection limits of the analytical methods used.
Analysis Method: Indicate the analytical method used. Record the method number from Chapter 62-160 or Chapter 62-601, F.A.C., or from other sources.
Sampling Equipment Used: Indicate the procedure used to collect the sample (e.g. airlift, bucket/bailer, centrifugal pump, etc.)
Samples Filtered: Indicate whether the sample obtained was filtered by laboratory (L), filtered in field (F), or unfiltered (N).
Signature: This report must be signed in accordance with Rule 62-620.305, F.A.C. Type or print the name and title of the signing official. Include the telephone number where the official may be reached in the event there are questions concerning this report. Enter the date when the report is signed.
Comments and Explanation: Use this space to make any comments on or explanations of results that are unexpected. If more space is needed, reference all attachments in this area.

SPECIAL INSTRUCTIONS FOR LIMITED WET WEATHER DISCHARGES

Flow (Limited Wet Weather Discharge): Enter the measured average flow rate during the period of discharge or divide gallons discharged by duration of discharge (converted into days). Record in million gallons per day (MGD).
Flow (Upstream): Enter the average flow rate in the receiving stream upstream from the point of discharge for the period of discharge. The average flow rate can be calculated based on two measurements, one made at the start and one made at the end of the discharge period. Measurements are to be made at the upstream gauging station described in the permit.
Actual Stream Dilution Ratio: To calculate the Actual Stream Dilution Ratio, divide the average upstream flow rate by the average discharge flow rate. Enter the Actual Stream Dilution Ratio accurate to the nearest 0.1.
No. of Days the SDF > Stream Dilution Ratio: For each day of discharge, compare the minimum Stream Dilution Factor (SDF) from the permit to the calculated Stream Dilution Ratio. On Part B of the DMR, enter an asterisk (*) if the SDF is greater than the Stream Dilution Ratio on any day of discharge. On Part A of the DMR, add up the days with an "*" and record the total number of days the Stream Dilution Factor was greater than the Stream Dilution Ratio.
$CBOD_5$: Enter the average $CBOD_5$ of the reclaimed water discharged during the period shown in duration of discharge.
TKN: Enter the average TKN of the reclaimed water discharged during the period shown in duration of discharge.
Actual Rainfall: Enter the actual rainfall for each day on Part B. Enter the actual cumulative rainfall to date for this calendar year and the actual total monthly rainfall on Part A. The cumulative rainfall to date for this calendar year is the total amount of rain, in inches, that has been recorded since January 1 of the current year through the month for which this DMR contains data.
Rainfall During Average Rainfall Year: On Part A, enter the total monthly rainfall during the average rainfall year and the cumulative rainfall for the average rainfall year. The cumulative rainfall for the average rainfall year is the amount of rain, in inches, which fell during the average rainfall year from January through the month for which this DMR contains data.
No. of Days LWWD Activated During Calendar Year: Enter the cumulative number of days that the limited wet weather discharge was activated since January 1 of the current year
Reason for Discharge: Attach to the DMR a brief explanation of the factors contributing to the need to activate the limited wet weather discharge.

Florida Department of
Environmental Protection
Southwest District Office
13051 North Telecom Parkway
Temple Terrace, Florida 33637-0926

Charlie Crist
Governor

Jeff Kottkamp
Lt. Governor

Michael W. Sole
Secretary

July 9, 2009

Mr. Larry Hatcher
Progress Energy Florida, Inc.
15760 W. Powerline Street
Crystal River, FL 34428
larry.hatcher@pgnmail.com

Re: Minor Revision
Progress Energy - Crystal River Units 4 & 5 WWTF
PA File No. FLA011862-003-DW3/MR
Citrus County

Dear Mr. Hatcher:

In accordance with Rule 62-620.325(2), Florida Administrative Code (FAC), the Department received your request for a minor revision of the permit conditions of the above-referenced Domestic Wastewater treatment facility permit FLA011862, which expires on May 16, 2012.

This revision involves the installation of a new 20,000-gallon cast-in-place concrete equalization basin with influent screening, dual submersible pumps and an emergency overflow pipe. The existing flow splitter box will be modified with a 45-degree v-notch weir for flow control to the plant. A new aeration blower assembly will also be installed as well as all associated piping.

Prior to placing the new facilities into operation or any individual unit processes into operation, for any purpose other than testing for leaks and equipment operation, the permittee shall complete and submit to the Department DEP Form 62-620.910(12), Notification of Completion of Construction for Domestic Wastewater Facilities. [Rule 62-620.630(2), FAC, 10-23-00]

Within six months after a facility is placed in operation, the permittee shall provide written certification to the Department on Form 62-620.910(13) that record drawings pursuant to Chapter 62-600, F.A.C., and that an operation and maintenance manual pursuant to Chapters 62-600 and 62-610, F.A.C., as applicable, are available at the location specified on the form. [Rule 62-620.630(7), FAC, 10-23-00]

This permit revision authorizing the above changes must be attached to your original permit and, together with any other preceding modification/revision(s), becomes a part of that permit.

Sincerely,

Jeffrey S. Greenwell, P.E.
Water Facilities Administrator

JSG/ra
cc: W. Murray Blackman, P.E., DNM Engineering & Associates, dnmengineering@embarqmail.com
Jamie Lewis, E.S., FDEP, jamie.l.lewis@dep.state.fl.us

Florida Department of
Environmental Protection

Southwest District Office
13051 North Telecom Parkway
Temple Terrace, Florida 33637-0926

Charlie Crist
Governor

Jeff Kottkamp
Lt. Governor

Michael W. Sole
Secretary

063-9558

In the Matter of an
Application for Permit by:

May 17, 2007

Progress Energy Florida, Inc.
Bernie M. Cumbie, Plant Manager
15760 Powerline Street, MAC CN77
Crystal River, FL 34428-6708

PA File No. FLA011862-002-DW3P/NR
Progress Energy-Crystal River Units 4 & 5 WWTF
Citrus County
Permit No. FLA011862

NOTICE OF PERMIT ISSUANCE

Enclosed is Permit Number FLA011862 to operate a domestic wastewater treatment facility, issued pursuant to Chapter 403, F.S., Chapters 62-4, 62-600, 62-601, 62-602, 62-610, 62-620, 62-640, and 62-699, F.A.C.

The Department's proposed agency action shall become final unless a timely petition for an administrative hearing is filed under Sections 120.569 and 120.57 of the Florida Statutes before the deadline for filing a petition. The procedures for petitioning for a hearing are set forth below.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Sections 120.569 and 120.57 of the Florida Statutes. The petition must contain the information set forth below and must be filed (received by the clerk) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000.

Petitions by the applicant or any of the parties listed below must be filed within fourteen (14) days of date of receipt of this written notice. Petitions filed by any persons other than those entitled to written notice under Section 120.60(3) of the Florida Statutes must be filed within fourteen (14) days of publication of the notice or within fourteen (14) days of receipt of the written notice, whichever occurs first.

Under Section 120.60(3) of the Florida Statutes, however, any person who has asked the Department for notice of agency action may file a petition within fourteen (14) days of receipt of such notice, regardless of the date of publication.

The petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57 of the Florida Statutes. Any subsequent intervention (in a proceeding initiated by another party) will be only at the discretion of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205 of the Florida Administrative Code.

A petition that disputes the material facts on which the Department's action is based must contain the following information:

(a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit Identification Number and the county in which the subject matter or activity is located;

(b) A statement of how and when each petitioner received notice of the Department action;

(c) A statement of how each petitioner's substantial interests are affected by the Department action;

(d) A statement of the material facts disputed by petitioner, if any;

(e) A statement of facts which petitioner contends warrant reversal or modification of the Department action;

(f) A statement of which rules or statutes the petitioner contends require reversal or modification of the Department action; and

(g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take.

A petition that does not dispute the material facts on which the Department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

Mediation under Section 120.573 of the Florida Statutes is not available for this proceeding.

This action is final and effective on the date filed with the Clerk of the Department unless a petition is filed in accordance with the above. Upon the timely filing of a petition this order will not be effective until further order of the Department.

Any party to the order has the right to seek judicial review of the order under section 120.68 of the Florida Statutes, by the filing of a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the Clerk of the Department in the Office of General Counsel, Mail Station 35, 3900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000; and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate district court of appeal. The notice of appeal must be filed within thirty (30) days from the date when the final order is filed with the Clerk of the Department

Executed in Hillsborough County, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

for Jeffry S. Greenwell, P.E.
Water Facilities Administrator
Southwest District
13051 North Telecom Parkway
Temple Terrace, FL 33637-0926

Progress Energy Florida, Inc.
Progress Energy-Crystal River Units 4 & 5 WWTF
PA File No. FLA011862-002-DW3P/NR

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this NOTICE OF PERMIT ISSUANCE and all copies were mailed before the close of business on May 17, 2007 to the listed persons.

FILING AND ACKNOWLEDGMENT

FILED, on this date, pursuant to s. 120.52(7), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Linda Butler 5/17/07
(Clerk) (Date)

Copies Furnished To:

Kerem H. Esin, P.E., Golder Associates, Inc.
Douglas Harmon, Operator
Vicki Wheeler, FDEP-SWD, DW Environmental Specialist
Citrus County Department of Health
JoAnne Bowden, FDEP-Tallahassee, MS 3535 (DMR)
Cheryl Minskey, FDEP-SWD Residuals Coordinator
FDEP-SWD, DW Citrus County Progress Energy-Crystal River Units 4 & 5 WWTF Permit File
FDEP-SWD, DW Permit Read File

July 19, 2010 103-82558

Mr. Doug Yowell
Progress Energy Florida, Inc.
299 1st Avenue North, PEF-903
St. Petersburg, FL 33701

RE: NORTH PLANT AREA STORMWATER MODELING REPORT
CRYSTAL RIVER ENERGY COMPLEX
CRYSTAL RIVER, FLORIDA

Dear Mr. Yowell:

Golder Associates Inc. (Golder) is pleased to present the stormwater modeling results for the north plant area (a.k.a. Units 4 and 5) of the Crystal River Energy Complex (CREC) to Progress Energy Florida, Inc. (PEF). This report summarizes the analysis by Golder of the capacity of the currently permitted stormwater system to manage additional impervious surfaces within Units 4 and 5 which comprise the north plant area of the CREC.

BACKGROUND INFORMATION

The existing stormwater management system for the north plant area of CREC was constructed in the late 1970s to treat/convey stormwater runoff for the 25-year, 24-hour design storm. The stormwater management system discharges to the Gulf of Mexico via NPDES Permit number FL0036366 - Runoff Collection Overflow outfall (Outfall D-0C0). A model for the stormwater management system was developed by Jacobs Engineering Inc. (Jacobs) in November 2006 and approved by the Florida Department of Environmental Protection (FDEP) as part of the modification of the Conditions of Certification (COC) to support the Crystal River Clean Air (CRCA) Project. Over the last four years, site construction activities related to the CRCA Project have triggered additional modeling exercises to demonstrate that the stormwater management system has sufficient capacity to handle a specific change in land use/ground cover due to proposed works within the stormwater management system basin. Stormwater permitting issues were discussed between PEF and FDEP Southwest District during a meeting held in January 2010. In order to reduce the number of future construction Environmental Resource Permit (ERP) reviews issued via COC amendments for individual projects involving land use/ground cover changes within the north plant area basin it was suggested by FDEP that PEF demonstrate via modeling that the entire north plant area stormwater system has sufficient capacity to handle additional impervious surface within the area. If the system was incapable of handling all impervious area, FDEP suggested that a "ledger" system could be created by FDEP that would allow the site to "bank" the maximum modeled acreage of impervious surface with subsequent future "debits" against the bank as new areas are developed within the basin in lieu of submitting an ERP modification. As a result of the meeting with FDEP, PEF requested Golder modify the stormwater model to include the entire north plant area as impervious surface.

STORMWATER MODEL SUMMARY

The stormwater model consists of eight basins that drain to a series of interconnected ditches, canals, and wet detention ponds. The stormwater model for the site was developed using the Interconnected Pond Routing (ICPR) program. A layout of the site and drainage basins is shown in Figure 1. Golder generally followed the same basin identification nomenclature as Jacobs' 2006 model for ease of review. Basins 1B-i, 1B-ii, and 1B-iii were excluded from the model as they discharge to coal pile runoff ponds constructed at the eastern end of the coal pile. The remaining basins, 1A, 1B-iv, 1B-v, 1B-vi, and 1B-vii, were modeled as impervious surfaces with a runoff curve number (CN) of 98. A summary of the drainage basins modeled is shown below:

Basin Designation	Area (acres)	Runoff Curve Number	Time of Concentration
1A	94.8	98	27.0
1B-iv	16.7	98	7.7
1B-v	44.1	98	16.9
1B-vi	74.0	98	11.4
1B-vii	22.9	98	3.8

Time of concentration calculations were modified from Jacobs' 2006 model to reflect flow conditions over impervious surfaces using the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Technical Release Number 55 (TR-55) methodology. The time of concentration value for basin 1A was used from a previous stormwater design that was performed by Golder on March 17, 2010 as part of the horizontal reconfiguration of the ash disposal area. This stormwater design and model verified that proposed modifications to the basins which make up basin 1A (f.k.a. basins 1A-iii, 1A-ii, and 1A-i) meet NPDES storage requirements and design high water elevations for 10-year, 24-hour and 25-year, 24-hour storm frequencies. Overall, the time of concentration values decreased in comparison to the 2006 Jacobs model. A minimum time of concentration value of 10 minutes was used for the Interconnected Pond Routing (ICPR) Model for Basins 1B-iv and 1B-vii. Time of concentration calculations are shown in Table 1.

Limited stormwater surveys were performed in November 2009 (ash disposal area) and May 2010 (north plant area) by Harry W. Marlow, Inc. to verify conveyance structure details and pond cross-sections. The survey data was used to validate the model inputs parameters and revise them as necessary. Model input data is provided in Appendix A.

STORMWATER MODEL RESULTS

Stormwater modeling was performed for the 10-year, 24-hour storm event and the 25-year, 24-hour storm event using ICPR and the results for peak flow rates and peak stages are shown in Table 2. These results and comparisons to the results reported for the 2006 Jacobs model indicated the following:

- The peak stages at each node were higher in comparison to the 2006 Jacobs model. However, none of the warning stages at any of the nodes in the ICPR model were exceeded and adequate freeboard is still available throughout the stormwater management system.
- The peak flow rates were higher in comparison to the 2006 Jacobs model with the exception of the outfall node into the Gulf of Mexico, Node TW-N1 (f.k.a. TW-N1POST).
  - The higher stages and peak flow rates can be attributed to incorporating a higher curve number (CN) for each basin.
  - The lower peak flow rate at node TW-N1 can be attributed to incorporating more detention storage into the model based on the cross-section data that was provided by Harry W. Marlow, Inc. and Southwest Florida Water Management District historical topographic data (dated February 1991).

CONCLUSION

In conclusion, the revised stormwater model results indicate that the stormwater management system is capable of managing the entire north plant area, defined by the drainage basins shown in Figure 1, as impervious surface.

CLOSING

Golder appreciates being given the opportunity to provide this report to PEF. Please feel free to contact the undersigned with any questions or comments.

Sincerely,

GOLDER ASSOCIATES INC.

Samuel F. Stafford
Project Engineer

Kenneth B. Karably, PE, PG
Principal

KENNETH B. KARABLY
LICENSE
No. 42366
7/19/2010
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

SFS/BTH/ke/kbk/ams

cc: George Hixon

Attachments:	Table 1	Time of Concentration Calculations
	Table 2	ICPR Modeling Results Summary
	Figure 1	Site Layout
	Appendix A	ICPR Modeling Inputs and Results

FN: G:\Projects\103\103-82\103-82558\Report\Final\PEF CREC North Plant Stormwater_FINAL_14JULY2010.docx

TABLES

TABLE 1
TIME OF CONCENTRATION CALCULATIONS

CRYSTAL RIVER ENERGY COMPLEX
NORTH PLANT AREA STORMWATER MODELING

		Basin				
Sheet Flow	Units	1B-IV	1B-V	1B-VI	1B-VII	1A
Surface Description		Paved	Paved	Paved	Paved	Refer to Appendix 1
Manning's Roughness Coefficient (n)		0.011	0.011	0.011	0.011	
Flow Length (L)	feet	300	300	300	100	
2-yr 24-hr Rainfall (P_2)	inches	5	5	5	5	
Land Slope (S)	feet/feet	0.002	0.002	0.002	0.013	
Travel Time (T_t)[1]	minutes	5.86	5.86	5.86	1.15	
		Basin				
Shallow Concentrated Flow	Units	1B-IV	1B-V	1B-VI	1B-VII	1A
Surface Description		Paved	Paved	Paved	Paved	Refer to Appendix 1
Flow Length (L)	feet	150	930	300	226	
Land Slope (S)	feet/feet	0.002	0.002	0.002	0.0066	
Average Velocity (v)	feet/second	1.4	1.4	1.4	1.4	
Travel Time (T_t)[2]	minutes	1.79	11.07	3.57	2.69	
		Basin				
Channel Flow	Units	1B-IV	1B-V	1B-VI	1B-VII	1A
Cross Sectional Area	square feet	Paved	Paved	30	Paved	Refer to Appendix 1
Wetted Perimeter (P)	feet	0	0	24	0	
Hydraulic Radius (H_r)	feet	0	0	1.25	0	
Channel Slope (S)	feet/feet	0	0	0.002	0	
Manning's Roughness Coefficient (n)		0	0	0.011	0	
Velocity (v)[3]	feet/second	0	0	7.03	0	
Flow Length (L)	feet	0	0	840.00	0	
Travel Time (T_t)	minutes	0	0	1.99	0	
Time of Concentration[4]	minutes	**7.65**	**16.94**	**11.43**	**3.84**	**27.00**

Notes:
[1]Natural Resource Conservation Service (NRCS) (TR-55) Equation was used to determine sheet flow travel time
[2]NRCS Average Velocity Chart (Paved Area) was used to determine shallow concentrated flow travel time
[3]Chezy-Manning equation was used to determine channel flow velocity
[4]A minimum time of concentration value of 10 minutes was used for Interconnected Pond Routing (ICPR) Model

Created by: BTH
Checked by: SFS
Reviewed by: KBK

TABLE 2
ICPR MODELING RESULTS SUMMARY

CRYSTAL RIVER ENERGY COMPLEX - UNITS 4 AND 5
STORMWATER MODELING

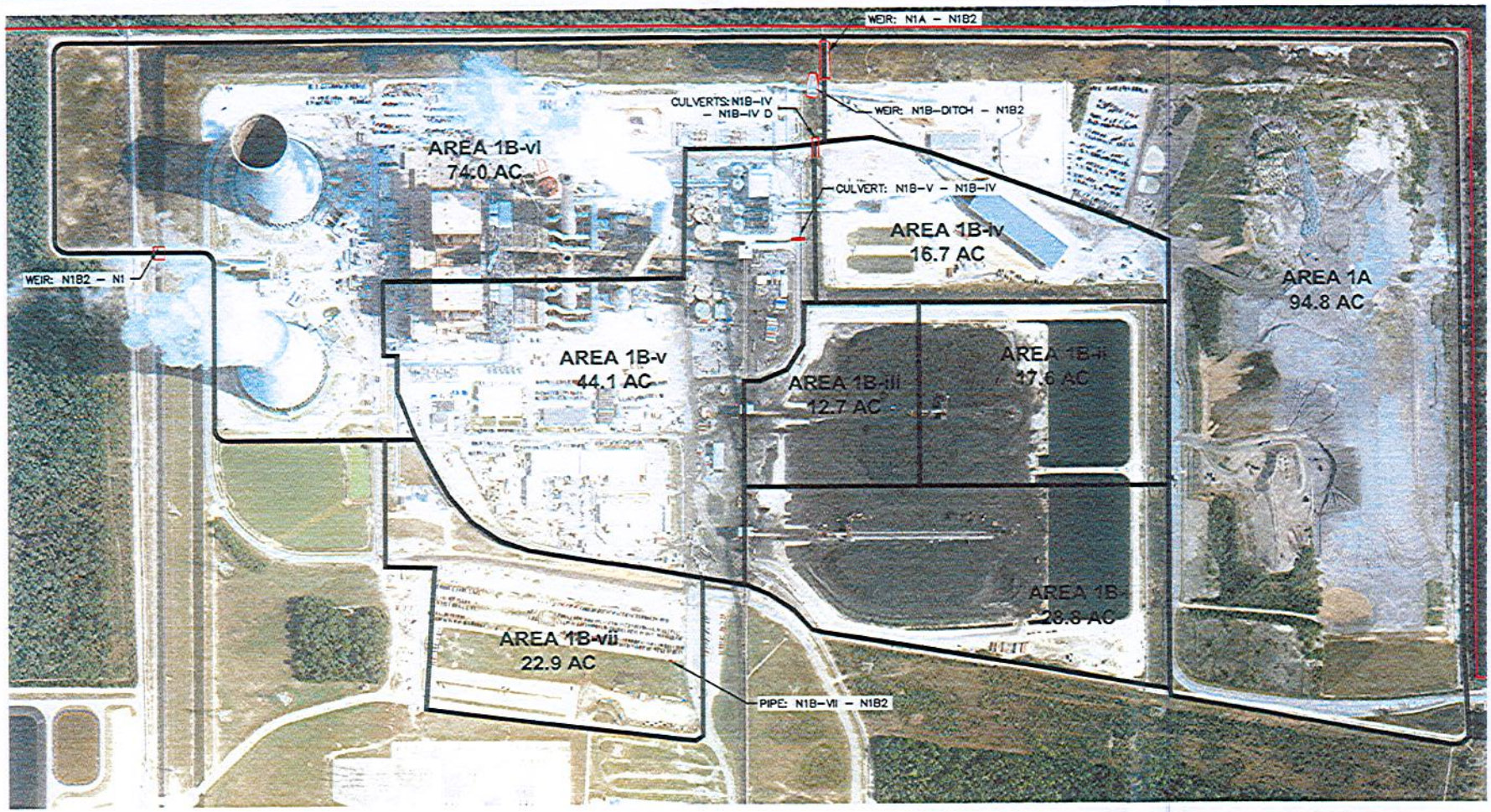
Outfall Name	Outfall NPDES Designation	Outfall ICPR Model Designation	Contributing Area (acres)	10-yr 24-hr Storm		25-yr 24-hr Storm	
				Peak Discharge (cfs)	Peak Stage (ft)	Peak Discharge (cfs)	Peak Stage (ft)
Ash Disposal Area Weir	I-C40	N1A - N1B2	94.8	0.0	6.6	11.7	7.0
Coal Pile Ditch Weir	I-CHO	N1B-DITCH - N1B2	60.8	41.3	7.2	73.2	7.4
Overall North Plant Weir	D-OCO	N1B2 - N1	252.5	0.0	6.6	28.5	7.0

Notes:
Contributing Area for does not include coal pile basins which are managed separately
NPDES Designations from FL0036366
cfs = cubic feet per second
ft = elevation in feet above mean sea level (NGVD29)

Created By: SFS
Checked By: BTH
Reviewed By: KBK

Golder Associates

FIGURES



REFERENCES

1.) AERIAL PHOTOGRAPH DATED APRIL 20, 2010 FROM SOUTHERN RESOURCE MAPPING, INC.

2.) DRAINAGE BASINS BASED ON MODEL BY JACOBS, DRAWING NUMBER 2830–C–106, REVISION 4, DATED 11/30/2007.

400 0 400
SCALE FEET

PROJECT: PROGRESS ENERGY
CRYSTAL RIVER ENERGY COMPLEX
CITRUS COUNTY, FLORIDA

TITLE: SITE LAYOUT

Golder Associates
Jacksonville, Florida

PROJECT No.	103-82556		FILE No.	10382556A001
DESIGN	SPS	06/04/10	SCALE AS SHOWN	REV. 0
CADD	PP	6/11/10		
CHECK	SPS	7/14/10	FIGURE 1	
REVIEW	KRB	7/14/10		

Drawing File: 10382556A001.dwg Jun 08, 2010 – 11:46am

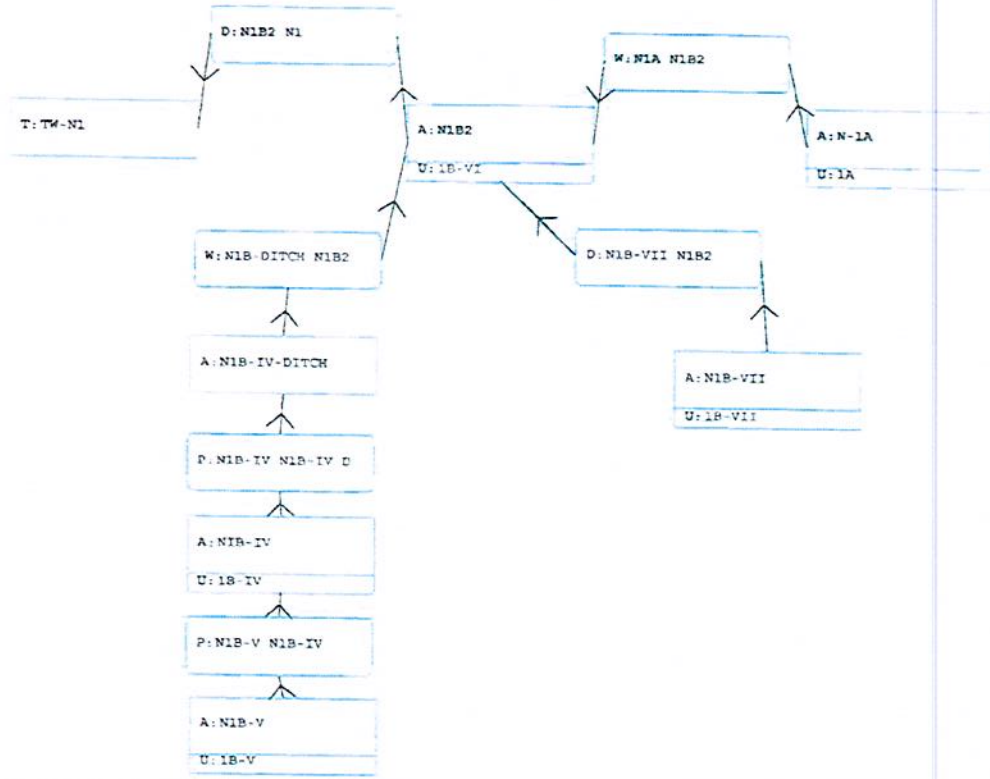
APPENDIX A

ICPR MODELING INPUTS AND RESULTS

Nodes
A Stage/Area
V Stage/Volume
T Time/Stage
M Manhole

Basins
O Overland Flow
U SCS Unit CN
S SBUH CN
Y SCS Unit GA
Z SBUH GA

Links
P Pipe
W Weir
C Channel
D Drop Structure
B Bridge
R Rating Curve
H Breach
E Percolation
F Filter
X Exfil Trench



==== Basins ====

```
Name: 1A                    Node: N-1A                    Status: Onsite
Group: POST                 Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh256              Peaking Factor: 256.0
Rainfall File: Flmod            Storm Duration(hrs): 24.00
Rainfall Amount(in): 0.000        Time of Conc(min): 27.00
Area(ac): 94.800                   Time Shift(hrs): 0.00
Curve Number: 98.00            Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00
```

```
Name: 1B-IV                 Node: N1B-IV                  Status: Onsite
Group: POST                 Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh256              Peaking Factor: 256.0
Rainfall File: Flmod            Storm Duration(hrs): 24.00
Rainfall Amount(in): 0.000        Time of Conc(min): 10.00
Area(ac): 16.700                   Time Shift(hrs): 0.00
Curve Number: 98.00            Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00
```

```
Name: 1B-V                  Node: N1B-V                   Status: Onsite
Group: POST                 Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh256              Peaking Factor: 256.0
Rainfall File: Flmod            Storm Duration(hrs): 24.00
Rainfall Amount(in): 0.000        Time of Conc(min): 16.90
Area(ac): 44.140                   Time Shift(hrs): 0.00
Curve Number: 98.00            Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00
```

```
Name: 1B-VI                 Node: N1B2                    Status: Onsite
Group: POST                 Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh256              Peaking Factor: 256.0
Rainfall File: Flmod            Storm Duration(hrs): 24.00
Rainfall Amount(in): 0.000        Time of Conc(min): 11.40
Area(ac): 74.000                   Time Shift(hrs): 0.00
Curve Number: 98.00            Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00
```

```
Name: 1B-VII                Node: N1B-VII                 Status: Onsite
Group: POST                 Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh256              Peaking Factor: 256.0
Rainfall File: Flmod            Storm Duration(hrs): 24.00
Rainfall Amount(in): 0.000        Time of Conc(min): 10.00
Area(ac): 22.900                   Time Shift(hrs): 0.00
Curve Number: 98.00            Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00
```

==== Nodes ====

```
Name: N-1A          Base Flow(cfs): 0.000          Init Stage(ft): 2.700
Group: POST                                        Warn Stage(ft): 7.700
Type: Stage/Area
```

Stage(ft)	Area(ac)
2.700	14.4800
3.700	15.5000
4.700	16.4900
5.700	17.4800
6.500	18.2300
6.700	18.4600
7.700	19.4500

Name: N1B-IV-DITCH Base Flow(cfs): 0.000 Init Stage(ft): 3.530
Group: POST Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
4.000	0.2000
8.000	0.3000

Name: N1B-V Base Flow(cfs): 0.000 Init Stage(ft): 4.000
Group: POST Warn Stage(ft): 10.000
Type: Stage/Area

Stage(ft)	Area(ac)
4.000	0.9000
8.000	1.5400

Name: N1B-VII Base Flow(cfs): 0.300 Init Stage(ft): 3.000
Group: POST Warn Stage(ft): 10.000
Type: Stage/Area

Stage(ft)	Area(ac)
3.000	0.2300
4.000	1.1500
5.000	2.2900
6.000	2.9800

Name: N1B2 Base Flow(cfs): 0.000 Init Stage(ft): 3.000
Group: POST Warn Stage(ft): 9.000
Type: Stage/Area

Stage(ft)	Area(ac)
3.000	10.0000
4.000	12.0000
5.000	14.0000
6.000	16.0000
7.000	18.0000
8.000	20.0000
9.000	22.0000

Name: N1B-IV Base Flow(cfs): 0.000 Init Stage(ft): 3.000
Group: POST Warn Stage(ft): 10.000
Type: Stage/Area

Stage(ft)	Area(ac)

3.000	3.2060
4.000	3.9400
5.000	4.4030
6.000	4.8690
7.000	5.3400
8.000	5.8150

Name: TW-N1 Base Flow(cfs): 0.000 Init Stage(ft): 5.600
Group: POST Warn Stage(ft): 5.600
Type: Time/Stage

Time(hrs)	Stage(ft)
0.00	5.600
24.00	5.600

==== Pipes ====

Name: N1B-IV N1B-IV D From Node: N1B-IV Length(ft): 81.10
Group: POST To Node: N1B-IV-DITCH Count: 4
Friction Equation: Automatic
Solution Algorithm: Most Restrictive
Flow: Both
Entrance Loss Coef: 0.50
Exit Loss Coef: 1.00
Bend Loss Coef: 0.00
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Stabilizer Option: None

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	36.00	36.00
Rise(in):	36.00	36.00
Invert(ft):	4.110	3.530
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Upstream FHWA Inlet Edge Description:
Circular CMP: Mitered to slope

Downstream FHWA Inlet Edge Description:
Circular CMP: Mitered to slope

Name: N1B-V N1B-IV From Node: N1B-V Length(ft): 50.00
Group: POST To Node: N1B-IV Count: 1
Friction Equation: Average Conveyance
Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.50
Exit Loss Coef: 1.00
Bend Loss Coef: 0.00
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Stabilizer Option: None

	UPSTREAM	DOWNSTREAM
Geometry:	Rectangular	Rectangular
Span(in):	60.00	60.00
Rise(in):	28.00	28.00
Invert(ft):	4.000	3.500
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Upstream FHWA Inlet Edge Description:
Rectangular Box: 30° to 75° wingwall flares

Downstream FHWA Inlet Edge Description:
Rectangular Box: 30° to 75° wingwall flares

==== Drop Structures ====

Name: N1B-VII N1B2 From Node: N1B-VII Length(ft): 2430.00
Group: POST To Node: N1B2 Count: 1

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	18.00	18.00
Rise(in):	18.00	18.00
Invert(ft):	5.590	3.000
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Friction Equation: Automatic
Solution Algorithm: Most Restrictive
Flow: Both
Entrance Loss Coef: 0.500
Exit Loss Coef: 1.000
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dc
Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

*** Weir 1 of 1 for Drop Structure N1B-VII N1B2 ***

TABLE

Count: 1
Type: Horizontal
Flow: Both
Geometry: Rectangular

Span(in): 50.40
Rise(in): 50.40

Bottom Clip(in): 0.000
Top Clip(in): 0.000
Weir Disc Coef: 3.200
Orifice Disc Coef: 0.600

Invert(ft): 7.710
Control Elev(ft): 7.710

Name: N1B2 N1
Group: POST

From Node: N1B2
To Node: TW-N1

Length(ft): 34.35
Count: 3

	UPSTREAM	DOWNSTREAM
Geometry:	Rectangular	Rectangular
Span(in):	120.00	120.00
Rise(in):	24.00	24.00
Invert(ft):	5.060	4.720
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Friction Equation: Automatic
Solution Algorithm: Most Restrictive
Flow: Both
Entrance Loss Coef: 0.500
Exit Loss Coef: 1.000
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dc
Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Rectangular Box: 0° wingwall flares

Downstream FHWA Inlet Edge Description:
Rectangular Box: 0° wingwall flares

*** Weir 1 of 1 for Drop Structure N1B2 N1 ***

TABLE

Count: 1
Type: Horizontal
Flow: Both
Geometry: Rectangular

Span(in): 466.20
Rise(in): 126.80

Bottom Clip(in): 0.000
Top Clip(in): 0.000
Weir Disc Coef: 3.200
Orifice Disc Coef: 0.600

Invert(ft): 6.800
Control Elev(ft): 6.800

==========
==== Weirs ==========
==========

Name: N1A N1B2
Group: POST
Flow: Both
Type: Vertical: Fread

From Node: N-1A
To Node: N1B2
Count: 1
Geometry: Trapezoidal

Bottom Width(ft): 108.00
Left Side Slope(h/v): 10.00
Right Side Slope(h/v): 10.00
Invert(ft): 6.460
Control Elevation(ft): 6.460
Struct Opening Dim(ft): 9999.00

TABLE

```
            Bottom Clip(ft): 0.000
               Top Clip(ft): 0.000
         Weir Discharge Coef: 2.600
      Orifice Discharge Coef: 0.600


-----------------------------------------------------------------------------------------------------------
        Name: N1B-DITCH N1B2        From Node: N1B-IV-DITCH
       Group: POST                    To Node: N1B2
        Flow: Both                      Count: 1
        Type: Vertical: Fread       Geometry: Trapezoidal

           Bottom Width(ft): 50.00
       Left Side Slope(h/v): 10.00
      Right Side Slope(h/v): 10.00
                 Invert(ft): 6.810
     Control Elevation(ft): 6.810
    Struct Opening Dim(ft): 9999.00
                                                TABLE
            Bottom Clip(ft): 0.000
               Top Clip(ft): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


===========================================================================================
==== Hydrology Simulations ================================================================
===========================================================================================

        Name: 100YR-24-HR
    Filename: C:\Documents and Settings\bholcomb\Desktop\PROGRESS ENERGY - UNITS 4-5\100YR-24-HR.R32

     Override Defaults: Yes
   Storm Duration(hrs): 24.00
         Rainfall File: Flmod
   Rainfall Amount(in): 11.50

Time(hrs)        Print Inc(min)
---------------- ---------------
30.000           5.00

-----------------------------------------------------------------------------------------------------------
        Name: 10YR-24-HR
    Filename: C:\Documents and Settings\bholcomb\Desktop\PROGRESS ENERGY - UNITS 4-5\10YR-24-HR.R32

     Override Defaults: Yes
   Storm Duration(hrs): 24.00
         Rainfall File: Flmod
   Rainfall Amount(in): 7.00

Time(hrs)        Print Inc(min)
---------------- ---------------
30.000           5.00

-----------------------------------------------------------------------------------------------------------
        Name: 25YR-24-HR
    Filename: C:\Documents and Settings\bholcomb\Desktop\PROGRESS ENERGY - UNITS 4-5\25YR-24-HR.R32

     Override Defaults: Yes
   Storm Duration(hrs): 24.00
         Rainfall File: Flmod
   Rainfall Amount(in): 8.60

Time(hrs)        Print Inc(min)
---------------- ---------------
30.000           5.00

===========================================================================================
==== Routing Simulations ==================================================================
===========================================================================================

        Name: 100YR-24-HR          Hydrology Sim: 100YR-24-HR
    Filename: C:\Documents and Settings\bholcomb\Desktop\PROGRESS ENERGY - UNITS 4-5\100YR-24-HR.I32
```

```
      Execute: Yes          Restart: No            Patch: No
  Alternative: No

       Max Delta Z(ft): 1.00                       Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                       End Time(hrs): 30.00
    Min Calc Time(sec): 0.5000                  Max Calc Time(sec): 5.0000
       Boundary Stages:                             Boundary Flows:


Time(hrs)        Print Inc(min)
---------------- ---------------
30.000           5.000

Group            Run
---------------- -----
POST             Yes


-------------------------------------------------------------------------------------------------------------
         Name: 10YR-24-HR          Hydrology Sim: 10YR-24-HR
     Filename: C:\Documents and Settings\bholcomb\Desktop\PROGRESS ENERGY - UNITS 4-5\10YR-24-HR.I32

      Execute: Yes          Restart: No            Patch: No
  Alternative: No

       Max Delta Z(ft): 1.00                       Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                       End Time(hrs): 30.00
    Min Calc Time(sec): 0.5000                  Max Calc Time(sec): 5.0000
       Boundary Stages:                             Boundary Flows:


Time(hrs)        Print Inc(min)
---------------- ---------------
30.000           5.000

Group            Run
---------------- -----
POST             Yes


-------------------------------------------------------------------------------------------------------------
         Name: 25YR-24-HR          Hydrology Sim: 25YR-24-HR
     Filename: C:\Documents and Settings\bholcomb\Desktop\PROGRESS ENERGY - UNITS 4-5\25YR-24-HR.I32

      Execute: Yes          Restart: No            Patch: No
  Alternative: No

       Max Delta Z(ft): 1.00                       Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                       End Time(hrs): 30.00
    Min Calc Time(sec): 0.5000                  Max Calc Time(sec): 5.0000
       Boundary Stages:                             Boundary Flows:


Time(hrs)        Print Inc(min)
---------------- ---------------
30.000           5.000

Group            Run
---------------- -----
POST             Yes
```

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
N-1A	POST	100YR-24-HR	15.07	7.34	7.70	0.0024	831815	12.25	418.93	15.70	45.94
N1B-IV-DITCH	POST	100YR-24-HR	13.22	7.55	8.00	0.0048	12607	13.21	114.94	13.22	114.94
N1B-V	POST	100YR-24-HR	12.71	10.83	10.00	0.0050	86835	12.08	245.26	12.60	117.75
N1B-VII	POST	100YR-24-HR	23.73	9.39	10.00	0.0025	231571	12.00	154.62	25.26	3.19
N1B2	POST	100YR-24-HR	15.01	7.33	9.00	0.0023	812475	12.08	490.68	15.01	120.63
NIB-IV	POST	100YR-24-HR	13.21	8.09	10.00	0.0021	255205	12.08	202.34	13.21	114.94
TW-N1	POST	100YR-24-HR	0.00	5.60	5.60	0.0000	0	15.01	120.63	0.00	0.00
N-1A	POST	10YR-24-HR	30.00	6.55	7.70	0.0018	796426	12.25	254.37	0.00	0.00
N1B-IV-DITCH	POST	10YR-24-HR	13.52	7.20	8.00	0.0047	12220	13.50	41.27	13.52	41.25
N1B-V	POST	10YR-24-HR	12.63	8.07	10.00	0.0050	67566	12.08	148.92	12.28	89.46
N1B-VII	POST	10YR-24-HR	22.78	7.90	10.00	0.0025	186901	12.00	94.02	17.44	2.39
N1B2	POST	10YR-24-HR	21.05	6.61	9.00	0.0018	750113	12.08	290.17	0.00	0.00
NIB-IV	POST	10YR-24-HR	13.51	7.27	10.00	0.0031	238192	12.18	144.88	13.50	41.27
TW-N1	POST	10YR-24-HR	0.00	5.60	5.60	0.0000	0	0.00	0.00	0.00	0.00
N-1A	POST	25YR-24-HR	22.87	7.01	7.70	0.0020	817335	12.25	312.92	24.33	11.69
N1B-IV-DITCH	POST	25YR-24-HR	13.33	7.37	8.00	0.0046	12407	13.32	73.17	13.33	73.15
N1B-V	POST	25YR-24-HR	12.69	9.05	10.00	0.0050	74427	12.08	183.19	12.43	94.20
N1B-VII	POST	25YR-24-HR	23.72	8.40	10.00	0.0025	201902	12.00	115.57	12.96	2.81
N1B2	POST	25YR-24-HR	22.85	7.00	9.00	0.0018	784160	12.08	356.91	22.85	28.48
NIB-IV	POST	25YR-24-HR	13.32	7.59	10.00	0.0028	244804	12.08	163.25	13.32	73.17
TW-N1	POST	25YR-24-HR	0.00	5.60	5.60	0.0000	0	22.85	28.48	0.00	0.00

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
N1A N1B2	POST	100YR-24-HR	15.70	45.94	1.005	15.07	7.34	15.01	7.33
N1B-DITCH N1B2	POST	100YR-24-HR	13.22	114.94	0.153	13.22	7.55	15.01	7.33
N1B-IV N1B-IV D	POST	100YR-24-HR	13.21	114.94	0.798	13.21	8.09	13.22	7.55
N1B-V N1B-IV	POST	100YR-24-HR	12.60	117.75	-0.746	12.71	10.83	13.21	8.09
N1B-VII N1B2	POST	100YR-24-HR	25.26	3.19	0.042	23.73	9.39	15.01	7.33
N1B2 N1	POST	100YR-24-HR	15.01	120.63	0.160	15.01	7.33	0.00	5.60
N1A N1B2	POST	10YR-24-HR	0.00	0.00	0.014	30.00	6.55	21.05	6.61
N1B-DITCH N1B2	POST	10YR-24-HR	13.52	41.25	0.139	13.52	7.20	21.05	6.61
N1B-IV N1B-IV D	POST	10YR-24-HR	13.50	41.27	-0.865	13.51	7.27	13.52	7.20
N1B-V N1B-IV	POST	10YR-24-HR	12.28	89.46	13.447	12.63	8.07	13.51	7.27
N1B-VII N1B2	POST	10YR-24-HR	17.44	2.39	0.002	22.78	7.90	21.05	6.61
N1B2 N1	POST	10YR-24-HR	0.00	0.00	0.000	21.05	6.61	0.00	5.60
N1A N1B2	POST	25YR-24-HR	24.33	11.69	0.179	22.87	7.01	22.85	7.00
N1B-DITCH N1B2	POST	25YR-24-HR	13.33	73.15	0.241	13.33	7.37	22.85	7.00
N1B-IV N1B-IV D	POST	25YR-24-HR	13.32	73.17	-0.839	13.32	7.59	13.33	7.37
N1B-V N1B-IV	POST	25YR-24-HR	12.43	94.20	10.789	12.69	9.05	13.32	7.59
N1B-VII N1B2	POST	25YR-24-HR	12.96	2.81	0.017	23.72	8.40	22.85	7.00
N1B2 N1	POST	25YR-24-HR	22.85	28.48	0.015	22.85	7.00	0.00	5.60

Time of Concentration - TR-55 Worksheet

Project ID: **PEF CREC ASH DISPOSAL AREA HORIZONTAL RECONFIGURATION**
Project #: **083-82671.1**

TRAVEL TIME PARAMETERS

Sheet Flow		Rim Ditch		Northwest Ditch		West Ditch	
P =	5	n =	0.03	n =	0.03	n =	0.03
s =	0.02	A =	1.7	A =	8.52	A =	7.38
n =	0.24	WP =	5.1	WP =	12.07	WP =	11.44
		Rh =	0.33	Rh =	0.71	Rh =	0.65
		s =	0.005	s =	0.005	s =	0.005
		v =	1.69	v =	2.78	v =	2.62

	TRAVEL DISTANCES (FT)				TRAVEL TIMES (HOURS)					
ID	Top of BSA	Rim Ditch	Northwest Ditch	West Ditch	Sheet Flow (Top of BSA)	Rim Ditch Flow	Northwest Ditch	West Ditch	**TOC (hr)**	**TOC (min)**
T1	310	225	920	0	0.470	0.037	0.092	0.000	**0.599**	**36**
T2	230	20	0	0	0.370	0.003	0.000	0.000	**0.374**	**22**
T3	230	240	0	0	0.370	0.039	0.000	0.000	**0.410**	**25**
T4	230	210	0	0	0.370	0.035	0.000	0.000	**0.405**	**24**
T5	210	210	0	0	0.344	0.035	0.000	0.000	**0.379**	**23**
T6	310	160	0	0	0.470	0.026	0.000	0.000	**0.497**	**30**
T7	200	170	0	0	0.331	0.028	0.000	0.000	**0.359**	**22**
T8	220	230	0	270	0.358	0.038	0.027	0.029	**0.451**	**27**
T9	230	190	0	710	0.370	0.031	0.071	0.075	**0.548**	**33**

AVERAGE TIME OF CONCENTRATION 27

Notes
P = rainfall for 2-yr, 24-hour storm (inches)
s = watercourse slope (ft/ft)
n = Manning's roughness coefficient
v = velocity (ft/sec) [from chart for shallow concentration flow, calculated in channel travel]
A = Area (ft2) - see Attachment 11
WP = Wet Perimeter (ft) - see Attachment 11
Rh = Hydraulic Radius (ft) [Area/Wet Perimeter]