



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

Rick Scott
Governor

Jennifer Carroll
Lt. Governor

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Secretary

**STATE OF FLORIDA
UNDERGROUND INJECTION CONTROL
CLASS I WELL CONSTRUCTION PERMIT**

PERMITTEE

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PERMIT/CERTIFICATION

PA File Nos.: 0281232-007-UC/1I (IW-1)
0281232-008-UC/1I (IW-2)
Facility ID No: PA 92-32, FL0043869
WACS ID: 98664
Date of Issuance:
Expiration Date:
County: Polk
Project: Class I Injection Wells
IW-1 and IW-2
Permit Processor: Rommy Lahera, P.G.

FACILITY

TECO Polk Power Station
Highway 37
Brewster, Florida

PROJECT LOCATION

Section/Township/Range: Sec. 3/ T32S / R23E
Latitude: 27° 43' 28.70" N
Longitude: 82° 0' 27.98" W

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Rules 62-4, 62-520, and 62-528 of the Florida Administrative Code. The construction of a Class V, Group 9, exploratory well (IW-1), and dual zone monitor well (DZMW-1) has been completed per the conditions of Permit 0281232-001-UC/5X, issued June 20, 2008, and Major Permit Modifications 0281232-002-UC/MM and 0281232-003-UC/MM, issued on April 9, 2010 and December 30, 2010, respectively. A second Class V, Group 9 exploratory well (IW-2) and dual zone monitor well (DZMW-2) are permitted for construction per the conditions of Permit 0281232-004-UC/5X, issued on June 16, 2011, and a Minor Permit Modification 0281232-006-UC/MN, issued on September 22, 2011. The above-named permittee is hereby authorized to perform the work or operate the facility shown on the application and other documents attached hereto or on file with the Department and made a part hereof, specifically described as follows:

TO TEST: Two, Class I injection wells (IW-1 and IW-2) in order to obtain hydrologic and geologic information to determine the feasibility of the disposal of non-hazardous wastewater into a deep geologic formation. The wastewater consists of the Polk Power Station (PPS) concentrate from the reverse osmosis of municipal reclaimed water, with lesser amounts of the PPS greywater, weak acid, boiler blowdown, slag pond leachate, and evaporator condensate.

The injection zone encompasses the Lower Cedar Keys, Lawson Limestone, and other Cretaceous Period formations to a depth 8,000 feet below land surface (bls).

Injection Well IW-1 has been completed with a 52-inch diameter surface casing to 216 feet bls; a 42-inch diameter steel casing to 1,207 feet bls; a 28-inch diameter steel intermediate casing to 3,280 feet bls; an 18-inch diameter steel casing to 4,215 feet bls; a 10.75-inch diameter FRP tubing to 4,228 feet bls cemented to land surface; and a 12.75-inch diameter open borehole from 4,200 to 8,000 feet bls.

Injection Well IW-2 will be completed with a 54-inch diameter surface casing to 218 feet bls; a 44-inch diameter steel casing to $\pm 1,212$ feet bls; a 28-inch diameter steel intermediate casing to $\pm 3,300$ feet bls; an 18-inch diameter steel casing to $\pm 4,200$ feet bls; a 10.75-inch diameter FRP tubing to $\pm 4,200$ feet bls cemented to land surface; and a 12.75-inch diameter open borehole from $\pm 4,200$ to 8,000 feet bls.

IN ACCORDANCE WITH: The Applications to Construct DEP Form No. 62-528.900(1) submitted by the Tampa Electric Company (TECO) with sufficient fee on November 9, 2011 (0281232-007-UC/1I) and July 27, 2012 (0281232-008-UC/1I), with accompanying supporting documentation and additional information submitted through July 30, 2012.

TO SERVE: The Tampa Electric Company Polk Power Station

SUBJECT TO: Specific Conditions 1 through 11

SPECIFIC CONDITIONS:

1. General Requirements

- a. 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 may constitute grounds for revocation and enforcement action. Any changes in the plans and/or technical specifications, except as provided elsewhere in this permit, must be approved by the Department before being implemented. Changes of negligible impact to the environment and staff time will be reviewed by the program manager, cleared when appropriate and incorporated into this permit. Changes or modifications other than those described above will require submission of a completed application and appropriate fee per Rule 62-4.050, F.A.C.
- b. This permit does not relieve the permittee from liability for harm to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefrom; 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.

- c. In the event that the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify the Department within 24 hours of noncompliance by e-mail or telephone with the following information:
 - 1) A description of and cause of noncompliance; and
 - 2) The period of noncompliance, including dates and times; or, if not corrected the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent the recurrence of the noncompliance. The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.
- d. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures.
- e. No underground injection is allowed that causes or allows movement of fluid into an underground source of drinking water.
- f. The permittee is reminded of the necessity to comply with the pertinent regulations of any other regulatory agency, as well as any county, municipal, and federal regulations applicable to the project. This permit should not be construed to imply compliance with the rules and regulations of other regulatory agencies.
- g. Hurricane Preparedness - Upon the issuance of a "Hurricane Watch" by the National Weather Service, the preparations to be made include, but are not necessarily limited to, the following:
 - 1) Secure all on-site salt and other stockpiled additive materials to prevent surface and/or ground water contamination.
 - 2) Properly secure drilling equipment and rig(s) to prevent damage to well(s) and on-site treatment process equipment.

2. Quality Assurance/Quality Control Requirements

- a. Pursuant to Rule 62-528.440(5)(b), F.A.C., a Florida Licensed Professional Engineer shall be retained throughout the construction period to certify all documents related to the construction and completion of the injection well system. The Department shall be notified immediately of any change of engineer.

- b. In accordance with Section 492, Florida Statutes, all documents prepared for the geological/hydrogeological evaluation of the injection well system shall be signed and sealed by a Florida Licensed Professional Geologist or qualified Florida Licensed Professional Engineer.
- c. All water quality samples required by this permit shall be collected in accordance with the appropriate Department Standard Operation Procedures (SOPs), pursuant to Chapter 62-160, Quality Assurance, Part II, Field Procedures, F.A.C. A certified laboratory shall conduct the analytical work, as provided by Chapter 62-160, Quality Assurance, Part III, Laboratory Certification and Procedures, F.A.C. Department approved test methods shall be utilized, unless otherwise stated in this permit. All calibration procedures for field testing and laboratory equipment shall follow manufacturer's instrumentation manuals and satisfy the requirements of the Department SOPs. A listing of the SOPs pertaining to field and laboratory activities is available at the FDEP website at: <http://www.dep.state.fl.us/water/sas/sop/sops.htm>

3. Construction and Testing Requirements

- a. Any construction, modification, repair, or abandonment of a well shall be performed by a Florida licensed water well contractor, licensed under Chapter 62-532, F.A.C., to engage in the business of construction, modification, repair or abandonment of a well. Prior to the commencement of any work, the name of the Florida-licensed driller(s) supervising the drilling operations and the driller's registration number shall be submitted to the Department. The permittee or the engineer of record shall provide the Department with copies of all required federal, state or local permits prior to spudding the wells.
- b. Continuous on-site supervision by qualified personnel (engineer and/or geologist, as applicable) is required during all testing and geophysical logging operations.
- c. If any problem develops that may seriously hinder compliance with this permit, construction progress, or good construction practice, the Department shall be notified immediately. The Department may require a detailed written report describing what problems have occurred, the remedial measures applied to assure compliance, and the measures taken to prevent recurrence of the problem.
- d. Mechanical Integrity Testing.
 - 1) Mechanical integrity of the injection well will be determined pursuant to F.A.C. Rules 62-528.300(6)(b)2. and (c) and Rule 62-528.425(1)(d). The pressure test for the 18-inch steel casing and 10.75-inch FRP tubing will be accepted if the cemented tubing is tested at 1.5 times the expected operating pressure with no more than a 5% change in pressure. Verification of pressure gauge calibration must be provided at the

scheduled test and with the test report. Test pressure gauges shall be calibrated within 6 months prior to testing.

- 2) The Department shall be notified 72 hours prior to all testing for mechanical integrity of the injection well.
- 3) All testing for mechanical integrity shall be initiated during daylight hours, Monday through Friday.
- 4) To demonstrate internal mechanical integrity of the injection well, an additional (interim) pressure test shall be run and completed midway between the standard 5-year full mechanical integrity tests. This interim test shall be completed 2.5 years after the pressure test of the cemented 10.75-inch FRP tubing (section 1) above. A plan describing the interim test procedures shall be submitted to the Department's Southwest District and Tallahassee offices for approval at least 90 days prior to the interim pressure test date, and the final report for the demonstration of internal mechanical integrity shall be submitted within three months of the completion date for the interim pressure test.

e. Test Injection Well System Construction Details:

IW-1 Construction Details:

O.D. Inches / Type	Depth ft (bls)	Aquifer
52" / Steel	216'	Surficial and Upper Floridan
42" / Steel	1,207'	Upper Floridan
28" / Steel	3,280'	Mid-Confining Layer & Lower Floridan
18" / Steel	4,215'	Lower Confining Layer & Cedar Keys Fm
10.75" / Fiberglass	4,228'	Lower Confining Layer & Cedar Keys Fm
12.75" Open Hole	8,000'	Lower Cedar Keys, Lawson Limestone, and other Cretaceous Fms

Monitor Well DZMW-1:

O.D. Inches / Type	Depth ft (bls)	Aquifer
28" / Steel	300'	Surficial and Intermediate Aquifers
16" / Steel	1,090'	Avon Park Limestone (Upper Zone Monitoring Interval for DZMW-1s: 1,090' - 1,202')
7.625"/Fiberglass	2,770	Mid-Confining Unit and Lower Floridan Aquifer
6" Open Hole	2,850'	Oldsmar Limestone (Lower Zone Monitoring Interval for DZMW-1d: 2,770 - 2,850)

IW-2 Construction Details:

O.D. Inches / Type	Depth ft (bls)	Aquifer
54" / Steel	218'	Surficial and Upper Floridan
44" / Steel	± 1,212'	Upper Floridan
28" / Steel	± 3,300'	Mid-Confining Layer & Lower Floridan
18" / Steel	± 4,200'	Lower Confining Layer & Cedar Keys Fm
10.75" / Fiberglass	± 4,200'	Lower Confining Layer & Cedar Keys Fm
12.75" Open Hole	± 8,000'	Lower Cedar Keys, Lawson Limestone, and other Cretaceous Fms

Monitor Well DZMW-2:

O.D. Inches / Type	Depth ft (bls)	Aquifer
30" / Steel	± 230'	Surficial and Intermediate Aquifers
16" / Steel	± 1,100'	Avon Park Limestone (Upper Zone Monitoring Interval for DZMW-2s: ~1,100' - 1,200')
7.625"/Fiberglass	± 2,700	Mid-Confining Unit and Lower Floridan Aquifer
6" Open Hole	± 2,800'	Oldsmar Limestone (Lower Zone Monitoring Interval for DZMW-2d: ~2,700 - 2,800)

4. Operational Testing Requirements

- a. The permittee shall conduct operational testing of the injection well to demonstrate that the well can absorb the design and peak daily flows that are expected.
- b. No wastewater shall be injected into this test injection well without prior written authorization from the Department.
- c. The Engineer of Record or designated qualified representative must be present for the start-up operations and the Department must be notified in writing of the date operational testing commenced for the subject well.
- d. Prior to Department authorization for operational testing, the permittee shall obtain all necessary state, federal and local permits for the selected temporary alternative discharge method for emergency disposal, pursuant to Rule 62-528.450(3)(a)4., F.A.C. All temporary alternative discharge methods shall be fully operational prior to test injection.
- e. Prior to operational testing, the background water quality for the injection and monitoring zones shall be established. The analysis shall include the Primary and Secondary Water Quality Standards listed in Rules 62-550.310 and 62-550.320, F.A.C.

- f. Prior to Department authorization of operational testing the following items must be submitted for TAC review and Department approval [Rule 62-528.450(3) (a)3., F.A.C.]:
- 1) The permittee shall submit at a minimum the following information to each member of the Technical Advisory Committee for review. Items already submitted may be referenced.
 - a) Draft operation and maintenance manual;
 - b) Lithologic and geophysical logs with interpretations;
 - c) Results of pressure tests on the final casing and FRP tubing for the injection well, and on the final casings of the monitor wells;
 - d) Short term injection test data and evaluation;
 - e) Confining zone data (cores, etc.);
 - f) Background water quality data (injection zones and monitoring zones);
 - g) Aquifer test data, analysis and evaluation;
 - h) Analysis of the chemical composition of the wastewater. The wastewater shall be analyzed for the Primary and Secondary Water Quality Standards listed in Rules 62-550.310 and 62-550.320, F.A.C. ;
 - i) Surface equipment completion certification or certification of interim completion for the purposes of testing;
 - j) Signed and sealed as-built engineering drawings of all wellheads and subsurface well components equipment pursuant to Rule 62-600.540(4), F.A.C.; and
 - k) Submittal of a plugging and abandonment plan.
 - 2) Before authorizing operational testing the Department shall conduct an inspection of the facility to determine if the conditions of this permit have been met.
- g. If any monitoring data indicates the movement of injected fluid or formation fluid into underground sources of drinking water, the Department shall prescribe such additional requirements for construction, corrective action (including possible closure of the injection well), operation, monitoring, or reporting as necessary to prevent such movement. These additional requirements shall be imposed by modifying the permit or via enforcement action, where applicable.
- h. The permittee shall calibrate all pressure gauge(s), flow meter(s), chart recorder(s), and other related equipment associated with the injection well system on a semi-annual basis, using standard engineering methods. The permittee shall maintain all monitoring equipment and shall ensure that the monitoring equipment is calibrated and in proper operating condition at all times. Laboratory equipment, methods, and quality control will follow EPA guidelines as expressed in Standard Methods for the Examination of Water and Wastewater.

- i. The injection well system shall be monitored in accordance with Rules 62-528.425(1)(g) and 62-528.430(2), F.A.C. The following injection well performance and monitor zone data shall be recorded and reported in the Monthly Operating Report as indicated below. All samples must be collected and analyzed in accordance with the quality assurance requirements of F.A.C. Chapter 62-160. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity:

Parameter	Units	Recording Frequency	Frequency of Analysis	
			IW-1 & IW-2	DZMW-1 & DZMW-2
Flow Rate, max.	gpm	daily/monthly	a	
Flow Rate, min.	gpm	daily/monthly	a	
Flow Rate, avg.	gpm	daily/monthly	a	
Parameter	Units	Recording Frequency	Frequency of Analysis	
			IW-1 & IW-2	DZMW-1 & DZMW-2
Total Injection Volume	mg	daily/monthly		
Injection Pressure, max.	psi	daily/monthly	a	
Injection Pressure, min.	psi	daily/monthly	a	
Injection Pressure, avg.	psi	daily/monthly	a	
Pressure or Water Level, max.	Psi or ft NGVD	daily/monthly		a
Pressure or Water Level, min.	Psi or ft NGVD	daily/monthly		a
Pressure or Water Level, avg.	Psi or ft NGVD	daily/monthly		a
Dissolved Oxygen	mg/L		M	M
Turbidity	NTU		M	M
pH	std. units		M	W
Specific Conductance	µmhos/cm		M	W
Field Temperature	°C		M	W
Ammonia (as N)	mg/L		M	W
Total Dissolved Solids	mg/L		M	W
Total Kjeldahl Nitrogen	mg/L		M	W
Total Alkalinity	mg/L		M	M
Total Nitrogen	mg/L		M	W
Total Organic Carbon	mg/L		M	M
Total Suspended Solids	mg/L		M	M
Bicarbonate-HCO ₃	mg/L		M	M

Carbonate	mg/L		M	M
Calcium	mg/L		M	M
Magnesium	mg/L		M	M
Potassium	mg/L		M	M
Sulfate	mg/L		M	W
Chloride	mg/L		M	W
Arsenic	µg/L		M	
Selenium	µg/L		M	
Fluoride	mg/L		M	M
Primary/Secondary DWS			A	A

W – Weekly; M - Monthly; A - Annually.

^a - Operational data reporting for flows, pressures, and water levels: daily max, min, and average from continuous reporting; monthly max, min, and average (calculated from daily averages).

Weekly monitoring may be reduced to monthly after six months with submittal of supporting information and with Department approval.

- j. A specific injectivity test, in accordance with Rule 62-528.430(2)(c) and 62-528.450(3)(a)7., F.A.C., shall be performed monthly on the injection well with the pumping rate set at a predetermined level and reported as the specific injectivity index (gallons per minute/specific pressure). The permittee shall propose the pumping rate to be used based on the expected flow, the design of the pump type(s), and the type of pump control used. The test shall include a period of time sufficient to observe and record pressure fall-off and stabilization by shutting in the well after the test. The proposed specific injectivity test shall be submitted to the Department for approval prior to operational testing. The specific injectivity test data shall be submitted monthly along with the monitoring results of the injection well and monitor wells.
- k. Operational testing of this injection well system shall cease within 2 years from the start of operational testing or the expiration of this permit, whichever is less, unless the Department has issued intent to issue an operation permit, or a timely renewal application (Rule 62-4.090, F.A.C.) of this construction permit has been submitted to the Department. However, under no circumstance shall the duration of the operational testing period exceed two years as specified in Rule 62-528.450(3)(b), F.A.C.

5. Reporting Requirements

- a. This project shall be monitored by the Department with the assistance of the Technical Advisory Committee (TAC). The permittee shall submit all correspondence required by and relative to this permit concurrently to each member of the TAC. Such correspondence includes, but is not limited to, reports, schedules, analyses, and geophysical logs required by the Department under the terms of this permit. The

permittee is not required to provide specific correspondence to any TAC member who submits to the permittee a written request to be omitted as a recipient of specific correspondence. The TAC consists of representatives from these agencies:

Florida Department of Environmental Protection
Southwest District - UIC Program
13051 North Telecom Parkway
Temple Terrace, Florida 33637-0926
bill.kelsey@dep.state.fl.us
rommy.laheraaument@dep.state.fl.us

Florida Department of Environmental Protection
Underground Injection Control Program
2600 Blair Stone Road, MS 3530
Tallahassee, Florida 32399-2400
joe.haberfeld@dep.state.fl.us
james.alexander@dep.state.fl.us

Southwest Florida Water Management District
Well Construction Permitting
7601 U.S. Highway 301 North
Tampa, FL 33637
davidn.arnold@swfwmd.state.fl.us

- b. After completion of construction and testing, a final engineering report shall be submitted to the Department and the TAC. The report shall include, but not be limited to:
- 1) All information and data collected under Rules 62-528.605, 62-528.615, and 62-528.635, F.A.C., with appropriate interpretations.
 - 2) A complete set of as-built engineering drawings (Florida-licensed Professional Engineer, signed and sealed).
 - 3) Mill certificates for the casings shall be included in the report.
 - 4) To the extent possible, the transmissivity of the injection zone and the maximum capacity within safe pressure limits shall be estimated.

The cover letter for the final engineering report shall be mailed to the U.S. EPA Region 4, UIC Program, 61 Forsythe Street SW, Atlanta, GA 30303-8909.

- c. The permittee shall submit monthly operating reports (MORs) during operational testing, which contain the injection and monitoring well data required by this permit (Condition 5.i.). The report shall include:

- 1) A cover page summarizing both the current status of operational testing and all monthly activities, and includes the certification and signature required in condition 6.h.;
- 2) Operational and water quality data in a tabular format. Standardized forms for the project may be provided by the Department if deemed necessary; and
- 3) Laboratory pages and supporting documentation.

The report shall be submitted no later than the last day of the month immediately following the month of record. The MOR shall be submitted *via* direct internet electronic mail (e-mail) to UIC Staff at the Southwest District (SWD_UIC@dep.state.fl.us) and Tallahassee Offices (james.alexander@dep.state.fl.us), in Adobe™ (pdf) format. A hard copy of only the tabulated data shall be sent to the Department of Environmental Protection, UIC Program, Mail Station 3530, 2600 Blair Stone Road, Tallahassee, FL 32399-2400.

- d. All reports and other submittals required to comply with this permit shall be signed by a person authorized under Rules 62-528.340(1) or (2), F.A.C. All reports shall contain the following certification as required in Rule 62-528.340(4), F.A.C.:

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 upon 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.

6. Abnormal Events

- a. In the event the permittee is temporarily unable to comply with any conditions of this permit due to breakdown of equipment, power outages, destruction by hazard of fire, wind or by other cause, the permittee shall notify the Department. Notification shall be made in person, by telephone or by electronic mail within 24 hours of breakdown or malfunction to the UIC Program staff, Southwest District office.
- b. A written report of any noncompliance referenced in a. above shall be submitted to the Southwest District office within five days after discovery of the occurrence. The report shall describe the nature and cause of the breakdown or malfunction, the steps being taken or planned to be taken to correct the problem and prevent its reoccurrence, emergency procedures in use pending correction of the problem, and the time when the facility will again be operating in accordance with permit conditions.

7. Financial Responsibility

- a. The permittee shall maintain the resources necessary to close, plug, and abandon the injection well system at all times (Rule 62-528.435(9), F.A.C.).
- b. The permittee shall review annually the cost estimates for plugging and abandonment. A certified (By Professional Geologist or Professional Engineer) copy of the annual update shall be submitted to the Department's Tallahassee UIC Program each year within 90 days of the close of the permittee's fiscal year, with a copy sent to the Department's Temple Terrace office. In addition, within 90 days of the close of the permittee's fiscal year, the permittee shall submit the items required for the UIC Financial Test on Page 48 of the document: "State of Florida Underground Injection Control Program Financial Responsibility Options for Owners and Operators of Injection Wells" (1996), which is located at the DEP website at:
http://www.dep.state.fl.us/water/uic/docs/Guidance_Document_scanned.pdf.
- c. In the event that the mechanism used to demonstrate financial responsibility should become invalid for any reason, the permittee shall notify the Department in writing within 14 days of such invalidation. The permittee shall then within 30 days of said notification submit to the Department for approval new financial documentation in order to comply with Rule 62-528.435(9), F.A.C., and the conditions of this permit.

8. Emergency Disposal

- a. All applicable federal, state and local permits shall be in place to allow for any alternative discharges due to emergency or planned outage conditions.
- b. Any changes in emergency disposal methods shall be submitted for TAC review and Department approval.
- c. The permittee shall notify the Department within 24 hours whenever an emergency discharge has occurred (Rule 62-528.415(4)(c)1., F.A.C.). Written notification shall be provided to the Department within 5 days after each occurrence. The Permittee shall indicate the location and duration of the discharge and the volume of fluid discharged.

9. General Conditions

The permittee shall be aware of and operate under General Conditions Rule 62-528.307(1)(a) through (x), and (2)(a) through (f) F.A.C. (Attachment A). General Conditions are binding upon the permittee and enforceable pursuant to Chapter 403, F.S.

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

Attachment A: Rules 62-528.307(1)(a) through (x)

DRAFT