FACT SHEET

Town of Davie Water Treatment Plant and Water Reclamation Facility (WTP/WRF)
WACS Facility ID No.: 98588
Permit No.: 0332031-001–002-UO/1I
May 7, 2015

Operation permit for Town of Davie WTP and WRF, Class I, Injection Well IW-1 and IW-2 and dual-zone monitoring well MW-1.

1. General Information

A. Statutory Basis for Requiring/Issuing Permit

The Department has permitting jurisdiction under Chapter 403, Florida Statutes (F.S.), and the rules adopted thereunder. The project is not exempt from permitting procedures. The Department has determined that an operation permit is required for the proposed project.

B. Name and Address of Applicant

Mr. Don Bayler, Director of Utilities
Town of Davie
7351 SW 30th Street
Davie, Florida 33314

Facility Address

Town of Davie Water System V & Reclamation System IV Complex
7351 SW 30th Street
Davie, Florida 33314

C. Description of Applicant's Proposed Operation

To operate two non-hazardous Class I injection wells IW-1 and IW-2 and dual-zone monitor well MW-1 located at the Town of Davie WTP/WRF, which is located at 7351 SW 30th Street (IW-1 latitude 26°05'10.6"N and longitude 80°14'37"W, IW-2 latitude 26°05'09.9"N and longitude 80°14'34"W, and MW-1 latitude 26°05'10.2"N and longitude 80°14'35.6"W), Broward County, Florida. The injection wells are used for disposal of reclaimed water from the WRF and reverse osmosis (RO) concentrate from the WTP. The reclaimed water from the Reclamation System IV WRF is secondary treated, reuse quality wastewater from the new membrane bioreactor wastewater facility. The RO concentrate from the Water Treatment Plant System V WTP is the by-product of the water treatment process and the neutralized Clean in Place solution from membrane cleanings. The source water for the WTP is the Floridan aquifer. The maximum permitted capacity of each injection well is 11.4 MGD. *See Document 1, Document 12, and Rules 62-528.360, 62-528.400, 62-528.415(1)(f), 62-528.450(2)(f), and 62-528.455(2)(c), (2)(e), and (2)(f).*

D. Permitting History of this Facility

Construction permit 0298127-001-UC was issued on January 21, 2011, for the construction of two Class I injection wells and monitor well. Permit 0298127-001-UC is to expire on January 20, 2016. Construction of the injection well IW-1 was

completed on June 11, 2011. Construction of injection well IW-2 was completed on September 11, 2011. Operational testing began July 2013.

E. Documents Used in Permitting Decision

1. Application to operate injection well IW-1 (received January 22, 2015).
2. "Engineering Report on the Construction and Testing of the Deep Injection Well System Town of Davie, FL Water Treatment and Water Reclamation Facility", dated December 2012.
3. "Operation and Maintenance Manual Town of Davie, Fl Water Treatment and Water Reclamation Facility" dated August 2013.
4. November 13, 2013, response to the Department's October 16, 2013, request for information concerning the August 2013, operation and maintenance manual.
5. April 6, 2015, responses to the February 3, 2015, request for additional information concerning the operation permit application.

2. Reasons Permit Was Issued; Derivation of Conditions

A. Area of Review (Rule 62-528.300(4), F.A.C.)

Wells located within a two-mile radius from the injection facility were located on a map and the well information listed. There where no wells identified that where not properly completed or plugged within the two-mile area of review. *See Documents 1 and 5, and Rules 62-528.300(4) and 62-528.455(3)(b)1. and 2., F.A.C.*

B. Mechanical Integrity Demonstration (Rule 62-528.300(6), F.A.C.)

IW-1:

1. Demonstrated by pressure testing the completed injection well IW-1 (after the 20-inch tubing was cemented in) at 153 psi with a pressure decrease of 1.96 percent to 150 psi over one hour on June 8, 2011. The pressure change is considered acceptable since it is within the 5 percent limits allowed by the Department. *See Document 1, Document 2, and Rules 62-528.300(6)(b)2. and (e), 62-528.410(7)(c), 62-528.425(1)(d), 62-528.430(2)(b)2.a., 528.450(3)(a)2., and 62-528.455(2)(b), F.A.C.*

2. A television survey of the completed injection well IW-1 was conducted on June 6, 2011. The television survey did not reveal any defects in the cased portion of the well. *See Document 2 and Rules 62-528.300(6), 62-528.425(1)(d), 62-528.430(2)(b)2.a., 62-528.455(3)(b)5., and 62-528.455(3)(c), F.A.C.*

3. The September 7, 2011, temperature log run on the completed injection well IW-1 indicated no evidence of fluid movement behind the casing. *See Document 2 and Rules 62-528.300(6), 62-528.425(1)(d), 62-528.430(2)(b)2.a., 62-528.455(3)(b)5., and 62-528.455(3)(c), F.A.C.*

4. The September 9, 2011, radioactive tracer survey indicated that there was no fluid movement behind injection well IW-1's casing and tubing. *See Document 2 and Rules 62-528.300(6), 62-528.425(1)(d), 62-528.430(2)(b)2.a., 62-528.455(3)(b)5., and 62-528.455(3)(c), F.A.C.*

5. Demonstrated by pressure testing the 40-inch casing of injection well IW-1 (after the 40-inch tubing was cemented in) at 156 psi with no increase or decrease in pressure on March 8, 2011. The pressure change is considered acceptable since it is within the 5 percent limits allowed by the Department. *See Document 2 and Rules 62-528.300(6)(b)2. and (e), 62-528.410(7)(c), 62-528.425(1)(d), 62-528.430(2)(b)2.a., 528.450(3)(a)2., and 62-528.455(2)(b), F.A.C.*

6. Demonstrated by pressure testing the 30-inch casing of injection well IW-1 (after the 30-inch tubing was cemented in) at 156 psi with no increase or decrease in pressure on May 1, 2011. The pressure change is considered acceptable since it is within the 5 percent limits allowed by the Department. *See Document 2 and Rules 62-528.300(6)(b)2. and (e), 62-528.410(7)(c), 62-528.425(1)(d), 62-528.430(2)(b)2.a., 528.450(3)(a)2., and 62-528.455(2)(b), F.A.C.*

7. The cement bonds log run on the 30-inch casing of IW-1 before and after cementing demonstrated a good cement bond around the casing. *See Document 2 and Rules 62-528.300(6), 62-528.410(7)(a), and 62-528.455(2)(b), F.A.C.*

8. A television survey of the 30-inch casing of injection well IW-1 was conducted on May 11, 2011. The television survey did not reveal any defects in the cased portion of the well. *See Document 2 and Rules 62-528.300(6), 62-528.425(1)(d), 62-528.430(2)(b)2.a., 62-528.455(3)(b)5., and 62-528.455(3)(c), F.A.C.*

9. The cement bond log run on the 20-inch casing of IW-1 before and after cementing (June 1, 2011, and June 6, 2011, respectively) demonstrated a good cement bond around the casing. *See Document 2 and Rules 62-528.300(6), 62-528.410(7)(a), and 62-528.455(2)(b), F.A.C.*

10. Demonstrated by pressure testing the 20-inch tubing of injection well IW-1 (before the 20-inch tubing was cemented in) at 108 psi with a pressure decrease of 1.39 percent to 107.5 psi over one hour. The pressure change is considered acceptable since it is within the 5 percent limits allowed by the Department. *See Document 2 and Rules 62-528.300(6)(b)2. and (e), 62-528.410(7)(c), 62-528.425(1)(d), 62-528.430(2)(b)2.a., 528.450(3)(a)2., and 62-528.455(2)(b), F.A.C.*

IW-2:

1. Demonstrated by pressure testing the completed injection well IW-2 (after the 20-inch tubing was cemented in) at 152.5 psi with a pressure decrease of 3.6 percent to 147.0 psi over one hour on July 6, 2011. The pressure change is considered acceptable since it is within the 5 percent limits allowed by the Department. *See Document 1, Document 2 and Rules 62-528.300(6)(b)2. and (e), 62-528.410(7)(c), 62-528.425(1)(d), 62-528.430(2)(b)2.a., 528.450(3)(a)2., and 62-528.455(2)(b), F.A.C.*

2. A television survey of the completed injection well IW-2 was conducted on July 7, 2011. The television survey did not reveal any defects in the cased portion of

the well. *See Document 2 and Rules 62-528.300(6), 62-528.425(1)(d), 62-528.430(2)(b)2.a., 62-528.455(3)(b)5., and 62-528.455(3)(c), F.A.C.*

3. The September 7, 2011, temperature log run on the completed injection well IW-2 indicated no evidence of fluid movement behind the casing. *See Document 2 and Rules 62-528.300(6), 62-528.425(1)(d), 62-528.430(2)(b)2.a., 62-528.455(3)(b)5., and 62-528.455(3)(c), F.A.C.*
4. The September 13, 2011, radioactive tracer survey indicated that there was no fluid movement behind injection well IW-2's casing and tubing. *See Document 2 and Rules 62-528.300(6), 62-528.425(1)(d), 62-528.430(2)(b)2.a., 62-528.455(3)(b)5., and 62-528.455(3)(c), F.A.C.*
5. Demonstrated by pressure testing the 40-inch casing of injection well IW-2 (after the 40-inch tubing was cemented in) at 154 psi with a pressure decrease of 3.57 percent to 148.5 psi over one hour on April 1, 2011. The pressure change is considered acceptable since it is within the 5 percent limits allowed by the Department. *See Document 2 and Rules 62-528.300(6)(b)2. and (e), 62-528.410(7)(c), 62-528.425(1)(d), 62-528.430(2)(b)2.a., 528.450(3)(a)2., and 62-528.455(2)(b), F.A.C.*
6. Demonstrated by pressure testing the 30-inch casing of injection well IW-2 (after the 30-inch tubing was cemented in) at 164.0 psi with a pressure decrease of 2.74 percent to 159.5 psi over one hour on June 2, 2011. The pressure change is considered acceptable since it is within the 5 percent limits allowed by the Department. *See Document 2 and Rules 62-528.300(6)(b)2. and (e), 62-528.410(7)(c), 62-528.425(1)(d), 62-528.430(2)(b)2.a., 528.450(3)(a)2., and 62-528.455(2)(b), F.A.C.*
7. The cement bond log run on the 30-inch casing of IW-2 after cementing on June 1, 2011, demonstrated a good cement bond around the casing. *See Document 2 and Rules 62-528.300(6), 62-528.410(7)(a), and 62-528.455(2)(b), F.A.C.*
8. A television survey of the injection well IW-2 30-inch casing was conducted on June 27, 2011. The television survey did not reveal any defects in the cased portion of the well. *See Document 2 and Rules 62-528.300(6), 62-528.425(1)(d), 62-528.430(2)(b)2.a., 62-528.455(3)(b)5., and 62-528.455(3)(c), F.A.C.*
9. The cement bond log run on the 20-inch casing of IW-2 before and after cementing (June 30, 2011, and July 5, 2011, respectively) demonstrated a good cement bond around the casing. *See Document 2 and Rules 62-528.300(6), 62-528.410(7)(a), and 62-528.455(2)(b), F.A.C.*
10. Demonstrated by pressure testing the 20-inch tubing of injection well IW-2 (before the 20-inch tubing was cemented in) at 157.0 psi with no increase or decrease in pressure on June 30, 2011. The pressure change is considered acceptable since it is within the 5 percent limits allowed by the Department. *See Document 2 and Rules 62-528.300(6)(b)2. and (e), 62-528.410(7)(c), 62-*

528.425(1)(d), 62-528.430(2)(b)2.a., 528.450(3)(a)2., and 62-528.455(2)(b), F.A.C.

MW-1:

1. Demonstrated by pressure testing the 16-inch casing of monitor well MW-1 (after the 16-inch casing was cemented in) at 108.0 psi with a pressure decrease of 3.24 percent to 104.5 psi over one hour on July 21, 2011. The pressure change is considered acceptable since it is within the 5 percent limits allowed by the Department. *See Document 2 and Rules 62-528.300(6)(b)2. and (e), 62-528.410(7)(c), 62-528.425(1)(d), 62-528.430(2)(b)2.a., 528.450(3)(a)2., and 62-528.455(2)(b), F.A.C.*
2. The cement bond log run on the 16-inch casing of monitor well MW-1 after cementing on July 22, 2011, demonstrated a good cement bond around the casing. *See Document 2 and Rules 62-528.300(6), 62-528.410(7)(a), and 62-528.455(2)(b), F.A.C.*
3. The cement bond log run on the 6.625-inch casing of monitor well MW-1 after cementing on August 6, 2011, demonstrated a good cement bond around the casing. *See Document 2 and Rules 62-528.300(6), 62-528.410(7)(a), and 62-528.455(2)(b), F.A.C.*
4. Demonstrated by pressure testing the 6.625-inch casing of monitor well MW-1 (after the 6.625-inch casing was cemented in up to the base of the upper monitor zone) at 105.0 psi with a pressure decrease of 0.47 percent to 104.5 psi over one hour on August 6, 2011. The pressure change is considered acceptable since it is within the 5 percent limits allowed by the Department. *See Document 2 and Rules 62-528.300(6)(b)2. and (e), 62-528.410(7)(c), 62-528.425(1)(d), 62-528.430(2)(b)2.a., 528.450(3)(a)2., and 62-528.455(2)(b), F.A.C.*
5. A television survey of the completed monitor well MW-1 was conducted on August 8, 2011. The television survey did not reveal any defects in the cased portion of the well. *See Document 2 and Rules 62-528.300(6), 62-528.425(1)(d), 62-528.430(2)(b)2.a., 62-528.455(3)(b)5., and 62-528.455(3)(c), F.A.C.*

IW-1, IW-2 and MW-1:

1. The monitor well physical/chemical (pressure/water quality) data does not indicate movement of fluids out of the injection zone. *See Documents 1 and 5, and Rules 62-528.425(1)(g), 62-528.430(2), 62-528.455(3)(b)6., and 62-528.455(3)(c), F.A.C.*
2. Mechanical integrity testing (TV survey, pressure test, radioactive tracer survey, and temperature log) shall be completed on injection well IW-1 before June 7, 2016, and IW-2 before July 5, 2016. A final report for the demonstration of mechanical integrity test must be submitted within three (3) months of the initiation date for mechanical integrity testing, as required by Rules

62-528.300(6), 62-528.425(1)(d), 62-528.430(2), 62-528.455(3)(b)5., and 62-528.455(3)(c), F.A.C.

C. Confinement (Rule 62-528.405(3), F.A.C.)

Demonstrated through water quality tests, formation sampling, coring, straddle packer testing, and geophysical logs (caliper, gamma ray, dual induction, borehole televiewer, borehole compensated sonic, pumping and static flowmeter, pumping and static temperature, pumping and static fluid resistivity, and television survey or borehole televiewer). The water samples from the packer test were analyzed for total dissolved solids (TDS), chloride, sulfate, ammonia-nitrogen, total kjeldahl nitrogen, temperature, and conductivity. Confinement occurs in the Avon Park and Oldsmar formations between 1710 to 2902 feet below land surface (bls). *See Document 1, Document 2, and Rules 62-528.405(1)(a), (2)(a) and (2)(c), 62-528.410(6), 62-528.430(1), 62-528.450(2), and 62-528.450(3), F.A.C.*

D. Injection Zone Testing (Rule 62-528.405(30), F.A.C.)

Performed through water quality testing, formation sampling, geophysical logs (caliper, gamma ray, dual induction, borehole televiewer, borehole compensated sonic, pumping and static flowmeter, pumping and static temperature, pumping and static fluid resistivity, and television survey or borehole televiewer), and long and short term injection testing. A short-term injection test at a rate of 7,987 gallons per minute was conducted on injection well IW-1 for a 12 hour period on October 1, 2012. A short-term injection test at a rate of 7,991 gallons per minute was conducted on injection well IW-2 for a 12 hour period on October 4, 2012. The top of the injection zone occurs in the Oldsmar Formation at approximately 2902 feet bls. *See Document 1, Document 2, Document 3, and Rules 62-528.405(1)(a) and (3), 62-528.410(6), 62-528.430(1), 62-528.450(2), 62-528.450(3), and 62-528.455(2)(a), (d), and (f), F.A.C.*

E. Underground Source of Drinking Water (USDW) (Rule 62-528.405(1)(a), F.A.C.)

The base of the lowermost USDW (10,000 mg/l total dissolved solids (TDS) interface) is in the Avon Park Formation at approximately 1710 feet bls. The depth of the base of the USDW and the characteristics of the monitor zones were evaluated by lithologic sampling at 10 foot intervals, water quality sampling during reverse air drilling, coring, geophysical logging (caliper, gamma ray, dual induction, borehole televiewer, borehole compensated sonic, pumping and static flowmeter, pumping and static temperature, pumping and static fluid resistivity, and television survey or borehole televiewer), and straddle packer testing. *See Document 1, Document 2, Document 3, and Rules 62-528.405(1)(a), 62-528.410(1)(b), 62-528.410(6), 62-528.425(1)(e)1.a., 62-528.430(1), 62-528.440(2)(c), 62-528.450(2), 62-528.450(3), 62-528.455(1)(c), and 62-528.455(2)(a) and (d), F.A.C.*

F. Well Construction

As-built casing program for injection well IW-1 (all casings and tubing were new and unused and cemented to land surface). See Document 1, Document 2, Document 3, and Rules 62-528.410(1)(e), 62-528.410(4) and (5), and 62-528.450(3)(a)3.h., F.A.C.

70" OD (0.375" thick) steel casing set to 45 feet bls
60" OD (0.375" thick) steel casing set to 250 feet bls
50" OD (0.375" thick) steel casing set to 975 feet bls
40" OD (0.375" thick) steel casing set to 1975 feet bls
30" OD (0.500" thick) steel casing set to 2902 feet bls
20" OD (1.00" thick) FRP tubing set to 2892 feet bls
28" open hole from 2902 to 3685 feet bls

As-built casing program for injection well IW-2 (all casings and tubing were new and unused and cemented to land surface). See Document 1, Document 2, Document 3, and Rules 62-528.410(1)(e), 62-528.410(4) and (5), and 62-528.450(3)(a)3.h., F.A.C.

70" OD (0.375" thick) steel casing set to 42 feet bls
60" OD (0.375" thick) steel casing set to 250 feet bls
50" OD (0.375" thick) steel casing set to 976 feet bls
40" OD (0.375" thick) steel casing set to 1990 feet bls
30" OD (0.500" thick) steel casing set to 2925 feet bls
20" OD (1.00" thick) FRP tubing set to 2917 feet bls
28" open hole from 2925 to 3800 feet bls

As-built casing program for monitor well MW-1 (all casings were new, unused and cemented to land surface, except the 6.625" which is partially uncemented for monitoring). See Document 1, Document 2, and Rules 62-528.410(4) and (5), 62-528.420, and 62-528.450(3)(a)3.h., F.A.C.

44"OD (0.375" thick) steel casing set to 39 feet bls
34"OD (0.375" thick) steel casing set to 233 feet bls
24"OD (0.375" thick) steel casing set to 975 feet bls
16"OD (0.500" thick) steel casing set to 1630 feet bls
Upper Monitor Zone 1630 to 1660
6.625"OD (0.580 thick) fiberglass reinforced plastic (FRP) casing set to 1960 feet bls

Lower Monitor Zone from 1960 to 2000 feet bls

G. Monitor Plan (Rule 62-528.425(1), F.A.C.)

Dual-zone monitor well MW-1 is located 144.71 feet east of injection well IW-1 and 146 feet west of injection well IW-2 (Document 1 and Document 10). The monitor intervals are from 1630 to 1660 feet bls (Avon Park Formation) and 1960 to 2000 feet bls (Avon Park Formation). The upper zone is for monitoring above the base of the USDW and the lower zone is for early warning monitoring below the USDW. *See Document 1, Document 2, and Rules 62-528.420, 62-528.425(1)(e) and (g), and 62-528.450(3)(a)3.h., F.A.C.*

Ground water from the monitor zones is analyzed monthly for chemical parameters. *See Rules 62-528.425(1)(e) and (g) and 62-528.430(2)(b)1.d., F.A.C.*

The pressure of the monitor zones is monitored continuously. *See Rules 62-528.425(1)(e) and (g) and 62-528.430(2)(b)1.d., F.A.C.*

The pressure and flow is monitored continuously for the injection well. *See Rules 62-528.425(1)(b) and 62-528.430(2)(b)1.b. and c., F.A.C.*

A controlled quarterly injectivity test to determine changes in the capacity of the well is conducted on the injection well. As part of the injectivity test a quarterly pressure fall-off test is required. *See Rules 62-528.425(1)(c) and 62-528.430(2)(b) and (d), F.A.C.*

The effluent is analyzed monthly for chemical parameters. *See Rules 62-528.425(1)(a) and 62-528.430(2)(b)1.a. and 2.b., F.A.C.*

H. Financial Responsibility (Rules 62-528.435(9) and 62-528.455(3)(b)8. & (c)3., F.A.C.)

Demonstrated by Local Government Guarantee. *See Document 1 and Rules 62-528.435(9) and 62-528.450(2)(o), F.A.C.*

I. Emergency Discharge (Rule 62-528.455(1)(d), F.A.C.)

Injection well IW-1 is the primary injection well during normal operation. When injection well IW-1 is out-of-service for planned and unplanned events injection well IW-2 is to be used for back up. If both injection wells are out-of-service the RO concentrate may be temporarily stored and the treated effluent will go to reuse. *See Document 1, Document 4, and Rules 62-528.450(2)(k) and 62-528.450(3)(a)4., F.A.C.*

3. Agency Action

A draft permit shall be issued as per rule 62-528.310, F.A.C.

4. Public Rights (Rules 62-528.315, .321, and .325, F.A.C.)

Any interested person may submit written comments on the draft permit for a minimum of 30 days after publication of this public notice. A public meeting will be held on Wednesday, June 10, 2015, at 10 am at Town of Davie Utilities - Administration Conference Room, 7351 SW 30 Street, Davie, Florida 33314 for the purpose of receiving oral and written comments concerning this project. Written comments shall be submitted to the Department of Environmental Protection, Aquifer Protection Program, 2600 Blair Stone Road, MS 3530, Tallahassee, Florida 32399-2400, which is the office processing this permit application. All comments received within the 30-day period and through the public meeting date, will be considered in formulation of the Department's final decision regarding permit issuance.

After the conclusion of the public comment period and public meeting described above, the Department may revise the conditions of the permit based on such public comment. Then the applicant will publish Notice of the Proposed Agency Action. A person whose

substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing). Accordingly, the Department's final action may be different from the position taken by it in the Notice of Proposed Agency Action. The petition must conform to the requirements specified in the Notice and be filed (received) within 14 days of publication of the Notice in the Department's Office of General Counsel, MS 35, 3900 Commonwealth Boulevard, Tallahassee, Florida 32399-3000. 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, or to intervene in this proceeding and participate as a party to it. Any subsequent intervention (in a proceeding initiated by another party) will only be 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.

The application and draft permit are available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at the Department of Environmental Protection, Southeast District office, 3301 Gun Club Road, MSC 7210-1, West Palm Beach, Florida 33406, or at the Department of Environmental Protection, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Please contact Mr. Neil Campbell at 850.245.8612 for additional information concerning this project.

5. Department of Environmental Protection Contact

Mr. Neil Campbell, Engineering Specialist, Aquifer Protection Program
Florida Department of Environmental Protection
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Phone: 850.245.8612