

**APPENDIX A  
INJECTION WELL SYSTEM  
MECHANICAL INTEGRITY TEST  
(MIT) CORRESPONDANCE**

**MECHANICAL INTEGRITY TEST  
WORK PLAN**

**Approved 9-15-04**



# Department of Environmental Protection

Jeb Bush  
Governor

Southeast District  
400 N. Congress Ave. — Suite 200  
West Palm Beach, Florida 33401

Colleen M. Castille  
Secretary

## ELECTRONIC CORRESPONDENCE

15 September 2004

Brig M. Garg, PE, DEE  
Director of Public Utilities,  
City of Miramar  
13900 Pembroke Road  
Miramar, FL 33027

BROWARD COUNTY  
UIC - City of Miramar West WTP  
FILE: 125256-007-UO

RE: Mechanical Integrity Testing (MIT) Plan  
Deep Injection Wells, IW-1 and IW-2

Dear Mr. Garg:

The Florida Department of Environmental Protection (Department or FDEP) acknowledges the receipt of your Mechanical Integrity Testing Plan for injection well IW-1, on July 28, 2004, for the above referenced facility.

Based on information provided and after review and receipt of comments from the UIC Technical Advisory Committee (TAC), the Department concurs with the plan submitted for the demonstration of mechanical integrity.

Please inform this office of the mobilization notice as well as the required 72-hour notice prior to the internal MIT phase.

If you have any questions, please contact Heidi Vandor, PG at 561/681-6695 (Heidi.Vandor@dep.state.fl.us) or myself at 561/681-6691 (Joseph.May@dep.state.fl.us). When referring to this letter, please reference the above date and file number. In addition, please provide a comprehensive distribution list with each submittal.

Sincerely,

---

Joseph May, PG  
Program Manager  
Underground Injection Control

JRM/HV

cc: Richard Deuerling, FDEP/TLH  
Garth Hinckle, BCDPEP

Nancy Marsh, USEPA/ATL  
Heidi Vandor, FDEP/WPB

Steve Anderson, SFWMD/WPB  
Susan Bodmann, MWH



July 15, 2004

0407024

Mr. Joe May, P.G.  
Program Manager  
Florida Department of Environmental Protection  
Underground Injection Control Division  
400 North Congress Avenue  
West Palm Beach, Florida 33401

**SUBJECT: City of Miramar Western Water Treatment Plant  
Injection Wells IW-1 and IW-2  
MIT Test Plan UIC Permit (Draft) 125256-007-UO**

Dear Mr. May:

In compliance with Specific Condition 2-j of the above-referenced draft operating permit, this letter presents a Mechanical Integrity Test Plan for Concentrate Disposal Wells IW-1 and IW-2. This plan is presented by MWH, on behalf of the City of Miramar. It is the City's intent to implement this test plan upon approval by the Florida Department of Environmental Protection. It is estimated that testing activities will begin in October 2004.

The Mechanical Integrity Test plan is comprised of two attachments in addition to this cover letter. Attachment A provides the procedures to be employed during testing and Attachment B provides a tentative schedule for testing.

If you have any questions regarding this submittal, please do not hesitate to call.

Respectfully submitted,

MWH Americas, Inc.

Mark J. Abbott  
Principal Hydrogeologist  
Licensed Professional Geologist No. PG1578

cc: Brij M. Garg, City of Miramar  
Tony Rabbat, City of Miramar  
Bill Knee, City of Miramar  
Hong Guo, City of Miramar  
Lyle Munce, MWH  
Project File: 1570789



**Mechanical Integrity Test Plan  
City of Miramar Injection Wells No. 1 & No. 2**

---

**ATTACHMENT A  
MECHANICAL INTEGRITY TEST PLAN  
UIC PERMIT (DRAFT) 125256-007-UO**

The City of Miramar is planning to perform Mechanical Integrity Tests (MIT's) to demonstrate the mechanical integrity of injection wells IW-1 and IW-2 at their western Water Treatment Plant.

Draft operating permit # 125256-007-UO requires that MIT test reports must be completed and submitted to the Florida Department of Environmental Protection (FDEP) within 3 months of the test completion dates. The test completion date for the two wells listed in the recent draft permit is December 14, 2004. The MIT's for IW-1 and IW-2 were last performed over the two-month period from December 1999 to January 2000. Results of the testing were submitted to the FDEP in a report dated February 2000.

Testing is planned to start by October 2004. In order to comply with this requirement, the following tests will be performed:

1. A pressure test of the injection tubing, and liner hanger packer using the existing annular piping system, as required by Chapter 62-528.300(6)(b) 1, and 62-528.300(6)(e)FAC.
2. A video television survey through the entire length of each well from the surface to the base of the injection zone, as required by Chapter 62-528.425 (1)(d) Florida Administrative Code (FAC).
3. A temperature log, gamma ray log, and radioactive tracer survey, as required by Chapter 62-528.300(6)(c)2 FAC.
4. The monitoring data and results, for the injection wells, effluent, and dual-zone monitor well will be submitted in tabular and graphical format, at a minimum, for the last five years. An interpretation of these data shall also be submitted as per Rule 62-528.300(6)(f), FAC.
5. A report will be submitted to FDEP within three months of the completion of testing that will consist of a description of the mechanical integrity testing methods, results, and an interpretation of the results.

The City of Miramar Water Treatment Plant (WTP) is located at 4100 South Flamingo Road, in western Miramar, as shown in the location map in Figure 1. The injection wells and monitor well are located on concrete pads near the water retention ponds on the East Side of the property as seen in Figure 2.

## **CONCENTRATE DISPOSAL SYSTEM**

The City of Miramar concentrate disposal system currently consists of two operational injection wells, IW-1 (Figure 3) and IW-2 (Figure 4). The wells were constructed to Class I Industrial injection well standards. Each well has a 16-inch outside diameter steel casing lined with a 13-3/8-inch removable injection tubing, supported by a retrievable liner hanger packer. The wells are currently permitted at a maximum injection rate of 2.08 mgd (1,444 gpm).

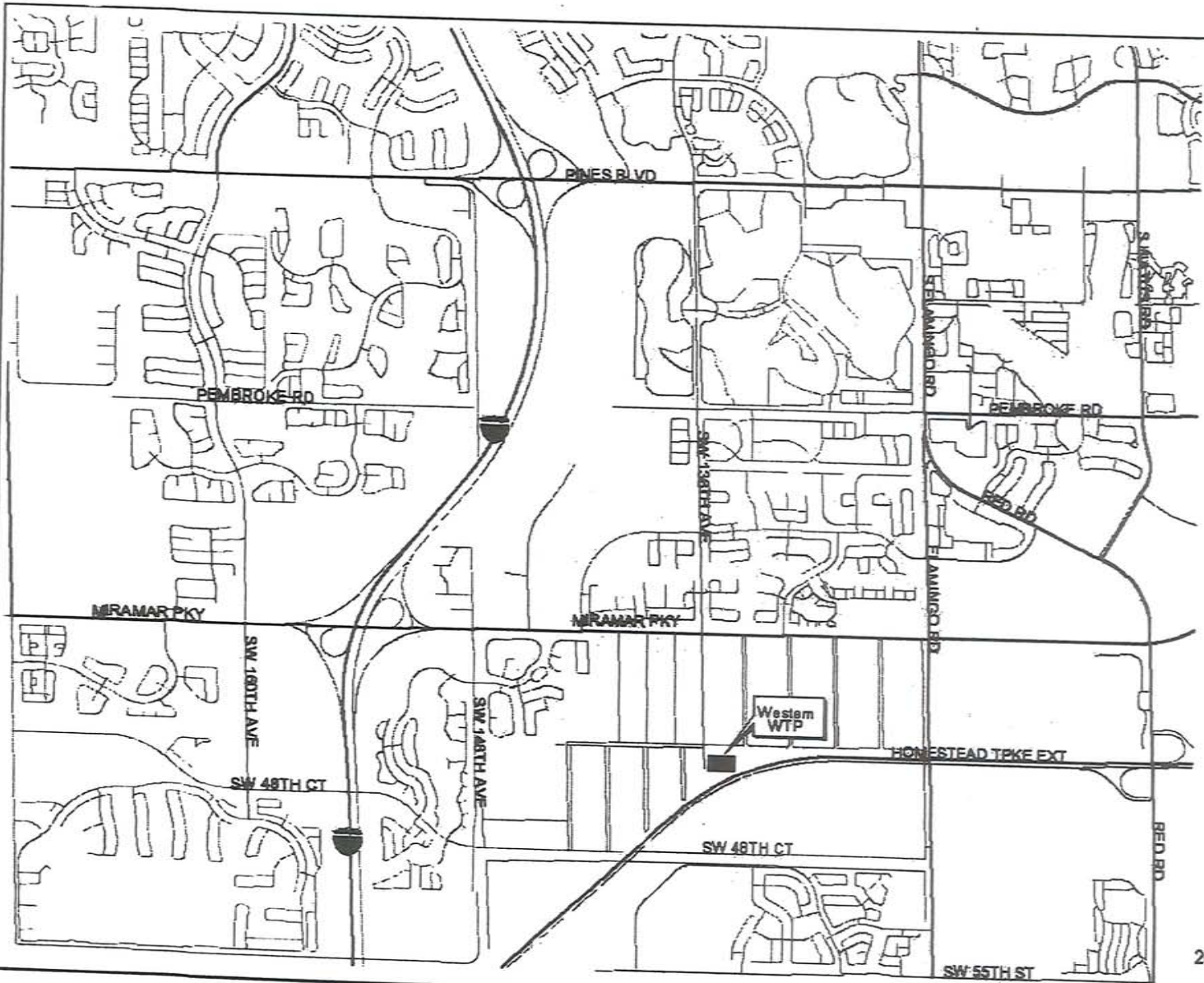
### **IW-1**

IW-1 has a final casing set and cemented to a total depth of 3,095 feet below land surface (bls). The injection tubing has a total depth of 3,049 feet bls. The well was completed with a nominal 16-inch diameter open borehole extending from the bottom of the final casing to approximately 3,500 feet bls. However, during the initial injection tubing run, the tubing was dropped, sealing the borehole below 3,179 feet bls. Based on information obtained during construction, the injection zone in IW-1 is located between 3,100 and 3,179 feet bls, and therefore the borehole below 3,179 feet was not reopened. Static wellhead pressure in IW-1 prior to injection was 18 pounds per square inch (psi); current static wellhead pressure is approximately 30 psi. During initial testing of the well, the wellhead pressure of the borehole filled with fresh water was 25 psi. Wellhead pressure measured in December 2003 during injection was approximately 33 psi, at an average injection rate of 887 gpm.

### **IW-2**

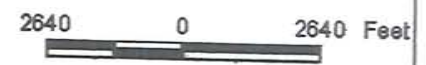
IW-2 has a final casing set and cemented to a total depth of 3,046 feet bls. The injection tubing has a total depth of 3,007 feet bls. The well was completed with a nominal 16-inch diameter open borehole extending from the bottom of the final casing to approximately 3,508 feet bls. Based on information obtained during construction, the injection zone in IW-2 is located between 3,100 feet bls and 3,210 feet bls. Static wellhead pressure in IW-2 prior to injection was 18 psi; current static wellhead pressure is approximately 30 psi. During initial testing of the well, the wellhead pressure in the borehole when filled with fresh water was 25 psi. Wellhead pressure measured in December 2003 during injection was approximately 32 psi, at an injection rate of 930 gpm.





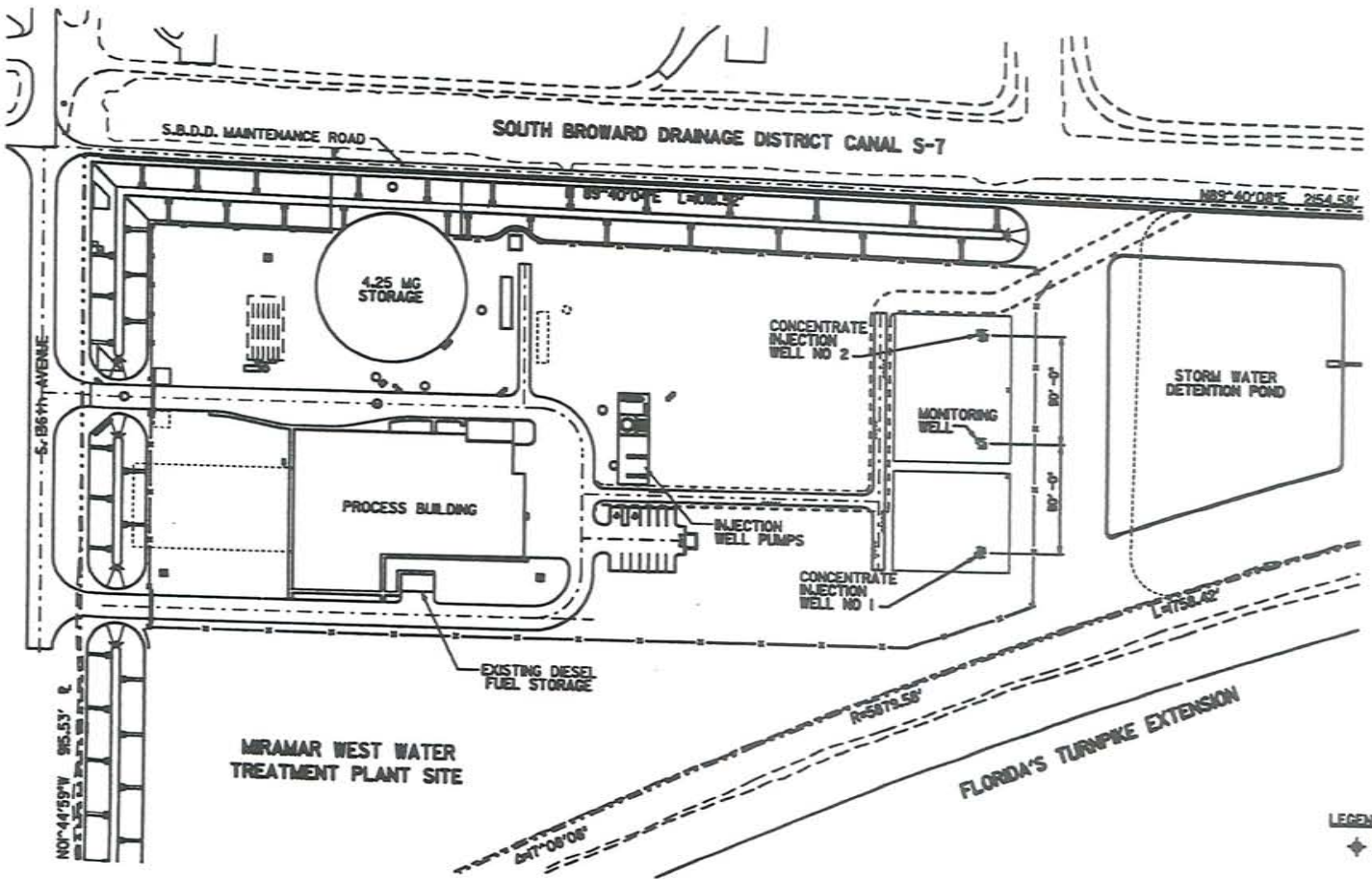
**LEGEND**

- Road
- Water



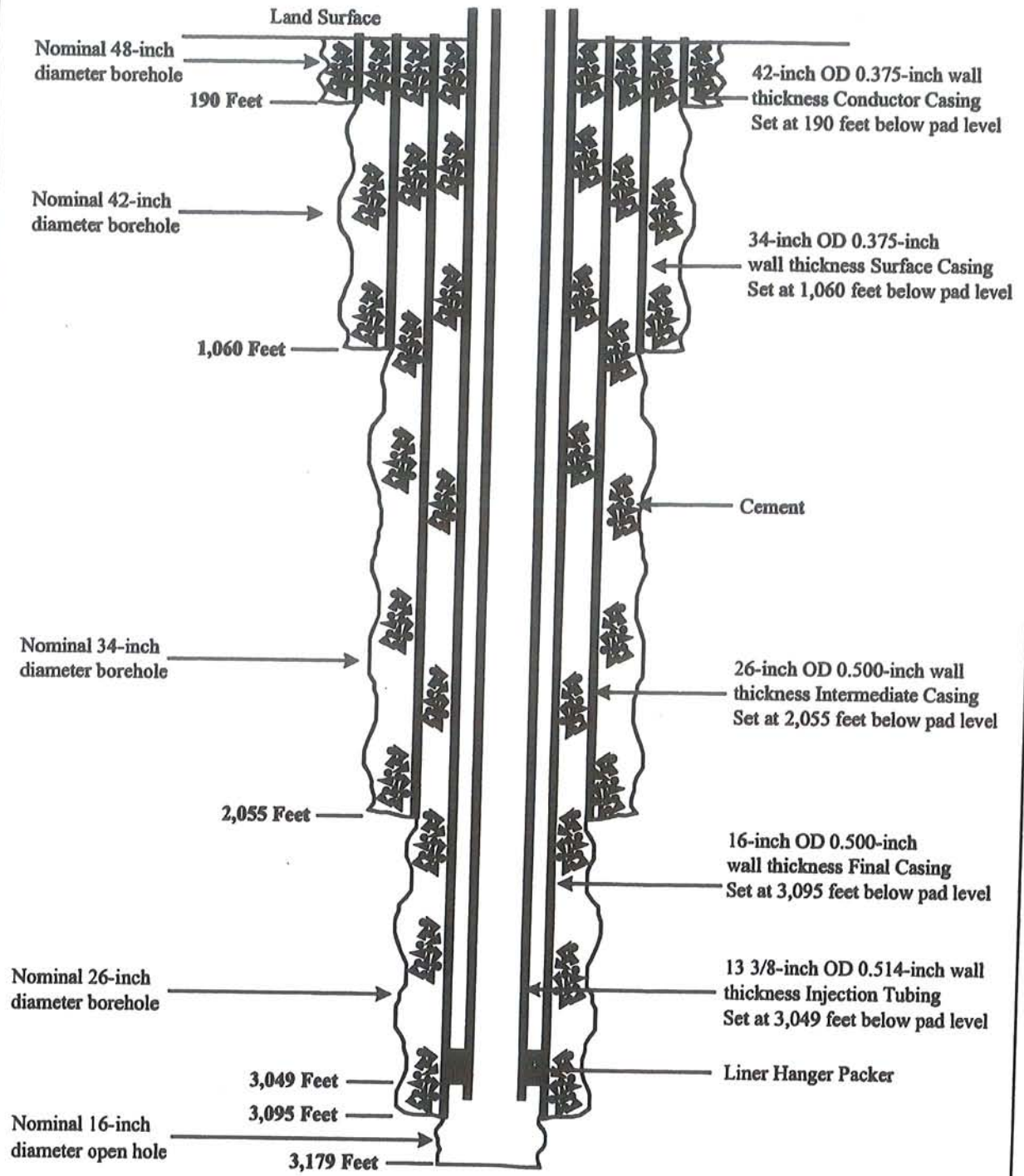
City of Miramar  
Western Water Treatment Plant Location

Figure  
1



LEGEND  
 ◆ EXISTING INJECTION WELL

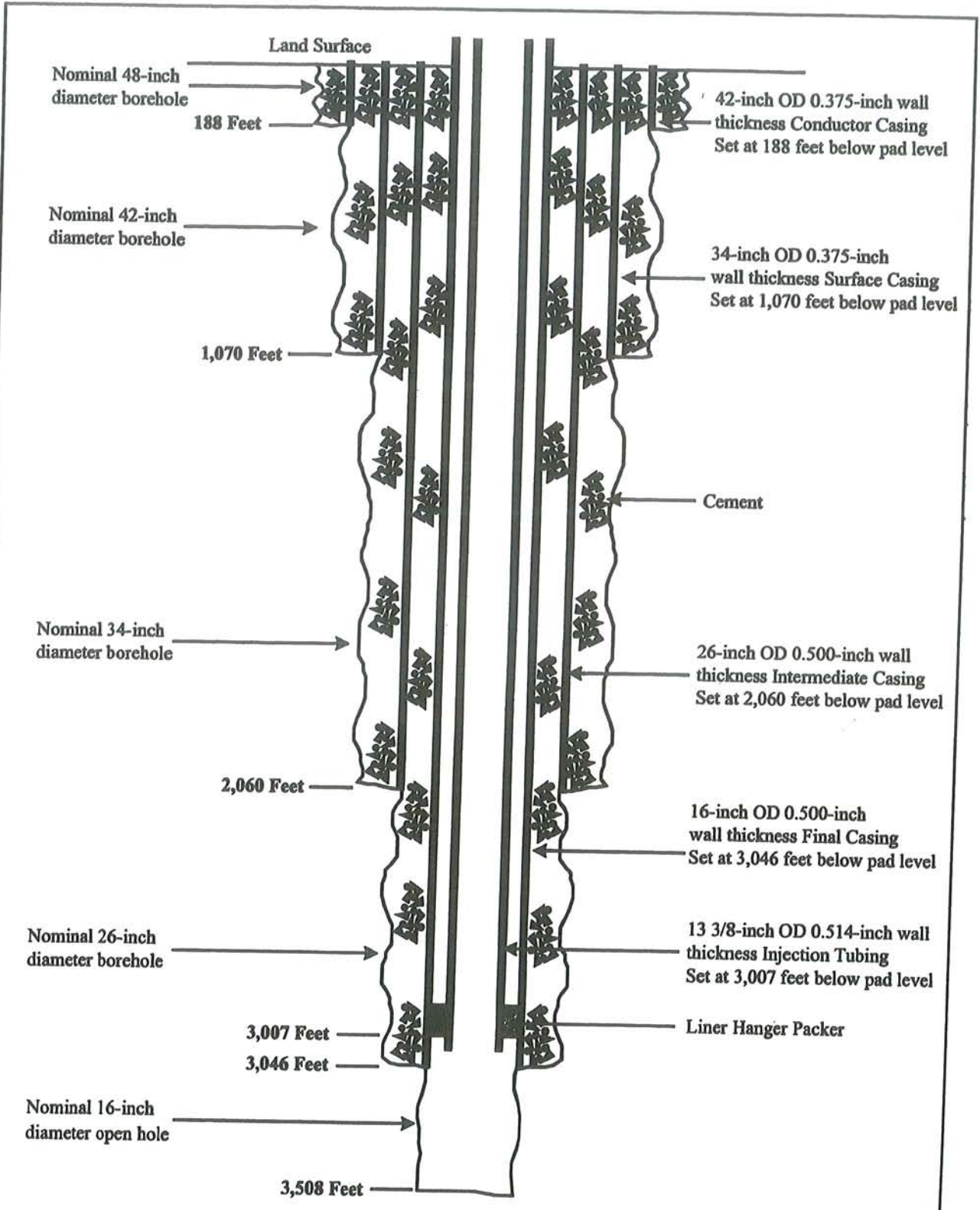
|                    |   |                          |  |                  |
|--------------------|---|--------------------------|--|------------------|
| SCALE<br>1" = 100' |  <b>MWH</b><br><small>WATER</small> | City of Miramar, Florida | CITY OF MIRAMAR<br>CONCENTRATE DISPOSAL WELLS<br>AND MONITORING WELL LOCATIONS | PAGE<br><b>2</b> |
|--------------------|---|--------------------------|--|------------------|



City of Miramar WTP  
Injection Well - IW-1

Figure  
3







## DZMW-1

DZMW-1 (Figure 5) was installed at the WTP site between IW-1 and IW-2. The DZMW-1 is located 110 feet north of IW-1, and 110 feet south of IW-2. The upper monitor zone taps the interval between 1,639 feet bls and 1,738 feet bls. The lower monitor zone taps the interval between 1,930 feet bls, and 2,005 feet bls. The DZMW-1 was designed and constructed to monitor both IW-1 and IW-2.

## DETAILS OF THE TESTING

The testing of the two injection wells will include initial performance of a video television survey to determine if the injection wells need brushing. If the wells do need brushing, a drilling rig will be mobilized to conduct brushing activities. Subsequent to brushing, a second television survey will be conducted to inspect the casing and open borehole, and determine an appropriate location for the inflatable packer to be used in pressure testing the well.

After completion of the pressure test to evaluate internal casing integrity, a radioactive tracer survey (including background gamma ray log) will be conducted to verify the external mechanical integrity of the cement seal at the base of the casing. A temperature log also will be performed to evaluate mechanical integrity, as required.

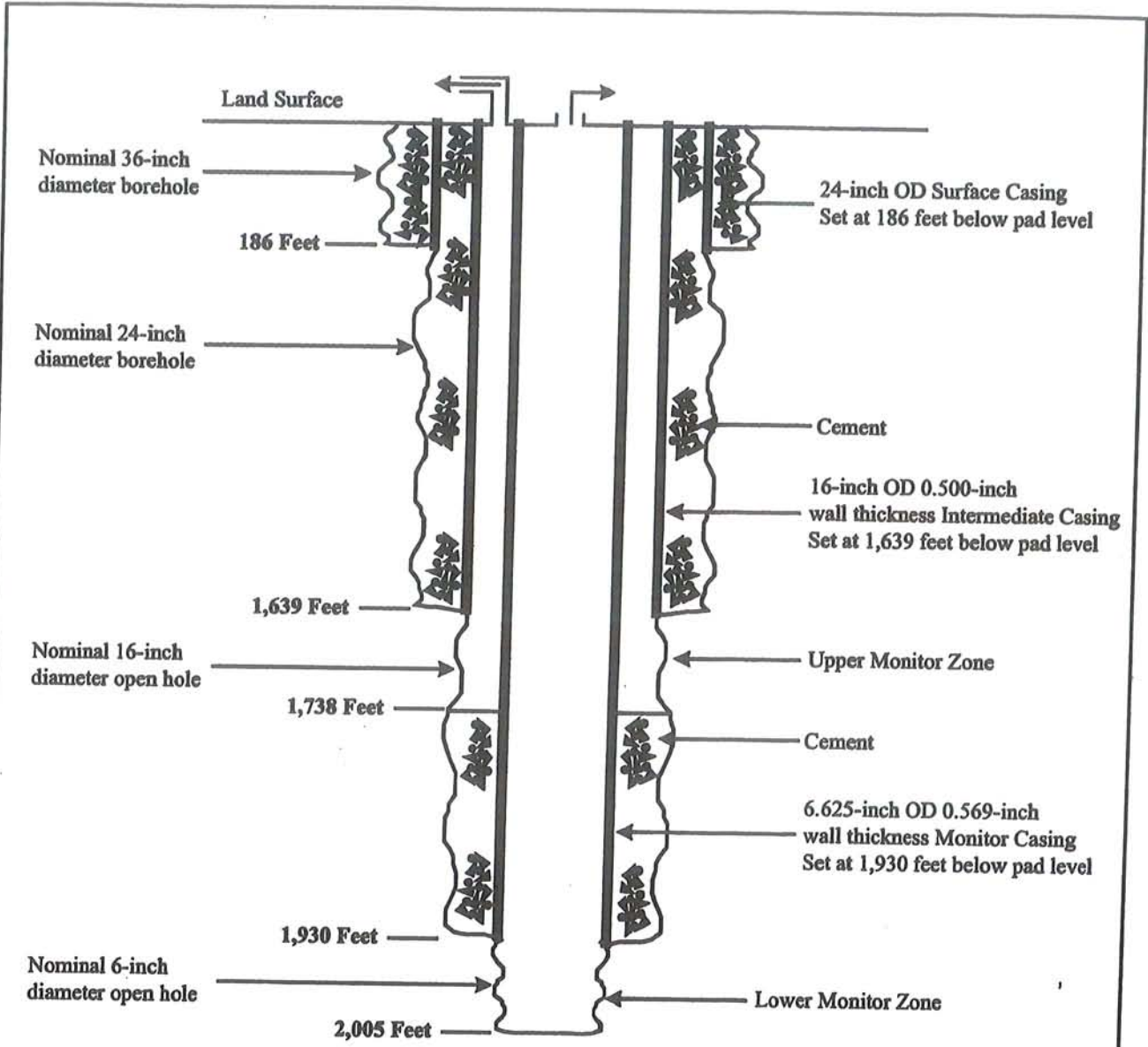
Each well will be tested and completed individually, so at least one well will be kept in service at all times. A summary of testing is presented below:

- Performance of a video survey
- Tubing brushing (if necessary)
- Re-run video survey (if tubing brushing is performed)
- Perform annular pressure test
- Background temperature and gamma-ray logs
- Radioactive tracer survey (RTS)

After the geophysical logging is completed, the first well will be placed back in service and the testing procedure will be repeated on the second well.

1. **Video Television Survey:** The following procedure will be used for the video television survey of the injection wells. A 12-inch diameter stripper head assembly will be bolted to the well head assembly above the existing gate valve. The assembly will have the ability to house the television camera between the gate valve and the pack-off assembly mounted in the stripper head and will include a tee and a 4-inch diameter valve. The camera will be centralized using spring type centralizers to permit entry through the wellhead valves.

Prior to performance of the survey, fresh water from a fire hydrant located on the plant property will be introduced into the well through the 4-inch diameter valve





located on the stripper head assembly. A check valve and totalizing flow meter (provided by the City) will be placed in line to prevent backflow from the well into the fresh water source utilized for testing. An estimated total of 60,000 gallons of potable water will be pumped into the well prior to testing (three well volumes) to provide clarity for the survey. If, upon entering the well with the TV camera and after pumping the specified quantity of potable water, the well is not clear, water will continue to be pumped during the video television survey.

A qualified service company will perform the video survey. The survey will be used to obtain information about the condition of the injection tubing. The video will also be used to observe the condition of areas where it would be inappropriate to inject the iodine tracer used in the radioactive tracer survey (RTS) test. Qualified personnel will witness the entire video survey.

2. **Tubing Cleaning (optional):** If during the performance of the video survey the concentrate well tubing is found to be covered with a deposit that will interfere with testing or with continued operation of the well, the tubing shall be cleaned using a hydrojet or casing brush. The procedure is summarized below:
  - a. After the well has been taken out of service, the well shall be "killed" and the wellhead disassembled. A drill rig shall be mobilized over the well and the cleaning string assembled and inserted into the well. The tubing shall be cleaned from land surface to the base of the casing. During cleaning, the waste products generated by the operation shall be circulated out of the well and disposed in accordance with applicable waste management regulations.
  - b. After the completion of tubing cleaning, the well will be purged by allowing the well to backflow under artesian pressure or by air development. Debris generated from the cleaning operation will be collected at land surface and disposed of in accordance with all applicable waste management regulations.
3. **Pressure Test.** The following procedure will be used for the pressure test of the injection well.

The existing access at the wellhead, used to monitor and add to the Baracor solution in the annulus of the well, will be used in the performance of the annular pressure test. The contractor will install temporary piping to the annular pressure compensation system to allow for pressurizing the well.

The contractor will be responsible for pressurizing the annulus of the well using potable water. The pressure in the annulus will be increased to 150 psi, which is in excess of 1.5 times the average injection pressure. Qualified personnel will record



pressure readings every five minutes for a one-hour period and the results will be certified as correct. The pressure should not vary by +/- 5 percent during the one hour testing period. The Florida Department of Environmental Protection (FDEP) is anticipated to be present to witness the performance of the pressure test. FDEP will be notified at least 72 hours prior to the test and the testing will be performed during normal business hours (8AM to 5PM) Monday through Friday.

The pressure gauge used for this test will have a full scale of 0 to 200 psi with a maximum of 1 psi increments that is accurate to one quarter of one percent of full-scale deflection will be mounted on the temporary piping. The gauge will have previously been calibrated. Calibration data will be submitted to FDEP prior to testing.

Water will be collected from the wellhead during depressurization and the quality of the recovered water will be recorded. In the event that the pressure in the casing cannot be maintained, and after thoroughly investigating the accessory surface piping and appurtenances to assure that the leak is in the well, the packer will be placed at a different depth, and the test will be repeated. Upon completion of a successful pressure test, the testing assembly will be removed from the well and the annular pressure compensation system re-assembled.

4. **Radioactive Tracer Survey (RTS) and Temperature Log.** Geophysical logging services for the high resolution temperature log and radioactive tracer survey will be provided by a service company qualified and experienced in the performance of this work, possessing appropriate certifications for the handling and use of radioactive tracers. This service company will also be subcontracted to the drilling contractor. All depths in the discussion below, in connection with the radioactive tracer tool positioning, specifically refer to the location of the ejector port on the radioactive tracer tool.

FDEP staff will be notified in order to be present to witness the radioactive tracer survey. FDEP will be notified at least 72 hours prior to the test and the start of testing will be in accordance with the timing requirements set out in the operating and operational testing permits. RTS procedures will begin after "kill" fluids have been flushed from the well and the well has been shut in for a minimum of 12 hours.

- a. **Background Geophysical Logging:** Background temperature and gamma ray logs will be run in the well. The logs will be run over the entire length of the well, including the open hole interval where obstructions do not preclude the tools passage. The temperature log will be run first, from the top to the bottom of the well, as so not to disturb the water column. The gamma ray log will either be run with the temperature log in the downward direction or may be run upward



from the bottom of the well to the top. The logs will be used for comparison during radioactive tracer surveying. The high-resolution temperature log will include a plot of differential temperature for ease of comparison. As casing collar locator will also be run with these logs to accurately reference the bottom of the casing.

- b. **RTS:** An RTS will be performed in the injection well after the above-described logs. The tool used for testing will be configured according to information to be supplied by the contractor performing the logs.

Below is a list of the different phases of RTS that will be performed. Actual injection quantities will be determined in the field. All flushing activity listed below requires at least three well volumes of water to be run through the injection tubing (IW-1 = 18,964 gal and IW-2 = 18,572 gal) to remove any remaining kill fluids prior to the performance of the RTS. In the event that tracer is detected at the upper detector during any of the monitoring periods the operator will immediately log out of position to a new position and resume time-drive monitoring for the remainder of the hour at the new position. This step should be repeated if the tracer slug is again detected by the upper gamma detector. This should enable the tracer slug to be followed as it moves uphole and keep the upper detector from being stained. Furthermore, the procedure to be used during unusual occurrences during the RTS test will follow recommendations of the on site FDEP observer.

- 1) **First Low Flow Dynamic Testing:** The low flow portion of the RTS will consist of the dynamic or pumping portion of the survey. A velocity of less than 5 feet per minute (fpm) is proposed for the dynamic portion of the test. This would require a rate of less than 50 gpm to be injected into the well during the survey. A totalizing flowmeter, measuring 0 to 500 gpm will be mounted on the water supply connected to the wellhead. The flowmeter will be accurate to 0.25 percent of full scale. The flowmeter will be calibrated within a three-month period before use and calibration records will be submitted to the FDEP. Potable water from the 3-inch line adjacent to the pad would be used for this portion of the test. A backflow preventer would be placed in line before the point of injection into the well.
  - a) After beginning flow of water into the well, the tool will be placed at a depth of approximately five feet inside the final casing (3,090 feet in IW-1 and 3,041 feet in IW-2), and a slug approximately 2 milliCuries (mCi) of medicinal-grade radioactive Iodine-131 will be

ejected. The iodine will be used within one half-life of its assay date. The tool will remain in place for a period of approximately one-hour and the three gamma ray detectors in the "Time drive" mode will record the movement of the slug. The log will include the time of injection and the amount injected.

- b) After the one-hour monitoring period, a log out of position will be performed between the ejection point and a minimum of 200 feet above the highest point of detection.
  - c) Upon completion of logging, the casing will be completely flushed utilizing the injection well pumps.
  - b) After flushing, the tool will immediately be run to the base of casing, then the interval between the injection point and 200 feet above the highest point of detection of Iodine-131 will be logged (the after flush pass).
- 2) **Second Low Flow Dynamic Testing:** The process described above for the low flow dynamic log will be repeated to include a log out-of-position, a casing flush, and an after-flush pass. A slug of tracer greater than 2mCi may be used during this repeat dynamic test.

If, during testing of the well, no apparent anomalies appear that may indicate a lack of mechanical integrity in the injection well, the test will be concluded. However, if anomalies do occur, the testing procedure will be altered to track the radioactive tracer material.

After the RTS is complete, the RTS tool will be discharged one to two feet above the uppermost injection zone and the well shall be flushed with 3 to 5 volumes of effluent. A second background log will be run from the bottom to the top of the well. The wellhead assembly will be completely re-assembled and the well placed back in service.

#### **Review of Monthly Operating Report Data**

Five years of Monthly Operating Report (MOR) data for IW-1 and 2 will be summarized in tabular and graphical format as part of the MIT Report.



**ATTACHMENT B  
MECHANICAL INTEGRITY TESTING PLAN SCHEDULE  
CITY OF MIRAMAR  
INJECTION WELLS No. 1 & No. 2**

The estimated time of the performance for individual portions of the testing are as follows:

**1. TV Survey**

- Prepare wellhead; set stripper head assembly; and pump water clear 1 day
  - Perform television survey; disassemble 1 day
- Total Time 2 days**

**2. Casing Cleaning (option)**

- Mobilize drill rig; prepare well head; "kill" well 1 day
  - Clean casing 1 day
  - Reassemble wellhead; place well back into service 1 day
  - Re-Run TV Survey 1 day
- Total Time 4 days**

**3. Pressure Test**

- Install piping onto the annular pressure compensation system for testing; perform pressure test; de-pressurize and remove piping; 1 day
- Total Time 1 day**

**4. Radioactive Tracer Test and Gamma Logs**

- Set stripper head assembly 4 hours
  - Rig up; perform temperature and Gamma logs 5 hours
  - Perform static radioactive tracer survey (RTS) 2 hours
  - Perform dynamic RTS 4 hours
  - Flush, background check 2 hours
  - Rig down; reassemble wellhead 4 hours
- Total Time 21 hours (2days)**

**For Each Well:**

**Total Estimated Testing Duration 5 days**

**Total Estimated Testing Duration including Casing Cleaning 9 days**

**MECHANICAL INTEGRITY TEST  
WORK PLAN  
AMMENDMENT Nos. 1 & 2  
Approved December 2004**



**MWH**

December 8, 2004

0401211

Mr. Joseph May, P.G.  
Florida Department of Environmental Protection  
Underground Injection Control Division,  
400 North Congress Avenue,  
West Palm Beach, Florida, 33401

Subject: City of Miramar MIT Plan Amendment No. 1  
Permit No. 125256-007-UO

Dear Mr. May:

Pursuant to our conversation, the following discussion summarizes the work performed to date and describes the proposed amendment to the existing Mechanical Integrity Testing Plan on file with Florida Department of Environmental Protection (FDEP).

**STATUS**

A video survey of the inner tubing (liner) and a preliminary pressure test of the annular space between the liner and the final casing was performed in the City of Miramar concentrate disposal well IW-2 on Tuesday, November 30, 2004. The video survey was conducted from pad level to approximately 3,100 feet below land surface (bls). Various areas of pitting and scaling were observed and encrustation was noted at base of the liner approximately 3,007 feet bls. There were no observable liner breaches in IW-2.

The IW-2 annular space was pressurized to approximately 150 percent of the rated capacity, approximately 150 pounds per square inch (psi). Chapter 62-528(6)(e) states, that the annular space should be pressurized to a minimum of "...1.5 times the maximum pressure at which the well is to be permitted, or 50 psi, whichever is higher, for at least one hour. Internal mechanical integrity under subparagraph (a)1. Above is demonstrated if there is no more than a five percent pressure change over the one hour test period." This would be a maximum pressure loss of 7.5 psi from the starting point of 150 psi.

The initial attempt to pressurize the liner using the on-site annular pressure system was not successful. The annular pressure system was then isolated and a compressor was connected directly to the annular space. The annular pressure was increased to 150 psi and shut in. Several attempts to hold the 150 psi pressure were made, however, the pressure dissipated at a rate that exceeded the allowable loss under Chapter 62-528(6)(e).

December 8, 2004

The FDEP was notified of the preliminary pressure test results and that an amendment to the MIT Plan would be developed for additional work and submitted for their approval.

**Proposed MIT Plan Amendment**

MWH proposes to the following amendment to perform MIT work on IW-1.

1. **Maintenance of Annular Pressure in IW-2:** The City of Miramar will set up facilities to maintain the annular pressure in IW-2 at approximately 60 psi using potable water. Sixty psi represents 1.5 times the current injection pressure of approximately 40 psi. Once the annular space pressure is at 60 psi, IW-2 will be placed back into service.
2. **MIT in IW-1:** When IW-2 is placed into service IW-1 will be taken off-line and MIT work will proceed as described in the approved MIT Plan. A tentative schedule for the IW-1 MIT work will be submitted to FDEP 72 hours prior to the pressure test and Radioactive Tracer Survey (RTS).
3. **IW-1 Testing Schedule:** The IW-1 testing schedule has been tentatively set for the following dates.
  - December 14, 2004 – Video Survey of Liner and Preliminary Annular Pressure Test
  - December 15, 2004 – Pressure Test and RTS

MWH will continue timely communication with FDEP throughout the MIT work process to ensure the City's compliance with their current operation permit and FDEP requirements. If you have any questions, please contact either Mark Abbott or myself.

Sincerely,

MWH



Susan Bodmann, P.G.  
Senior Hydrogeologist

cc: Heidi Vandor, FDEP  
Hong Guo, City of Miramar  
Tony Rabbat, City of Miramar  
Bill Knee, City of Miramar  
Lyle Munce, MWH  
Mark Abbott, MWH  
MWH Project No. 1570811/3.1





# MWH

December 23, 2004

04041231

Mr. Joseph May, P.G.  
Florida Department of Environmental Protection  
Underground Injection Control Division,  
400 North Congress Avenue,  
West Palm Beach, Florida, 33401

Subject: City of Miramar MIT Plan Amendment No. 2  
Permit No. 125256-007-UO

Dear Mr. May:

Pursuant to our conversation on December 15, 2004, the following information summarizes the work performed to date and describes the proposed amendment to the existing Mechanical Integrity Testing Plan on file with Florida Department of Environmental Protection (FDEP).

## STATUS

A Mechanical Integrity Testing (MIT) Plan was prepared for the City of Miramar concentrate disposal wells IW-1 and IW-2. FDEP approved the plan on September 15, 2004. A preliminary pressure test of the IW-2 annular space was performed on November 30, 2004 and it was determined that the annular space could not maintain the appropriate pressure for a full hour as required by FDEP. Amendment No. 1 to the MIT Plan was prepared and submitted to FDEP on December 8, 2004 to get approval for pressurization of the IW-2 annular space using potable water in order to test IW-1.

A video survey of the IW-1 liner and a preliminary pressure test of the annular space between the liner and the final casing was performed on Tuesday, December 14, 2004. The video survey was unsuccessful due to contractor equipment failures and was rescheduled for Friday December 17, 2004. The video showed pitting and encrustation of the liner, but no obvious penetrations.

The preliminary pressure test of the IW-1 annular space indicated that pressure could not be maintained for the required time. An estimation of flow from the annular space to the liner is approximately 4 to 5 gallons per minute. The FDEP was notified of the preliminary pressure test results and that an amendment to the MIT Plan would be developed for additional work and submitted for their approval.

## Proposed MIT Plan Amendment No. 2 for Testing and Repair of IW-1

The City proposes to the following amendment to the MIT Plan to add a description of final casing testing and liner replacement in IW-1.

1. **Maintenance of Annular Pressure in IW-2:** The City of Miramar will continue to operate IW-2 while maintaining the annular pressure at approximately 50-percent over the

injection pressure, using potable water. A record of the annular space pressure and injection flow readings taken every 12 hours will be maintained and reviewed.

2. **Shallow Background Water Quality Samples:** Background water quality samples will be collected from the pad monitor wells surrounding the IW-1 and IW-2 injection well pad. Water quality sample collection will be performed on a weekly basis. Sample collection will begin one week prior to the initiation of well testing and repair work and continue through completion of the work. Water quality analysis shall consist of the following parameters: specific conductance, pH, chloride concentration, temperature and water level.
3. **Mobilization of Equipment:** Testing and repair equipment will be mobilized to the project site and set over the wellhead. Equipment setup will include all necessary removal and replacement of the containment pad wall and dismantling of existing wellhead and associated wellhead piping/instrumentation equipment. The well will be killed prior to the dismantling of the existing wellhead and mobilization of a drill rig over the well.
4. **Discharge Containment:** Equipment will be maintained to direct discharges from the well during testing and repair work into the well sump. Discharge water will be directed to the existing scavenger tank system that ultimately discharges to IW-2.
5. **Liner Removal:** The existing 13 ¾ -inch diameter steel injection liner will be removed and disposed of. The male end of the YBI packer will be left in the well.
6. **Video Survey of Final Casing:** Perform video survey from land surface to approximately 25 feet below base of 16-inch diameter final casing. Perform side-view inspection of YBI packer area.
7. **Final Casing Brushing:** Should the video identify significant scaling, a cleaning string will be assembled and inserted into the well. The final casing shall be cleaned from land surface to the base of the casing. After the completion of casing cleaning the well will be purged by allowing the well to backflow under artesian pressure or by air development. During cleaning, the waste products generated by the operation shall be circulated out of the well and disposed in accordance with applicable waste management regulations.
8. **Pressure Test of Final Casing:** A temporary wellhead will be placed on the well for use during pressure testing. The temporary wellhead will provide access to run the packer into the well, and provide an airtight seal. A pressure gauge, measuring 0 to 200 pounds per square inch (psi) will be mounted on the temporary wellhead. The gauge will have previously been calibrated. Calibration will have been conducted on the gauge within a period of three months from the date of use. Calibration data will be submitted to FDEP prior to testing.
  - a. A packer will be run as close to the bottom of the casing as possible and seated against the final casing. Packer setting depths will be determined based upon the results of the television survey. A casing brush may also be attached below the packer assembly to swab the inside of the 16-inch casing if the video shows any remaining debris inside the casing.
  - b. The pressure in the well will be increased to 150 psi, using a full column of fluid. The selected pressure is in excess of 1.5 times the maximum expected injection



pressure. Pressure readings will be recorded every five minutes for a one-hour period. The results will be certified as correct by a qualified and Florida licensed professional. The pressure must not vary by +/- 5 percent during the one-hour testing period in order to meet FDEP requirements. The FDEP must be present to witness the performance of the pressure test. The FDEP will be notified at least 72 hours prior to beginning the test.

- c. Upon conclusion of pressure testing, the testing assembly and equipment will be disassembled and removed from the well.
9. **Radioactive Tracer Survey of the Final Casing:** The procedure for the Radioactive Tracer Survey defined in the existing MIT Plan will be followed to test the exterior mechanical integrity of the final casing.
10. **New Liner and Packer Installation:** A 11 3/4-inch outer diameter fiberglass reinforced pipe (FRP) replacement liner will be installed, open ended, to approximately 3,036 feet below land surface. The liner will be positioned immediately above the YBI Packer remaining in the hole and attached to the final casing with a new packer assembly. The liner shall be new, filament-wound fiberglass pipe, such as Red Box fiberglass manufactured by the Tubular Fiberglass Corporation, or approved equivalent. The liner shall conform to API Specification 15TR and shall have an internal pressure rating of a minimum of 1,750 psi. The liner shall have long threaded and coupled connections that are precision-lathe cut and factory milled with a pressure rating tested to 1,750 psi for a minimum of 5 seconds prior to shipping. The liner will be a nominal 11 3/4-inch outer diameter (OD) pipe with a nominal inner diameter (ID) of 10.62 inches. The wall thickness will be approximately 1 inch.
11. **Injection Test in FRP Liner:** After completion of the liner installation, an injection test shall be run for a period of 24 hours. The injection rate shall be approximately 3,315 gpm. The Contractor is responsible for providing the injection test equipment, pumps, pipeline, and other appurtenances to perform the injection test. The Contractor shall supply or provide the services of a company to supply a bottom hole transducer and data logging system that can measure the bottom hole pressure to the resolution of  $\pm 0.01$  psi to record pressures during testing and temperature to  $\pm 0.01$  degrees Celsius. The equipment should provide a hard copy of the data accessible throughout the test, and a disk copy upon completion of the test in ASCII format. A period of 24 hours of pre-test readings shall be collected, and following the 24 hours of injection testing, 48 hours of recovery. During this recovery period, no activity must occur in the injection well. Readings shall be collected on a schedule to be supplied by MWH prior to the start of injection testing. At a minimum, the equipment should be capable of recording readings on a schedule of variable intervals from one reading per 10 seconds to one reading per hour. The Contractor shall provide equipment and services to monitor the wellhead pressure on the injection well during the injection test.
12. **Video Survey of FRP:** Perform video survey from land surface to approximately 25 feet below base of 16-inch diameter final casing. Perform side-view inspection of the base of the new liner and the area of the new packer.

13. **Pressure Test of New Replacement Liner:** The procedure defined in the existing MIT Plan will be used to pressure test the annular space between the new liner and the final casing.
14. **Reinstall wellhead:** Reinstall a modified wellhead to incorporate the new liner. Annular pressure maintenance system and associated piping, and instrumentation will be modified to fit the modified wellhead configuration.
15. **Return IW-1 to Service:** Final sampling of the pad monitor wells will be performed following FDEP approval of the injection test and final MIT and the City will request FDEP approval to place IW-1 back into operation. A report summarizing the IW-1 testing and repair will be prepared and submitted to FDEP within 60 days of project completion.

#### **Project Schedule**

The IW-1 testing and repair project will continue as soon as FDEP approval is obtained to conduct the work. Substantial completion of the project is expected to take approximately two weeks following receipt of the liner and packer materials.

MWH will continue timely communication with FDEP throughout the MIT work process to ensure the City's compliance with their current operation permit and FDEP requirements. If you have any questions, please contact either Mark Abbott or myself.

Sincerely,

MWH



Susan Bodmann, P.G.  
Senior Hydrogeologist

cc: Heidi Vandor, FDEP West Palm Beach  
Richard Deuerling, FDEP Tallahassee  
Cathy McCarty, FDEP Tallahassee  
Vernon E. Hargray, City of Miramar  
Hong Guo, City of Miramar  
Tony Rabbat, City of Miramar  
Bill Knee, City of Miramar  
Lyle Munce, MWH  
Mark Abbott, MWH  
MWH Project No. 1570811/3.1

**REQUEST FOR MAJOR  
MODIFICATION PERMIT  
(NO ATTACHMENTS)  
January 21, 2004**





**City of Miramar**  
An Equal Opportunity Employer

**Mayor**  
**Lori C. Moseley**

**City Commission**

**Winston F. Barnes**

**Marjorie J. Conlan**

**George S. Pedlar**

**Fitzroy D. Salesman**

*"We're at the  
Center of Everything"*

**Office of Operational Services  
Public Works/Utilities Dept.  
13900 Pembroke Road  
Miramar, Florida  
33027-3489**

**Phone (954) 538-6888  
T.D.D. (954) 602-3802  
FAX (954) 538-6842**

January 21, 2005

Mr. Joseph May, P.G.  
Florida Department of Environmental Protection  
Underground Injection Control Division,  
400 North Congress Avenue,  
West Palm Beach, Florida, 33401

**Subject: Letter Requesting a Major Modification of  
FDEP UIC Injection Well System  
City of Miramar, Broward County, Florida  
Permit No. 125256-007-UO**

1570 811/3.1  
**RECEIVED**  
**JAN 24 2005**  
DEPT OF ENV PROTECTION  
WEST PALM BEACH

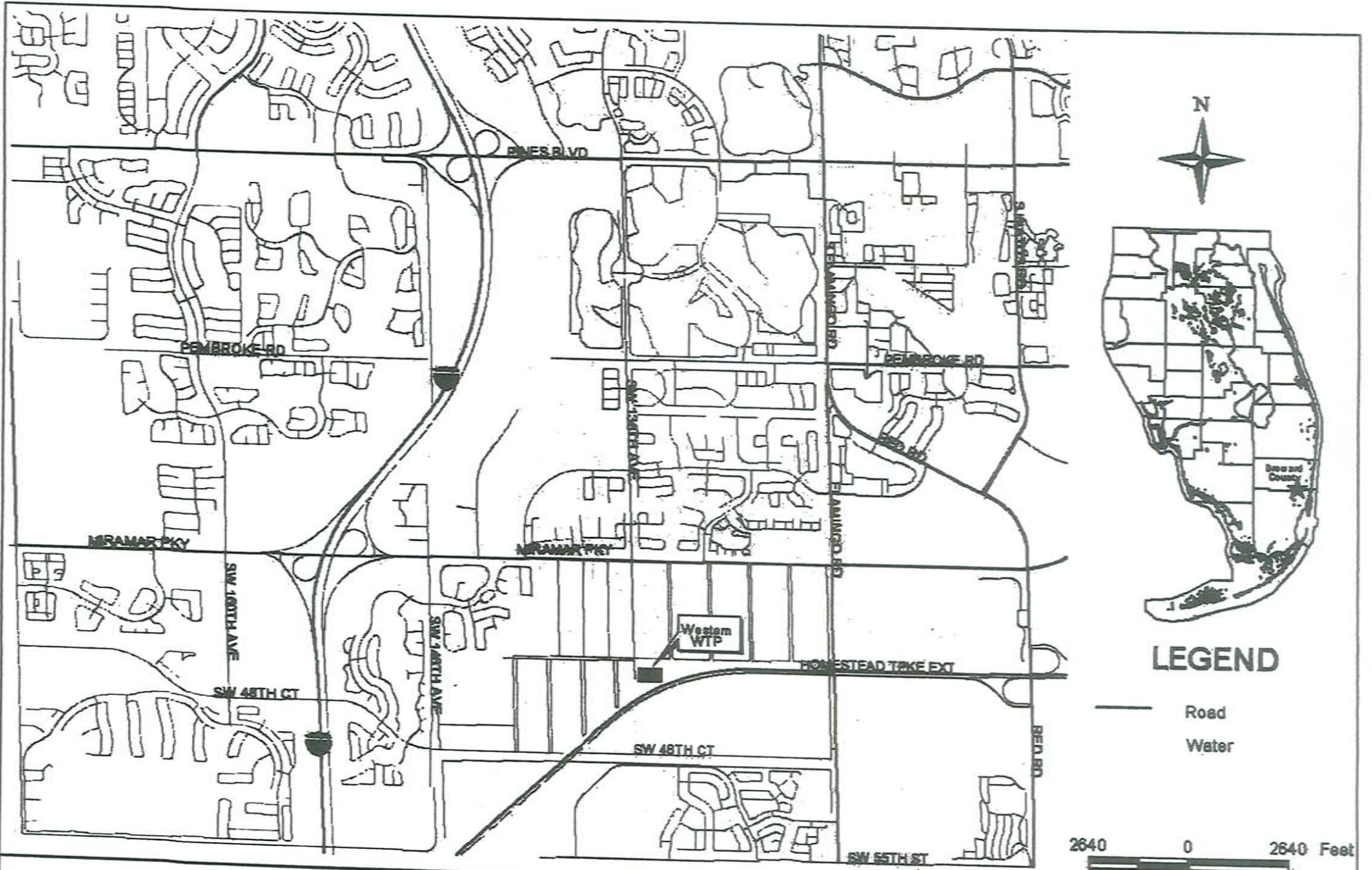
Dear Mr. May:

The City of Miramar is requesting a major modification of the Florida Department of Environmental Protection (FDEP) Underground Injection Control (UIC) Operational Permit No. 125256-007-UO for Injection Wells IW-1 and IW-2 located at the City's Western Water Treatment Plant (WTP). The modification will correct a loss of pressure in the annular space between the final casing and the injection tubing that does not meet the requirements of 62-528.410(7)(c). It is the intent of the City to replace the 13.375-inch outer diameter (OD), 0.500-inch wall thickness steel injection tubing in both wells and install 10.75-inch OD, 0.95-inch wall thickness Fiberglass Reinforced Plastic (FRP) injection tubing. The wells will be completed by cementing the FRP injection tubing inside the final casing. A Work Plan outlining the installation and testing of the injection tubing is contained in Attachment 1.

**HISTORY**

The City of Miramar is located in southern Broward County, Florida, as shown in Figure 1. The City currently operates an Eastern and Western WTP. Groundwater is treated using conventional lime softening at the Eastern WTP and nanofiltration (membrane softening) at the western WTP. Two Class I industrial deep injection wells and one associated dual-zone monitoring well are located on the western WTP site at 4100 South Flamingo Road, Miramar, Florida, adjacent to the Homestead Extension of Florida's Turnpike (Figure 2).

On April 5, 1993, the Florida Department of Environmental Protection (FDEP) issued two permits to the City of Miramar for the construction of Injection Well IW-1 (permit number UC-06-



City of Miramar  
Western Water Treatment Plant Location

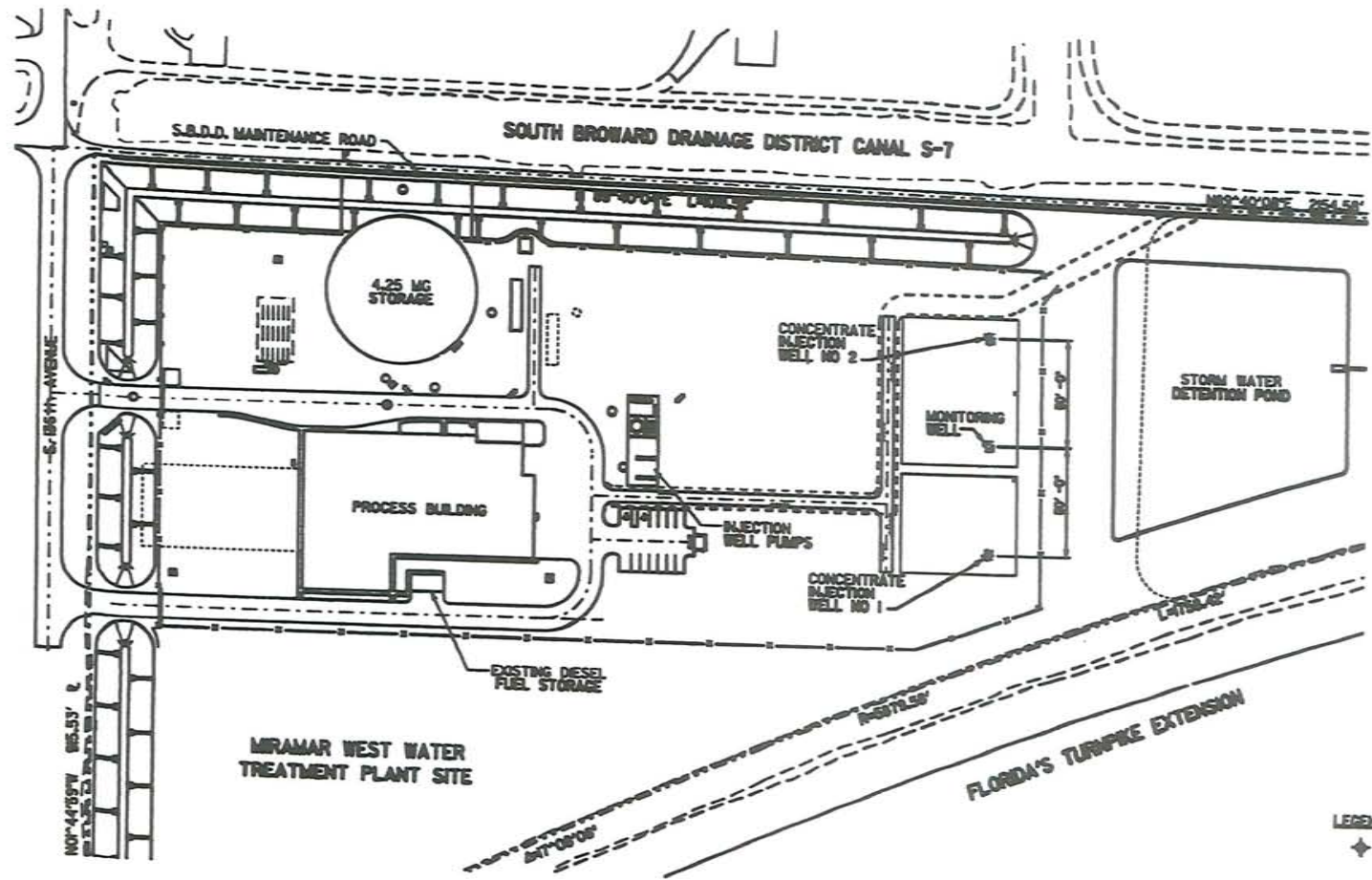
Figure  
1



Rev B 10/07-03-0004

File \\Miramar\Projects\100000000\100000000\100000000\100000000.dwg

Job No 000000



MIRAMAR WEST WATER TREATMENT PLANT SITE

LEGEND  
 ◆ EXISTING INJECTION WELL

|                    |  |                          |  |   |
|--------------------|--|--------------------------|--|---|
| SCALE<br>1" = 100' |  | City of Miramar, Florida | CITY OF MIRAMAR<br>CONCENTRATE DISPOSAL WELLS<br>AND MONITORING WELL LOCATIONS | 2 |
|--------------------|--|--------------------------|--|---|



Mr. Joseph May, P.G.

January 24, 2005

Page 2

214324), Injection Well IW-2 (permit number UC-06-214325) and the associated dual-zone monitoring well DZMW-1 (permit number UC-06-214325). Both injection wells were constructed in 1995 with 16-inch outside diameter final casings cemented in place. Well IW-1 was set to 3,095 feet below land surface (bls) and Well IW-2 was set to 3,046 feet bls. The 13.375-inch outside diameter (12.347-inch inside diameter) steel injection tubings are set to depths of 3,049 (IW-1) and 3,007 (IW-2) feet bls. The tubings are suspended inside the final casing with Texas Iron Works (TIW) liner hanger packers. The annulus between casing and tubing was filled with a non-corrosive fluid and the pressure in the annulus was maintained using an annular pressure compensation system. The injection zone for each of the concentrate disposal wells was determined to be between 3,100 and 3,179 feet bls in Well IW-1 and 3,125 and 3,180 feet bls in Well IW-2, respectively. Monitoring Well DZMW-1 was constructed between Well IW-1 and Well IW-2. The upper monitor zone taps the interval between 1,639 and 1,738 feet bls and the lower monitor zone taps the interval between 1,930 and 2,005 feet bls.

Operational testing of the concentrate disposal wells began in 1995 and operating permit number UO-06-291335 (IW-1) and UO-06-291336 (IW-2 & DZMW-1) were issued by FDEP on March 26, 1997. Specific Condition No. 2 of the operating permits required the City of Miramar to complete Mechanical Integrity Tests and submit a report for both concentrate wells every five years. Both IW-1 and IW-2 were successfully tested for internal and external mechanical integrity in December 1999 and the final report was submitted to and approved by FDEP.

On July 9, 2004, a Mechanical Integrity Testing (MIT) Plan was prepared for the City of Miramar concentrate disposal well IW-1 and IW-2 and submitted to FDEP. FDEP approved the plan on September 15, 2004. A preliminary pressure test of the IW-2 annular space was performed on November 30, 2004 and it was determined that the annular space could not maintain the appropriate pressure for a full hour as required by FDEP Rule 62-528.410(7)(c). Amendment No. 1 to the MIT Plan was prepared and submitted to FDEP on December 8, 2004. Amendment No. 1 outlined a methodology to maintain the annular pressure in IW-2 using potable water during the MIT of IW-1. The flow to maintain the annular pressure in IW-2 was estimated at less than 0.1 gallons per minute (gpm).

Mr. Joseph May, P.G.

January 24, 2005

Page 3

A video survey of the IW-1 liner and a preliminary pressure test of the annular space between the liner and the final casing were performed on Tuesday, December 14, 2004. The video survey was unsuccessful due to contractor equipment failures and was rescheduled for Friday December 17, 2004. A second video survey was performed on December 17, 2004 that showed pitting and encrustation of the liner.

The preliminary pressure test of the IW-1 annular space on December 14, 2004 indicated that pressure could not be maintained for the required time. An estimation of flow from the annular space to the liner is approximately 5 gpm. The FDEP was notified of the preliminary pressure test results. The City of Miramar has maintained communication with FDEP to obtain approvals and guidance throughout the MIT work. At the most recent meeting with FDEP on January 19, 2005 it was decided that the City would pursue an alternative design to correct the pressure maintenance issues identified in IW-1 and IW-2.

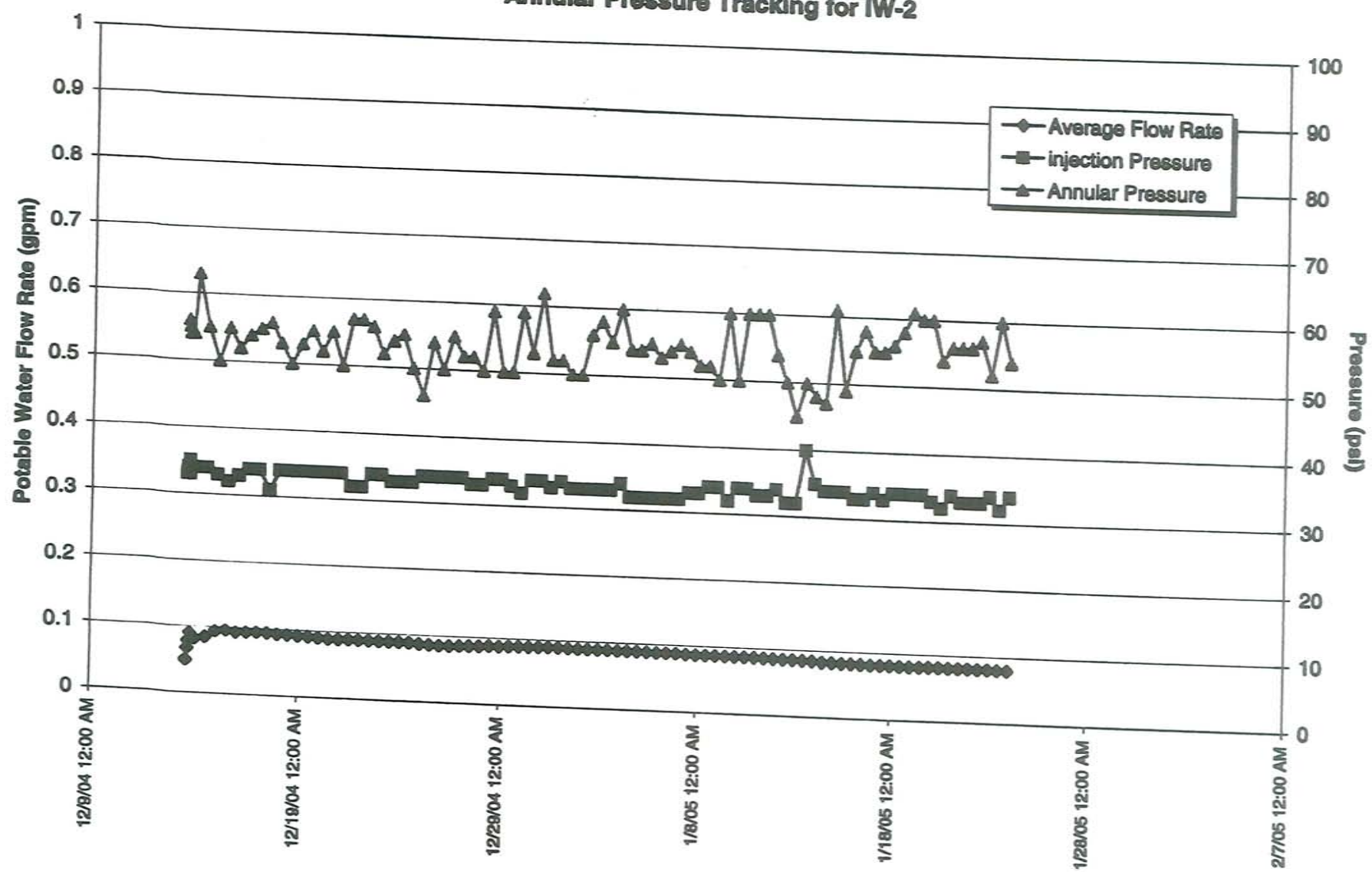
Currently, IW-2 is operational with positive annular pressure being maintained with potable water. The average injection pressure is 33.5 psi and the average annular pressure is 53.8 psi. The average flow rate of potable water to the annulus is less than 0.1 gpm. A record of these data is displayed in Figure 3. IW-1 is currently out of service. Following installation of the FRP injection tubing in IW-1 and FDEP approval of IW-1 for operation, the steel injection tubing in IW-2 will be removed and FRP injection tubing installed.

#### **REQUEST FOR FDEP APPROVAL OF ALTERNATE DESIGN**

A request is made for FDEP approval of an alternative concentrate injection well design that consists of FRP injection tubing cemented inside the final casings in the wells IW-1 and IW-2. As requested by FDEP, information concerning the request for major modification of the City of Miramar FDEP UIC Permit No. 125256-007-UO is provided below. Bold type indicates FDEP's information request. Responses are provided in normal type.



**FIGURE 3**  
**Annular Pressure Tracking for IW-2**





1. **Well Designs Allowed by Rule for Class I Non-municipal Injection Wells**
  - (a) **Tubing and packer design**
  - (b) **Fluid seal design**

The existing injection well design for the City of Miramar injection well system is a tubing and packer design.

2. **Alternative Designs that are Currently Allowable**
  - (a) **Fully cemented liner with intermediate casing set below the base of the lowermost underground source of drinking water (USDW) including the following types:**
    - (1) **FRP**
    - (2) **Internally coated steel**
    - (3) **Stainless steel**

Because the alternative design is typically a fully cemented liner it is not considered replaceable thus adequate wall thickness for the liner is an item of concern.
  - (b) **Alternative designs using casing materials other than those listed above may be allowable, however, the approval process may be much longer because these requests may be sent to EPA for review.**

The proposed alternative design is type (a) Fully cemented liner (10.75-inch OD, 0.95-inch wall thickness FRP) with intermediate casing set below the base of the lowermost USDW. The liner (injection tubing) material will be FRP. Figure 12 in the "Response to FDEP RFI Comments Dated February 20, 2002" provided in Attachment 2 shows that the intermediate casings in both injection wells are set below the base of the USDW.

3. **Injectate Types**
  - (a) **Desalination concentrate from drinking water treatment facilities.**
  - (b) **Combination of desalination concentrate from drinking water treatment facilities and domestic wastewater.**
  - (c) **An alternative design may be allowable for Class I wells used to inject fluids other than those listed above, however, approval will take much longer and may require review by EPA.**

The City of Miramar injection well system injectate is type (a) Desalination concentrate from drinking water treatment facility by membrane softening of Biscayne aquifer water.

**4. Requirements**

- (a) A detailed discussion of the local geology/hydrogeology**
- (b) A detailed discussion of each USDW present within the area of review including, at a minimum, the following items:**
  - (1) Name and depth of each USDW;**
  - (2) Current use for each USDW;**
  - (3) Future use for each USDW; and**
  - (4) Water quality in each USDW.**

Attachment 2, Page 7 provides an overview of the local geology/hydrogeology, the aquifer names and general depths within the USDW, the current and future usage for the USDW, and the water quality for the USDW. Attachment 3 contains the construction reports for both IW-1 and IW-2 for a complete discussion of the geology/hydrogeology and water quality of the USDW.

- (c) Provide a detailed discussion of the ground water monitoring plan including:**
  - (1) Location and purpose of monitoring wells; and**
  - (2) Intervals monitored and the depth of the monitoring intervals with respect to the base of the lowermost USDW.**

The lowermost USDW is located at approximately 1,790 feet bls. Four pad monitor wells are located at the corners of the injection well containment pad. The pad monitor wells monitor water quality between 15 and 20 feet below land surface (bls). Dual-Zone Monitor Well DZMW-1 was constructed in between injection wells IW-1 and IW-2 approximately 110 feet from each injection well as shown on Figure 3 in Attachment 2. The purpose of DZMW-1 is to monitor water quality above and below the lowermost USDW. The upper monitor zone taps the interval between 1,639 and 1,738 feet bls above the base of the lowermost USDW. The lower monitor zone taps the interval between 1,930 and 2,005 feet bls below the lowermost USDW.



**(d) Provide a detailed discussion of the proposed alternative well design including at a minimum the following information:**

- (1) Number, purpose and length/setting depth of each casing;**
- (2) Thickness and type of cement in each annulus including a discussion of the purpose of proposed cement additives.**
- (3) Thickness and type of casing material, and thickness and type of cement (including proposed additives) between the inside of the injection tubing and the formation for each USDW.**

The 13.375-inch outer diameter (OD), 0.514-inch wall thickness steel injection tubing in IW-1 will be replaced by 10.75-inch OD, 0.95-inch wall thickness FRP injection tubing to a depth approximately 10 feet above the existing TIW liner hanger packer that is set at 3,049 feet bls. The 13.375-inch outer diameter (OD), 0.514-inch wall thickness steel injection tubing in IW-2 will be replaced by 10.75-inch OD, 0.95-inch wall thickness FRP injection tubing to a depth approximately 10 feet above the existing TIW liner hanger packer that is set at 3,007 feet bls. Setting depths are approximate and will depend on field conditions at the time of injection tubing installation.

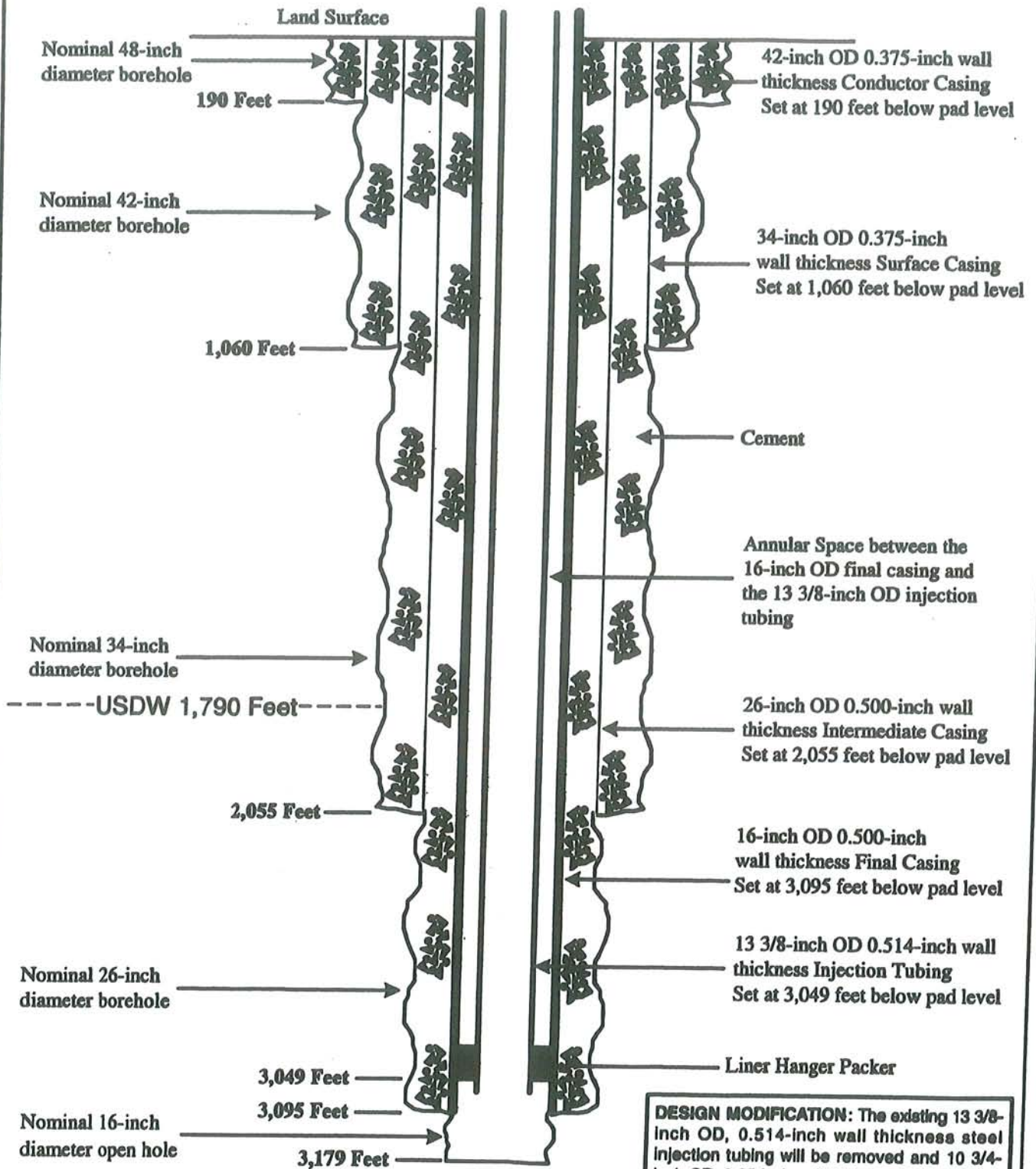
The thickness of cement within the annulus between the 16-inch OD, 0.500-inch wall thickness final steel casing and proposed 10.75-inch OD FRP injection tubing is approximately 2.125 inches. Cement shall be sulfate-resistant ASTM C 150 Type II, or API Class B, with additives as necessary. Additives will consist of bentonite, up to 12 percent. Construction details for the existing surface, intermediate and final steel casings in each injection well are shown on Figure 4 (IW-1) and Figure 5 (IW-2).

**(e) Provide a detailed discussion of testing during construction designed to locate the base of the lowermost USDW.**

Section 3 of Attachment 3 contains a thorough discussion of the testing during construction of both IW-1 and IW-2 to locate the base of the lowermost USDW.

**(f) A discussion of the source and quality of the proposed injectate.**



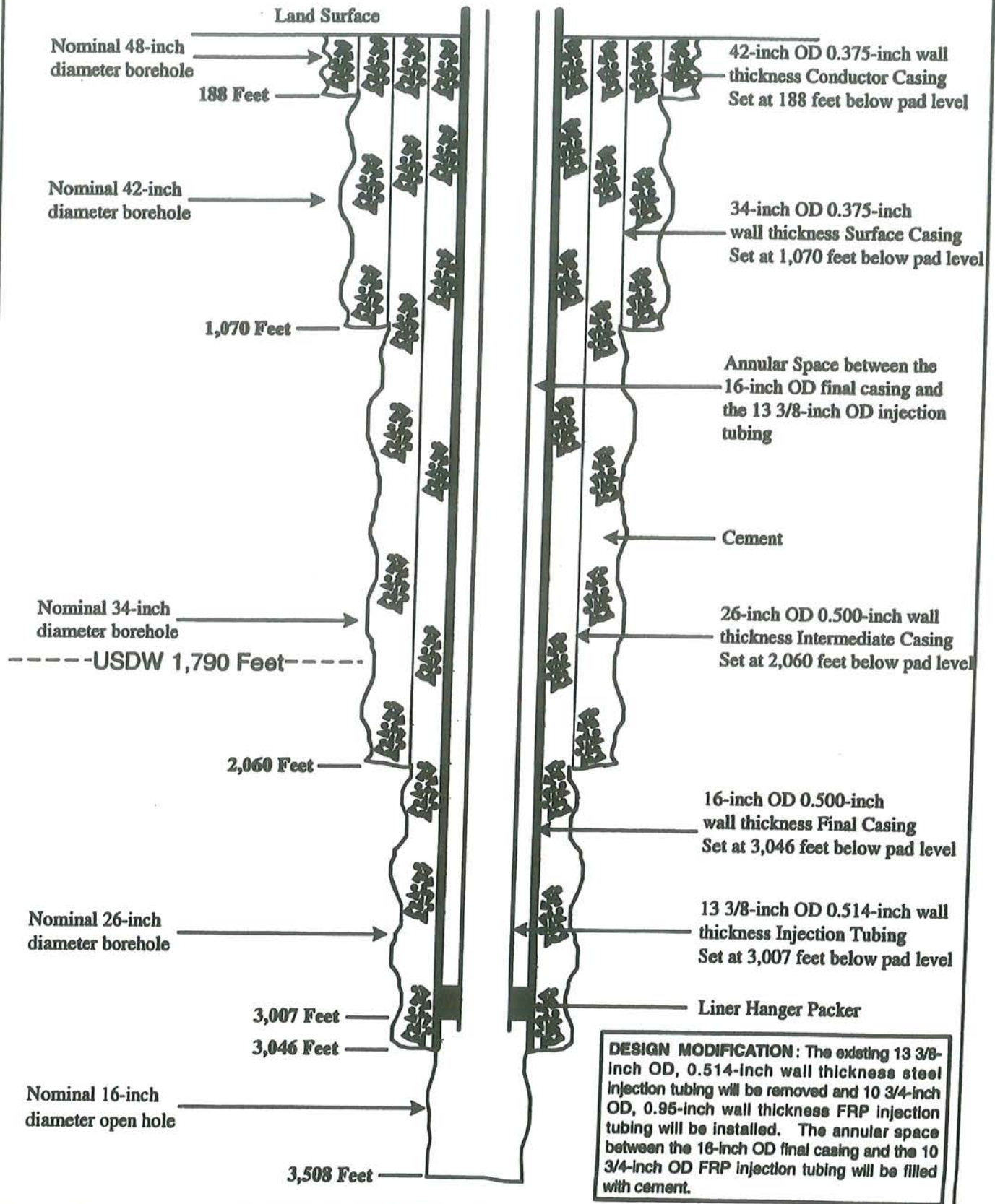


**DESIGN MODIFICATION:** The existing 13 3/8-inch OD, 0.514-inch wall thickness steel injection tubing will be removed and 10 3/4-inch OD, 0.95-inch wall thickness FRP injection tubing will be installed. The annular space between the 16-inch OD final casing and the 10 3/4-inch OD FRP injection tubing will be filled with cement.



City of Miramar WTP  
Injection Well - IW-1

Figure  
4



City of Miramar WTP  
Injection Well - IW-2

Figure  
5



The source of water treated at the City of Miramar Western Membrane WTP is the Biscayne aquifer. The City of Miramar Western Water Treatment Plant Monthly Operating Reports for 2004 are presented below in Table 1. A copy of the most recent wastestream analysis is provided in Attachment 4 and Table 2 includes a summary of average injectate concentrations for selected parameters taken from City of Miramar 2003 WTP monthly operating reports.

**Table 1**  
**Summary of Source Water Quality 2004**

| Parameters            | Jan  | Feb  | Mar  | Apr  | May  | Jun  | Jul  | Aug  | Sep  | Oct  | Nov  | Dec  |
|-----------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| PH                    | 7.1  | 7.1  | 7.0  | 7.0  | 7.0  | 7.1  | 7.1  | 7.1  | 7.1  | 7.0  | 7.0  | 7.0  |
| Cond (umhos/cm)       | 669  | 669  | 665  | 669  | 678  | 621  | 606  | 609  | 608  | 611  | 617  | 614  |
| Temperature (F)       | 24   | 24   | 24   | 24   | 24   | 25   | 24   | 24   | 24   | 24   | 24   | 23   |
| Alkalinity (mg/L)     | 259  | 259  | 262  | 260  | 266  | 262  | 260  | 261  | 260  | 260  | 267  | 261  |
| Ca Hardness (mg/L)    | 262  | 260  | 261  | 266  | 272  | 279  | 274  | 267  | 273  | 267  | 272  | 266  |
| Total Hardness (mg/L) | 300  | 303  | 303  | 307  | 312  | 317  | 317  | 309  | 304  | 314  | 321  | 328  |
| Turbidity (NTU)       | 0.59 | 0.86 | 0.87 | 0.70 | 0.57 | 0.65 | 0.67 | 0.78 | 0.76 | 0.76 | 0.81 | 0.82 |
| Iron (mg/L)           | 1.26 | 1.33 | 1.30 | 1.25 | 1.30 | 1.26 | 1.27 | 1.30 | 1.30 | 1.26 | 1.29 | 1.32 |
| Color (Color Units)   | 75   | 77   | 76   | 75   | 74   | 77   | 79   | 77   | 80   | 76   | 76   | 78   |



**Table 2**  
**Average Injectate Quality 2003**

| Parameters             | Injectate Average Concentration |
|------------------------|---------------------------------|
| PH                     | 6.8                             |
| Temperature (C)        | 23                              |
| Conductance (umhos/cm) | 4100                            |
| Chloride (mg/L)        | 820                             |
| TDS (mg/L)             | 2500                            |
| SO <sub>4</sub> (mg/L) | 1250                            |
| NH <sub>3</sub> (mg/L) | 3.9                             |
| TKN (mg/L)             | 8.2                             |
| Fluoride (mg/L)        | 0.9                             |
| Bromide (mg/L)         | 3.0                             |
| TOC (mg/L)             | 146                             |
| Total Hardness (mg/L)  | 1850                            |
| Iron (mg/L)            | 7.3                             |
| Phosphate (mg/L)       | 0.5                             |
| Phosphorus (mg/L)      | 0.3                             |
| Potassium (mg/L)       | 10                              |

- (g) Provide a detailed discussion of how the proposed alternative well design provides equivalent or better protection to the USDW as the fluid seal, and tubing and packer designs that are allowed by rule. This discussion should include information concerning the amount and type of casing material, and cement that would have to be breached before injection fluid could enter USDW (e.g. Biscayne aquifer, and upper Floridan aquifer, etc.)

As shown on Figure 4 and Figure 5, the lowermost USDW is positioned at approximately 1,790 feet bls. Under the current well design the injectate would have to move out of the 13.375-inch OD, 0.514-inch wall thickness steel tubing, through 0.8 inches of annular fluid, through the 16-inch OD, 0.500-inch wall thickness steel final casing, through 4.5 inches of cement, through the 26-inch OD, 0.500-inch intermediate casing and through approximately 7.25 inches of cement to reach the USDW through the telescoped casings. Under the current design injectate could also enter the fluid-filled annular space between the final casing and the injection tubing through the packer at the bottom of the

Mr. Joseph May, P.G.

January 24, 2005

Page 9

injection tubing, but the injectate would still need to travel through the telescoped intermediate casing and cement.

Under the alternative design there would be no fluid-filled annular space. The annular space between the injection tubing and the final casing would be filled with approximately 2.125 inches of cement. Additionally, the FRP injection tubing will have a thickness of approximately 0.95 inches. Therefore, the alternative design provides approximately 3.075 of additional physical separation and protection to the USDW.

**(h) Mechanical Integrity Testing – An interim mechanical integrity test is required at the mid-point between the normal 5-year mechanical integrity testing. The request for approval of an alternative well design should include a proposal for an interim mechanical integrity test. The following tests may be allowed:**

**(1) Packer pressure test.**

**(2) Internal radioactive tracer survey (RTS) and temperature survey provided an internal RTS was also run along when the most recent pressure test was conducted. *NOTE: The internal RTS will only be allowed for the interim mechanical integrity test and not for the regular 5-year mechanical integrity testing.***

**(3) Other interim mechanical integrity tests/procedures may be allowable, however, such testing procedures may require a much longer time to review and approve.**

**More frequent interim mechanical integrity testing may be required if an alternative design other than those listed in 2(a)(1) through 2(a)(3) above is used, if fluids other than those listed in 3(a) and 3(b) above are to be injected, or if a drinking water supply well is located within 500 feet of the injection well.**

The interim Mechanical Integrity Test (MIT) will consist of the performance of a packer pressure test and video survey. This interim MIT would be performed 2.5 years after each 5-year MIT.



Mr. Joseph May, P.G.  
January 24, 2005  
Page 10

- (i) Provide a drawing showing the injection well construction, monitor well construction, geology/hydrogeology, USDWs, expected confining units, and the base of the lowermost USDW.

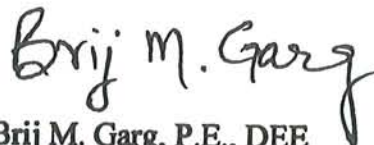
Drawings showing the injection well construction, monitor well construction, geology/hydrogeology, USDWs, expected confining units, and the base of the lowermost USDW are provided in Attachment 2 and in Figure 4 and Figure 5 of this document.

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.

If you have any questions, please do not hesitate to contact my office at 954 538 6801.

Respectfully,

City of Miramar



Brij M. Garg, P.E., DEE  
Public Works/Utilities Director

**Attachments:**

- Attachment 1 - City of Miramar Injection Well System Work Plan
  - Attachment 2 - Response to FDEP RFI Comments Dated February 20, 2002
  - Attachment 3 - Western Water Treatment Plant Injection Well System Drilling and Testing Injection Wells IW-1 and IW-2
  - Attachment 4 - December 2003 Annual Wastestream Analysis
- cc: Distribution



**Technical Advisory Committee (TAC) Member Distribution List  
City of Miramar FDEP UIC Operating Permit 125256-007-UO**

**Ms. Heidi Vandor, P.G.**  
Florida Dept. of Environmental Protection  
400 N. Congress Avenue, Suite 200  
West Palm Beach, Florida 33401  
(561) 681-6695

**Mr Richard Deuerling, P.G.**  
Florida Dept. of Environmental Protection  
2600 Blair Stone Road  
Tallahassee, Florida 32399  
(p) (850) 245-8653  
(f) (850) 245-7573

**Mr. Ron Reese**  
United States Geological Survey  
Water Resources Division  
9100 NW 36<sup>th</sup> Street, Suite 107  
Miami, FL 33178

**Ms. Nancy Marsh**  
U. S. Environmental Protection Agency  
Region IV  
100 Alabama Street, SW  
Atlanta, GA 30303

**Mr. Steve Anderson**  
South Florida Water Management District  
3301 Gun Club Road  
West Palm Beach, FL 33416-4680

**Vernon Hargray**  
Assistant City Manager/Operations  
2300 Civic Center Place  
Miramar, FL 33025-6577  
(954)-602-3119

**Brij Garg, P.E., DEE**  
Director of Public Works/Utilities  
City of Miramar  
13900 Pembroke Road  
Miramar, Florida 33027-3489

**Houg Guo, P.E.**  
Assistant Utility Director  
City of Miramar  
13900 Pembroke Road  
Miramar, Florida 33027-3489  
(954) 538-6825

**Tony Rabbat, P.E.**  
Project Manager  
City of Miramar  
13900 Pembroke Road  
Miramar, Florida 33027-3489  
(954) 538-6888

**Mr. Mark J. Abbott, P.G.**  
MWH  
490 Sawgrass Corp. Parkway, Suite 300  
Sunrise, FL 33325  
(954) 846-0401

**Mr. Lyle Munce, P.E.**  
MWH  
490 Sawgrass Corp. Parkway, Suite 400  
Sunrise, FL 33325  
(954) 846-0401

**Susan Bodmann, P.G.**  
MWH  
490 Sawgrass Corp. Parkway, Suite 400  
Sunrise, FL 33325  
(954) 846-0401

**Mel Entus**  
Mel Entus and Associates  
10421 NW 12<sup>th</sup> Ct.  
Plantation, Fl 33322  
(954) 536-1219



City of Miramar  
2300 Civic Center Place  
Miramar, FL 33025

First Union National Bank  
Miramar, Florida

65-843  
870

VOID AFTER 90 DAYS

CHECK DATE  
01/21/05

CHECK NO.  
249534

PAY THE SUM OF TWO THOUSAND DOLLARS & ZERO CENTS

AMOUNT \$2,000.00

TO THE ORDER OF  
DEPT. OF ENVIRONMENTAL PROTECTION  
DEP STORAGE TANK REGISTRATION  
PO BOX 3070  
TALLAHASSEE FL 32318-3070

*[Handwritten signatures]*

⑆00769536⑆ ⑆057086⑆ ⑆2⑆2⑆50000⑆ ⑆0072⑆

City of Miramar

VENDOR NO. 16299

CHECK NO. 249534

| Account     |      | Purchase Order | Invoice Number | Amount   | Description           |
|-------------|------|----------------|----------------|----------|-----------------------|
| 41050700533 | 4920 | 05003868       | 624050         | 2,000.00 | FEE FOR PERMIT MODIFI |

16299 DEPT. OF ENVIRONMENTAL PROTECTION

TOTAL:\*\*\*\*\*2,000.00\*

DATE: 01/21/05



**Miramar RO Alternative Design/Major Permit Modification Request  
Request for Information Response to February 11, 2005 Comments  
March 8, 2005**

The following are responses to comments provided by FDEP on March 4, 2004. These responses have been incorporated into the "City of Miramar Injection Well System Work Plan" (Attachment C of this response) originally provided to FDEP as Attachment 1 to the Letter Requesting a Major Modification of UIC Permit No. 125256-007-UO for the City of Miramar Injection Well System.

1. **Please verify that the information contained in the table in Attachment A is correct.**

The casing thickness for the 26-inch diameter outer diameter (OD) casing is 0.375 inches according to the construction report. Attachment A has been modified to reflect this change. Additionally, detailed design information provided by Tubular Fiberglass Corporation (Attachment B) indicates that the 10.75-inch casing size has a nominal OD of 9.76 inches and a nominal inner diameter (ID) of 8.85 inches with a nominal wall thickness of .045 inches. Figures 4 and 5 from the Major Modification Request have been modified and are attached.

2. **Please provide inside and outside diameters for the FRP tubing at the joints/couplings.**

Attachment B summarizes the dimensions of the 10.75, 1250 psi tubing being proposed for installation. As indicated by the specifications the 10.75, 1250 psi tubing has an OD of 9.76 inches, an ID of 8.85 inches and a wall thickness of 0.45 inches. The diameter of the coupling is approximately 13.14 inches according to the specifications.

3. **Please include details concerning the method for emplacement of the cement in the casing/tubing annulus. What is the purpose of using up to 12 percent bentonite?**

A bridge plug will be set just below the base of the 8.85-inch ID final tubing in the 16-inch OD final casing. Cement will be installed under pressure from the bottom up in one stage. Following the appearance of cement returns at the surface the cement will be allowed to set for approximately 48 hours. The bridge plug will be drilled out and a cement bond and temperature logs will be performed inside the tubing.

4. **Radioactive Tracer Survey (RTS)**
  - (a) **A 5 ft/min injection velocity is approximately 16 gallons per minute (gpm) in an 8.85-inch ID casing and approximately 46 gpm in the 15-inch casing.**

A flow of approximately 16 gpm will be maintained during the RTS to hold an injection velocity of 5 ft/min during the test.

- (b) **The background gamma log should be run in an upward direction.**

The background gamma log will be run in an upward direction.

- (c) **It is not clear if this RTS is to be conducted before or after the fully cemented liner has been installed.**

The RTS will be conducted after the tubing has been fully cemented inside the final 16-inch OD steel casing after assembly of the wellhead.

- (d) **Will potable water be injected during the RTS? If not what fluid will be injected?**

Potable water will be used during performance of the RTS.

5. **Pressure Testing**

- (a) **The amount of fluid bled-off after the conclusion of the pressure test should be measured and recorded.**

The amount of fluid bled-off at the conclusion of the pressure test will be measured and recorded.

- (b) **What is the maximum injection pressure expected for the new well design? Please note that the pressure test must be run at 1.5 times the maximum permitted injection pressure.**

The injection pressure was calculated as follows:

Static Head Pressure+Pipe Friction Head Loss+Bottom Hole Driving Pressure =  
Total Injection Pressure

- The Static Head Pressure based on operating data is approximately 30 psi (13 feet of head)
- The Pipe Friction Head Losses for a smooth pipe with roughness factor of 140 is approximately 177 feet (5.9 ft/100 ft)
- The Bottom Hole Driving Pressure based on the Injection Well Design Rpt., 1992 is approximately 9 feet (4 psi)

$$13 \text{ feet} + 177 \text{ feet} + 9 \text{ feet} = 199 \text{ feet}$$

$$199 \text{ feet} * 2.31 \text{ psi/ft} = 86 \text{ psi}$$

It is expected that the maximum injection pressure will be between 80 and 100 psi.

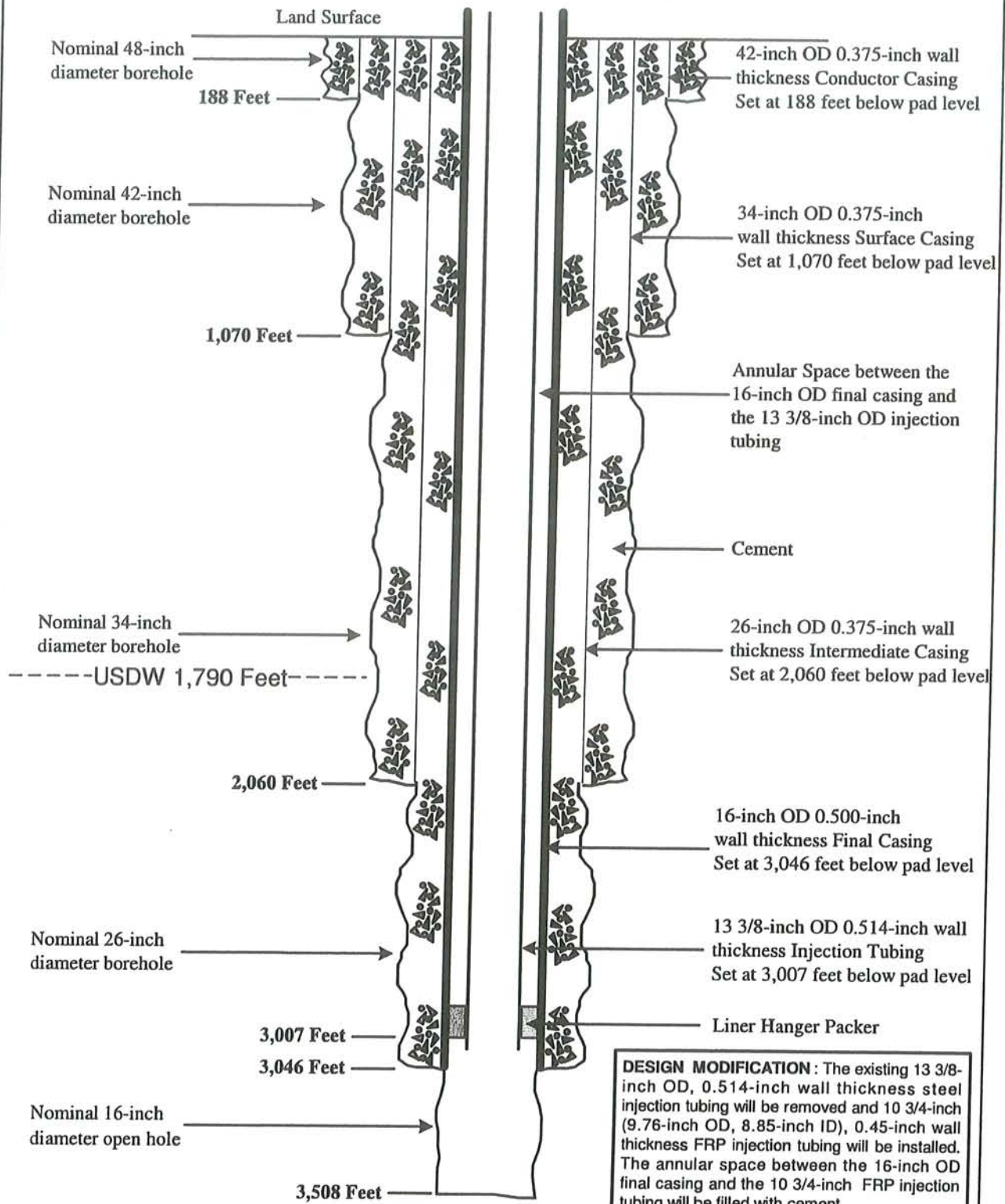


6. **It appears that the wellhead will be reassembled after the RTS has been conducted. Unless there is a reason that this is necessary it is suggested that the RTS be run after the wellhead has been reassembled**

The wellhead will be reassembled prior to the performance of the RTS in the final cemented tubing.

7. **Is any centralization of the fully cemented liner proposed?**

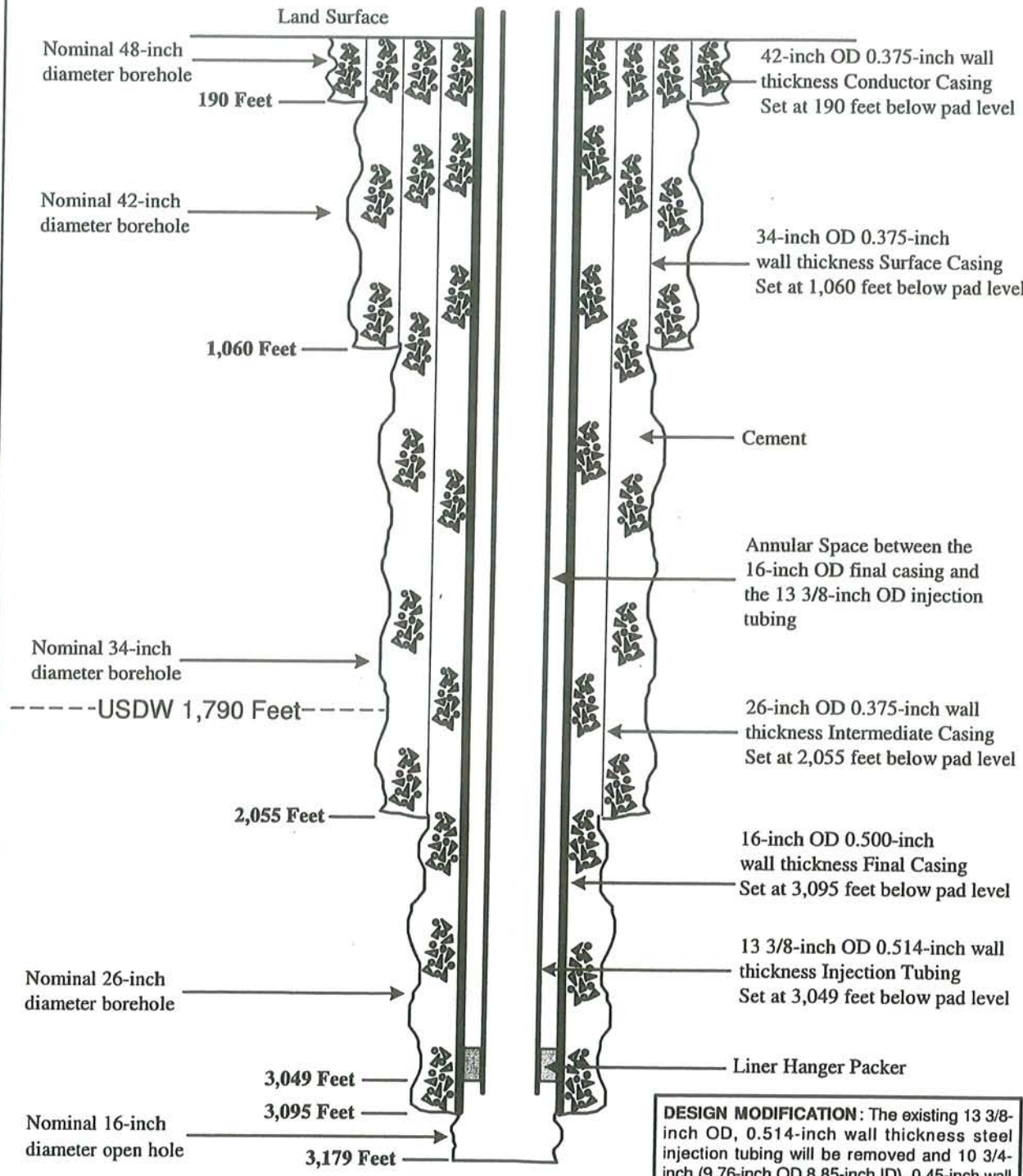
Centralization at the base of the new tubing will be achieved with the placement of slips to hold the casing in place.



City of Miramar WTP  
Injection Well - IW-2

Figure  
5





City of Miramar WTP  
Injection Well - IW-1

Figure  
4

**Attachement A (Modified)**  
**Miramar RO Alternative Design Casing/Cement Thickness**

**IW-1 Casing and Cement Thickness for Alternative Design Proposal**

| Casing/Cement               | Thickness (inches) |              | Cumulative Thickness (inches) | Depth (feet) | Remarks                                  |
|-----------------------------|--------------------|--------------|-------------------------------|--------------|--|
|                             | Cement             | Casing       |                               |              |  |
| 16-inch OD Casing<br>Cement | 4.625              | 0.500        | 5.125                         | 3095         | Top of Injection Zone                    |
| 9.76-inch OD FRP<br>Cement  | 2.620              | 0.450        | 8.195                         | 3049         | Near Top of Injection Zone<br>(Proposed) |
| 26-inch OD Casing<br>Cement | 3.625              | 0.375        | 12.195                        | 2055         | Below Base of USDW                       |
| 34-inch OD Casing<br>Cement | 3.625              | 0.375        | 16.195                        | 1060         | Through Hawthorn Group                   |
| 42-inch OD Casing<br>Cement | 3.000              | 0.375        | 19.570                        | 190          | Biscayne Aquifer                         |
| 48-inch Borehole            |                    |              |                               |              |  |
| <b>TOTAL</b>                | <b>17.495</b>      | <b>2.075</b> | <b>19.570</b>                 |              |  |

| Depth     | Cement (inches) | Casing (inches) | Total Thickness (inches) | Remarks                               |
|-----------|-----------------|-----------------|--------------------------|---------------------------------------|
| 0-190     | 17.495          | 2.075           | 19.570                   | Biscayne Aquifer                      |
| 190-1060  | 14.495          | 2.075           | 16.570                   | Through Hawthorn Group                |
| 1060-2055 | 10.870          | 1.700           | 12.570                   | Below Base of USDW                    |
| 2055-3049 | 7.245           | 0.950           | 8.195                    | Near Top of Injection Zone (Proposed) |
| 3049-3095 | 4.625           | 0.500           | 5.125                    | Top of Injection Zone                 |

**IW-2 Casing and Cement Thickness for Alternative Design Proposal**

| Casing/Cement               | Thickness (inches) |              | Cumulative Thickness (inches) | Depth (feet) | Remarks                                  |
|-----------------------------|--------------------|--------------|-------------------------------|--------------|--|
|                             | Cement             | Casing       |                               |              |  |
| 16-inch OD Casing<br>Cement | 4.625              | 0.500        | 5.125                         | 3046         | Top of Injection Zone                    |
| 9.76-inch OD FRP<br>Cement  | 2.620              | 0.450        | 8.195                         | 3007         | Near Top of Injection Zone<br>(Proposed) |
| 26-inch OD Casing<br>Cement | 3.625              | 0.375        | 12.195                        | 2060         | Below Base of USDW                       |
| 34-inch OD Casing<br>Cement | 3.625              | 0.375        | 16.195                        | 1070         | Through Hawthorn Group                   |
| 42-inch OD Casing<br>Cement | 3.000              | 0.375        | 19.570                        | 188          | Biscayne Aquifer                         |
| 48-inch Borehole            |                    |              |                               |              |  |
| <b>TOTAL</b>                | <b>17.495</b>      | <b>2.075</b> | <b>19.570</b>                 |              |  |

| Depth     | Cement (inches) | Casing (inches) | Total Thickness (inches) | Remarks                               |
|-----------|-----------------|-----------------|--------------------------|---------------------------------------|
| 0-188     | 17.495          | 2.075           | 19.570                   | Biscayne Aquifer                      |
| 188-1070  | 14.495          | 2.075           | 16.570                   | Through Hawthorn Group                |
| 1070-2060 | 10.870          | 1.700           | 12.570                   | Below Base of USDW                    |
| 2060-3007 | 7.245           | 0.950           | 8.195                    | Near Top of Injection Zone (Proposed) |
| 3007-3046 | 4.625           | 0.500           | 5.125                    | Top of Injection Zone                 |





ISO 9001  
CERTIFIED FIRM

**FUTURE PIPE INDUSTRIES, INC.**  
**(TUBULAR FIBERGLASS CORPORATION)**

11811 Proctor Road • Houston, Texas 77038

Phone: (281) 847-2987 • Fax: (281) 847-1931



September 2003

# RED BOX 1250

FIBERGLASS TUBING, CASING, AND LINERS  
AROMATIC AMINE CURED EPOXY RESIN

## DIMENSIONAL SPECIFICATIONS

| Nominal Size (Inches) | Nominal I.D. (Inches) | Minimum Drift Dia (Inches) | Nominal O.D. (Inches) | Nominal Wall (Inches) | Pin Upset O.D. (Inches) | Max Box OD* (Inches) | Nominal Weight |          | Connection Type<br>API 5B, Table 14", 7", 6"<br>Fourteenth Edition August 06 |
|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|-------------------------|----------------------|----------------|----------|--|
|                       |                       |                            |                       |                       |                         |                      | (lbs/ft)       | (lbs/ft) |  |
| 2-3/8                 | 2.00                  | 1.91                       | 2.21                  | 0.10                  | 2.69                    | 3.47                 | 0.7            | 21       | 2-3/8" 8Rd EUE Long**IJ  |
| 2-7/8                 | 2.47                  | 2.37                       | 2.73                  | 0.13                  | 3.19                    | 3.97                 | 1.0            | 31       | 2-7/8" 8Rd EUE Long**IJ  |
| 3-1/2                 |                       | 2.90                       | 3.30                  | 0.15                  | 3.85                    | 4.49                 | 1.5            | 44       | 3-1/2" 8Rd EUE Long**IJ  |
| 4                     | 3.33                  |                            | 3.68                  | 0.17                  | 4.35                    | 5.18                 | 2.0            | 61       | 4" 8Rd EUE Long TC   |
| 4-1/2                 | 3.98                  | 3.89                       | 4.38                  | 0.20                  | 4.85                    | 5.43                 | 2.4            | 73       | 4-1/2" 8Rd EUE Long**IJ  |
| 5-1/2                 | 4.42                  | 4.33                       | 4.87                  | 0.23                  | 5.60                    | 6.72                 | 3.2            | 97       | 5-1/2" 8Rd Csg Long**IJ  |
| 6-5/8                 | 5.43                  | 5.33                       | 5.97                  | 0.27                  | 6.73                    | 8.00                 | 4.8            | 145      | 6-5/8" 8Rd Csg Long**IJ  |
| 7                     | 6.21                  | 6.11                       | 6.83                  | 0.31                  | 7.10                    | 8.40                 | 5.8            | 173      | 7" 8Rd Csg Long**IJ  |
| 7-5/8                 | 6.21                  | 6.11                       | 6.83                  | 0.31                  | 7.73                    | 9.37                 | 6.4            | 192      | 7-5/8" 8Rd Csg Long**IJ  |
| 9-5/8                 | 7.84                  | 7.75                       | 8.63                  | 0.40                  | 9.73                    | 11.84                | 10.3           | 309      | 9-5/8" 8Rd Csg***IJ  |
| 10-3/4                | 8.85                  | 8.76                       | 9.76                  | 0.45                  | 10.85                   | 13.14                | 13.1           | 394      | 10-3/4" 8Rd Csg***IJ   |
| 11-3/4                | 10.72                 | 10.62                      | 11.70                 | 0.49                  | 11.85                   | 14.00                | 16.0           | 480      | 11-3/4" 8Rd Csg***TC   |
| 13-3/8                | 11.98                 | 11.89                      | 13.21                 | 0.61                  | 13.48                   | 15.35                | 22.1           | 684      | 13-3/8" 8Rd Csg***TC   |
| 16                    | 14.48                 | 14.39                      | 15.80                 | 0.68                  | 16.20                   | 18.55                | 29.9           | 897      | 16" 6Rd Csg TC   |

\*Depending on the application, smaller maximum box diameters are available.

Thread lengths on larger sizes exceed API L4

30 ft Standard Joint Length

## PERFORMANCE AND RATINGS (-60 deg F to +210 deg F)

| Nominal Size | Internal Pressure Rating (psi) | Mill Test Pressure (psi) | Collapse Rating (psi) | Axial Tension Rating (lbs) | Stretch vs Tension-Over-Pipe-Wt Stretch (ft) = Coeff. x P x L |
|--------------|--------------------------------|--------------------------|-----------------------|----------------------------|---|
| 2-3/8        | 1,250                          | 1,570                    | 640                   | 10,500                     | 0.467   |
| 2-7/8        | 1,250                          | 1,570                    | 670                   | 16,000                     | 0.295   |
| 3-1/2        | 1,250                          | 1,570                    | 600                   | 22,500                     | 0.221   |
| 4            | 1,250                          | 1,570                    | 640                   | 29,000                     | 0.169   |
| 4-1/2        | 1,250                          | 1,570                    | 580                   | 39,500                     | 0.129   |
| 5-1/2        | 1,250                          | 1,570                    | 600                   | 49,500                     | 0.101   |
| 6-5/8        | 1,250                          | 1,570                    | 590                   | 74,000                     | 0.089   |
| 7            | 1,250                          | 1,570                    | 590                   | 79,500                     | 0.052   |
| 7-5/8        | 1,250                          | 1,570                    | 590                   | 90,000                     | 0.052   |
| 9-5/8        | 1,250                          | 1,570                    | 580                   | 146,500                    | 0.033   |
| 10-3/4       | 1,250                          | 1,570                    | 600                   | 169,000                    | 0.025   |
| 11-3/4       | 1,250                          | 1,570                    | 450                   | 149,000                    | 0.029   |
| 13-3/8       | 1,390                          | 1,740                    | 600                   | 183,000                    | 0.021   |
| 16           | 1,250                          | 1,570                    | 450                   | 248,000                    | 0.016   |

Where: P = Tensile Load (1,000 lbs)

L = String Length (1,000 ft)

## MECHANICAL AND PHYSICAL PROPERTIES

| TUBING/CASING BODY PROPERTIES              | UNIT                            | VALUE          |             | TEST METHOD    |
|--|---------------------------------|----------------|-------------|----------------|
|  |                                 | 2-3/8 - 10-3/4 | 11-3/4 - 16 |                |
| Tensile Strength, Hoop                     | psi                             | 31,300         | 31,300      | ASTM D1599     |
| Tensile Strength, Axial                    | psi                             | 30,000         | 20,000      | ASTM D2105     |
| Modulus of Elasticity, Axial               | 10E+06 psi                      | 3.0            | 2.0         | ASTM D2105     |
| Long Term Hydrostatic Strength at 20 Years | psi                             | 16,875         | 10,109      | ASTM D2992 (B) |
| Specific Gravity                           | —                               | 1.9            | 1.9         | ASTM D792      |
| Density                                    | lbs/in <sup>3</sup>             | 0.07           | 0.07        | ASTM D792      |
| Thermal Conductivity                       | Btu/hr/ft <sup>2</sup> /in/degF | 2.4            | 2.4         | ASTM C177      |
| Thermal Expansion Coefficient (Linear)     | 10E-05in/in/degF                | 1.1            | 1.2         | ASTM D696      |
| Flow Factor                                | —                               | 150            | 150         | Hazen Williams |

**RED BOX® CASING AND TUBING SYSTEM**

**YELLOW BOX® LINE PIPE SYSTEM**

Email: tubularfiberglass@houston.rr.com • website: www.tubularfiberglass.com



# City of Miramar

## Injection Well System Work Plan

---

Modifications are shown in Red

The City proposes to the following Work Plan for the final casing testing and injection tubing installation in IW-1 and IW-2.

1. **Maintenance of Annular Pressure in IW-2:** The City of Miramar will continue to operate IW-2 while maintaining the positive annular pressure greater than the injection pressure, using potable water. A record of the annular space pressure and injection flow readings taken every 12 hours will be maintained and reviewed. Once work in IW-1 is complete, IW-2 will be taken out of service.
2. **Shallow Background Water Quality Samples:** The City will collect Background water quality samples from the pad monitor wells surrounding the IW-1 and IW-2 injection well pad. Water quality sample collection will be performed on a weekly basis. Sample collection will begin one week prior to the initiation of well testing and repair work and continue through completion of the work. Water quality analysis shall consist of the following parameters: specific conductance, pH, chloride concentration, temperature and water level.
3. **Mobilization of Equipment:** The Contractor shall mobilize testing and installation equipment to the project site and set over the wellhead. Equipment setup will include all necessary removal and replacement of the containment pad wall and dismantling of existing wellhead and associated wellhead piping/instrumentation equipment. The well will be killed prior to the dismantling of the existing wellhead and mobilization of a drill rig over the well.
4. **Discharge Containment:** Equipment will be maintained to direct discharges from the well during testing and repair work into the well sump. Discharge water will be directed to the existing scavenger tank system that ultimately discharges to an FDEP approved disposal site. Solids will be settled out before discharge and disposed of in accordance with federal, state and local requirements.
5. **Steel Injection Tubing Removal:** The existing 13.375-inch outer diameter (OD) steel injection tubing will be removed and disposed in accordance with federal, state and local requirements. The male end of the TIW packer will be left in the well. Following removal of the steel tubing, debris that has accumulated in the well will be removed and disposed of in accordance with federal, state and local requirements.
6. **Video Survey of Final Casing:** Perform video survey from land surface to approximately 25 feet below base of 16-inch OD final casing. Perform side-view inspection of TIW packer area.
7. **Pressure Test of Final Casing:** A temporary wellhead will be placed on the well for use during pressure testing. The temporary wellhead will provide access to run the packer into the well, and provide an airtight seal. A pressure gauge, measuring 0 to 200 pounds per square inch (psi) will be mounted on the temporary wellhead. Calibration will have been conducted on the gauge within a period of three months from the date of use. Calibration data will be submitted to FDEP prior to testing.

## City of Miramar - Injection Well System Work Plan

- a. A packer will be run as close to the bottom of the casing as possible and seated against the final casing. Packer setting depths will be determined based upon the results of the television survey. A casing brush may also be attached below the packer assembly to swab the inside of the 16-inch OD casing if the video shows any remaining debris on the casing walls.
  - b. The pressure in the well will be increased to 130-150 psi, using a full column of fluid. The selected pressure is in excess of 1.5 times the maximum expected injection pressure of 86 psi. Pressure readings will be recorded every five minutes for a one-hour period. The results will be certified as correct by a qualified and Florida licensed professional. The pressure must not vary by +/- 5 percent during the one-hour testing period in order to meet FDEP requirements. The FDEP must be present to witness the performance of the pressure test. The FDEP will be notified at least 72 hours prior to beginning the test.
  - c. Upon conclusion of pressure testing, the pressure held on the casing will be bled-off and the fluid discharged collected, measured and recorded and the testing assembly and equipment will be disassembled and removed from the well.
8. **New Injection Tubing Installation:** A 10.75-inch  $\text{OD}$ -fiberglass reinforced pipe (FRP) injection tubing will be installed, open ended. The tubing will be positioned immediately above the YBI Packer remaining in the hole and attached to the final casing with a new packer assembly. The tubing shall be new, filament-wound fiberglass pipe, such as Red Box fiberglass manufactured by the Tubular Fiberglass Corporation, or approved equivalent. The tubing shall conform to API Specification 15TR and shall have an internal pressure rating of a minimum of 1,250-1,000 pounds per square inch (psi). The tubing shall have long threaded and coupled connections that are precision-lathe cut and factory milled with a pressure rating of a minimum of 1,250-1,000 psi for a minimum of 5 seconds prior to shipping. The tubing will be a nominal 9.94-10.75-inch OD pipe with a nominal inner diameter (ID) of 8.85 inches. The wall thickness will be approximately 0.45+ inches.
  9. **Cementing:** The annular space between the 10.75-inch  $\text{OD}$ -tubing and the 16-inch OD final casing will be filled in a single stage with sulfate-resistant cement. Cement type ASTM C 150 will be used. with additives-Additives consisting of less than 12 percent bentonite may be used to make a more fluid slurry mix and to slightly retard the setting time of the cement.
  10. **Cement Bond Log:** A background cement bond log will be performed inside the 10.75-inch FRP tubing prior to placement of cement in the annular space and a final cement bond and temperature log will be performed between 48 and 72 hours after the completion of annular space cementing activities.
  11. **Video Survey of FRP:** A video survey will be performed inside the 10.75-inch FRP tubing from land surface to the bottom of the well with a side-view inspection of the base of the new tubing and the area of the new packer will.
  12. **Pressure Test of New Tubing:** The procedure defined above for pressure testing the final casing will be used to pressure test the 10.75-inch  $\text{OD}$ -FRP injection tubing.



13. **Reinstall Wellhead:** Reinstall a modified wellhead to incorporate the new tubing. Associated piping and instrumentation will be modified to fit the modified wellhead configuration.

- ~~13-14.~~ **Radioactive Tracer Survey of the Final Casing:** Geophysical logging services for the high resolution temperature log and radioactive tracer survey will be provided by a service company qualified and experienced in the performance of this work, possessing appropriate certifications for the handling and use of radioactive tracers. This service company will also be subcontracted to the drilling contractor. All depths in the discussion below, in connection with the radioactive tracer tool positioning, specifically refer to the location of the ejector port on the radioactive tracer tool.

FDEP staff will be notified in order to be present to witness the radioactive tracer survey. FDEP will be notified at least 72 hours prior to the test and the start of testing will be in accordance with the timing requirements set out in the operating and operational testing permits. RTS procedures will begin after "kill" fluids have been flushed from the well and the well has been shut in for a minimum of 12 hours.

- a. **Background Geophysical Logging:** Background temperature and gamma ray logs will be run in the well. The logs will be run over the entire length of the well, including the open hole interval where obstructions do not preclude the tools passage. The temperature log will be run first, from the top to the bottom of the well, as so not to disturb the water column. The gamma ray log will ~~either be run with the temperature log in the downward direction or may be run upward from the bottom of the well to the top.~~ The logs will be used for comparison during radioactive tracer surveying. The high-resolution temperature log will include a plot of differential temperature for ease of comparison. As casing collar locator will also be run with these logs to accurately reference the bottom of the casing.
- b. **RTS:** An RTS will be performed in the injection well after the above-described logs. The tool used for testing will be configured according to information to be supplied by the contractor performing the logs.

Below is a list of the different phases of RTS that will be performed. Actual injection quantities will be determined in the field. All flushing activity listed below requires at least three well volumes of water to be run through the injection tubing to remove any remaining kill fluids prior to the performance of the RTS. In the event that tracer is detected at the upper detector during any of the monitoring periods the operator will immediately log out of position to a new position and resume time-drive monitoring for the remainder for the remainder of the hour at the new position. This step should be repeated if the tracer slug is again detected by the upper gamma detector. This should enable the tracer slug to be followed as it moves uphole and keep the upper detector from being stained.

## City of Miramar - Injection Well System Work Plan

---

Furthermore, the procedure to be used during unusual occurrences during the RTS test will follow recommendations of the on site FDEP observer.

- 1) **First Low Flow Dynamic Testing:** The low flow portion of the RTS will consist of the dynamic or pumping portion of the survey. A velocity of less than 5 feet per minute (fpm) is proposed for the dynamic portion of the test. This would require a rate of ~~less than~~ approximately 1650 gpm to be injected into the well during the survey. A totalizing flowmeter, measuring 0 to 500 gpm will be mounted on the water supply connected to the wellhead. The flowmeter will be accurate to 0.25 percent of full scale. The flowmeter will be calibrated within a three-month period before use and calibration records will be submitted to the FDEP. Potable water from the 3-inch line adjacent to the pad would be used for this portion of the test. A backflow preventer ~~would~~ will be placed in line before the point of injection into the well.
  - a) After beginning flow of water into the well, the tool will be placed at a depth of approximately five feet inside the final casing (3,090 feet in IW-1 and 3,041 feet in IW-2), and a slug approximately 2 milliCuries (mCi) of medicinal-grade radioactive Iodine-131 will be ejected. The iodine will be used within one half-life of its assay date. The tool will remain in place for a period of approximately one-hour and the three gamma ray detectors in the "Time drive" mode will record the movement of the slug. The log will include the time of injection and the amount injected.
  - b) After the one-hour monitoring period, a log out of position will be performed between the ejection point and a minimum of 200 feet above the highest point of detection.
  - c) Upon completion of logging, the casing will be completely flushed utilizing the injection well pumps with three well volumes of potable water (approximately 520 gallons).
  - b) After flushing, the tool will immediately be run to the base of casing, then the interval between the injection point and 200 feet above the highest point of detection of Iodine-131 will be logged (the after flush pass).
- 2) **Second Low Flow Dynamic Testing:** The process described above for the low flow dynamic log will be repeated to include a log out-of-position, a casing flush, and an after-flush pass. A slug of tracer greater than 2mCi may be used during this repeat dynamic test.



## City of Miramar - Injection Well System Work Plan

---

If, during testing of the well, no apparent anomalies appear that may indicate a lack of mechanical integrity in the injection well, the test will be concluded. However, if anomalies do occur, the testing procedure will be altered to track the radioactive tracer material.

After the RTS is complete, the RTS tool will be discharged one to two feet above the uppermost injection zone and the well shall be flushed with 3 to 5 volumes of effluent potable water. A second background log will be run from the bottom to the top of the well. The wellhead assembly will be completely re-assembled and the well placed back in service.

15. **Injection Test in FRP Liner:** After completion of the tubing installation, an injection test shall be run for a period of 24 hours. The injection rate shall be approximately 2,300 gpm (an injection rate of 12 feet per second). The Contractor is responsible for providing the injection test equipment, pumps, pipeline, and other appurtenances to perform the injection test. The Contractor shall supply or provide the services of a company to supply a bottom hole transducer and data logging system that can measure the bottom hole pressure to the resolution of  $\pm 0.01$  psi to record pressures during testing and temperature to  $\pm 0.01$  degrees Celsius. The equipment should provide a hard copy of the data accessible throughout the test, and a disk copy upon completion of the test in ASCII format. A period of 24 hours of pre-test readings shall be collected, and following the 24 hours of injection testing, 48 hours of recovery. During this recovery period, no activity must occur in the injection well. Readings shall be collected on a schedule to be supplied by MWH prior to the start of injection testing. At a minimum, the equipment should be capable of recording readings on a schedule of variable intervals from one reading per 10 seconds to one reading per hour. The Contractor shall provide equipment and services to monitor the wellhead pressure on the injection well during the injection test.
16. **Return Injection Well to Service:** Final sampling of the pad monitor wells will be performed following FDEP approval of the injection test and final MIT and the City will request FDEP approval to place IW-1 back into operation. A report summarizing the installation and testing of the new injection tubing in IW-1 and IW-2 will be prepared and submitted to FDEP within 60 days of project completion.

### Project Schedule

The installation and testing of the FRP tubing will begin with IW-1 upon FDEP approval of the request for major modification of FDEP UIC Permit No. 125256-007-UO. Installation and testing of IW-2 will begin when IW-1 has been approved by FDEP for operation. Substantial completion of the work in both wells is expected to take approximately 30 days following delivery of the FRP tubing to the site.

**MAJOR MODIFICATION PERMIT  
153722-003-UC**





# Department of Environmental Protection

Jeb Bush  
Governor

Southeast District  
400 North Congress Avenue, Suite 200  
West Palm Beach, Florida 33401

Colleen M. Castille  
Secretary

**ELECTRONIC CORRESPONDENCE June 3, 2005**

In the Matter of an  
Application for Permit by:

Brij M. Garg, PE, DEE  
Public Works/Utilities Director  
City of Miramar  
13800 Pembroke Road  
Miramar, FL 33027-3489

BROWARD COUNTY  
UIC - Miramar West WTP

FILE: 153722-003-UC  
Modification to Injection Wells IW-1, IW-2

## INTENT TO ISSUE MODIFICATION TO PERMIT

The Southeast District Office of the Florida Department of Environmental Protection (Department or FDEP) hereby gives notice of its intent to issue a permit for the proposed project as detailed in the application specified above. The Southeast District has developed a Draft Permit for reasons stated below.

Under the proposed modification to permit, the applicant, City of Miramar, applied on January 24, 2005, to modify and test injection wells IW-1 and IW-2. The modification is an alternative design to the standard Class I injection well design for the installation of the injection tubing. For both injection wells, the alternative design consists of removing the existing 13.375-inch outside diameter (OD) injection tubing and installing a 10.75-inch FPI Red Box 1250 Fiberglass Reinforced Plastic (FRP) tubing having a 9.78-inch OD and 0.45-inch wall thickness. The new FRP tubing will be fully cemented inside the final casing to a depth of about 3039 feet below land surface (bls) for IW-1 and to 2997 feet bls for IW-2. The associated dual zone monitoring well, MW-1, will not be altered and has monitoring intervals at 1639 to 1735 feet bls and 1930 to 2005 feet bls. The base of the lowermost USDW is reported to be about 1790 feet bls. The final depth of the replacement tubing and the permitted flow rate under normal operating condition will be based on the results of field testing. The purpose of the injection wells is for the disposal of concentrate reject water from the membrane softening drinking water facility.

The Department has permitting jurisdiction under Chapter 403 of the Florida Statutes and Chapters 62-4, 62-520, 62-522, and 62-528, 62-550, and 62-680 of the Florida Administrative Code. The project is not exempt from permitting procedures. The Department has determined that a construction permit is required for the proposed work.

Under Section 403.815, FS, and Rule 62-110.106 F.A.C., you (the applicant) are required to publish at your own expense the enclosed Notice of Intent to Issue Permit. The notice shall be published one time only within 30 days, in the legal ad Section of a newspaper of general circulation in the area affected. For the purpose of this rule, "publication in a newspaper of general circulation in the area affected" means publication in a newspaper meeting the requirements of Sections 50.011 and 50.031, F.S., in the county where the activity is to take place. Where there is more than one newspaper of general circulation in the county, the newspaper used should be one with significant circulation in the area that may be affected by the permit. If you are uncertain that a newspaper meets these requirements, please contact the Department at the address of telephone number listed below. The applicant shall provide an original copy of the proof of publication to the Department, at 400 N. Congress Avenue, Suite 200, West Palm Beach, Florida 33401, within seven days of publication. Failure to publish the notice and provide proof of publication within the allotted time may result in the denial of the permit.

The Department will issue the permit with the attached conditions 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) under Sections 120.569 and 120.57 of the Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000. Petitions filed by the applicant or any of the parties listed below must be filed within 14 days of receipt of this written notice.

Petitions filed by any other persons other than those entitled to written notice under Section 120.60(3) of the Florida Statutes must be filed within 14 days of publication of the public notice or receipt of the written notice, whichever occurs first. Under Section 120.60(3), however, any person who asked the Department for notice of agency action may file a petition within 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, 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 Section 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 name, address, and telephone number of the petitioner's representative, if any; each the Department case or identification number and the county in which the subject matter or activity is located;
- (b) A statement of when and how 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 all disputed issues of material fact. If there are none, the petition must so indicate;
- (e) A statement of facts that the petitioner contends warrant reversal or modification of the Department action;
- (f) A concise statement of the ultimate facts alleged, as well as the rules and statutes which entitle the petitioner to relief; and
- (g) Demand for relief (sought by the petitioner, stating precisely the action that the 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 contain the same information as set forth above, as required by Section 28-106.301.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department 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 on the petitions have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

Mediation is not available for this proceeding.

A party to this order has the right to seek judicial review of it under Section 120.68 of the Florida Statutes, by filing a notice of appeal under Section 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 must be filed within thirty days after this order is filed with the clerk of the Department.

Executed in the City of West Palm Beach, Florida.

STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

---

Kevin R. Neal Date  
District Director  
Southeast District

KRN/LAH/JM/HV

Enclosures: Notice of Intent to Issue Modification to Permit  
Draft Modification to Permit

Copies furnished to:

Richard Deuerling, FDEP/TLH  
Steve Anderson, SFWMD/WPB  
Heidi Vandor, FDEP/WPB

Nancy Marsh, USEPA/ATL  
Garth Hinckle, BCDPEP

Ron Reese, USGS/MIA  
Susan Bodmann, MWH

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this NOTICE OF INTENT TO ISSUE MODIFICATION TO PERMIT and all copies were mailed before the close of business on 6/3/05 to the listed persons.

FILING AND ACKNOWLEDGMENT, FILED, on this date, pursuant to §120.52(11), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

---

Clerk

---

6/3/05  
Date



STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
NOTICE OF INTENT TO ISSUE MODIFICATION TO PERMIT

The Department of Environmental Protection gives notice that an Intent to Issue a Modification to Permit (Permit No. 153722-003-UC) has been prepared for Mr. Brij M. Garg, PE, DEE, Director of Public Utilities, for the City of Miramar, 13900 Pembroke Road, Miramar, Broward County, Florida, 33027, to modify two Class I injection wells, IW-1 and IW-2, and associated monitor well, MW-1. The purpose of the facility is to inject non-hazardous membrane softening concentrate generated at the City of Miramar Water Treatment Plant, 4100 S. Flamingo Road, Miramar, Broward County, Florida.

Under the proposed modification to permit, the applicant, City of Miramar, applied on January 24, 2005, to modify and test injection wells IW-1 and IW-2. The modification is an alternative design to the standard Class I injection well design for the installation of the injection tubing. For both injection wells, the alternative design consists of removing the existing 13.375-inch outside diameter (OD) injection tubing and installing a 10.75-inch FPI Red Box 1250 Fiberglass Reinforced Plastic (FRP) tubing having a 9.76-inch OD and 0.45-inch wall thickness. The new FRP tubing will be fully cemented inside the final casing to a depth of about 3039 feet below land surface (bls) for IW-1 and to 2997 feet bls for IW-2. The associated dual zone monitoring well, MW-1, will not be altered and has monitoring intervals at 1639 to 1735 feet bls and 1930 to 2005 feet bls. The final depth of the replacement tubing and the permitted flow rate under normal operating condition will be based on the results of field testing.

The Department will issue the permit with the attached conditions unless a timely petition for an administrative hearing is filed under Sections 120.569 and 120.57 of the Florida Statutes (F.S.).

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative hearing in accordance with Sections 120.569 and 120.57 F.S. The petition must contain the information set forth below and must be filed (received) in the Department's Office of General Counsel, 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida, 32399-3000. Petitions filed by the applicant or any of the parties listed below must be filed within 14 days of receipt of this written notice. Petitions filed by any other persons other than those entitled to written notice under Section 120.60(3) F.S., must be filed within fourteen days of publication of the public notice or receipt of the written notice, whichever occurs first. 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 F.S., 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.

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 name, address, and telephone number of the petitioner's representative, if any; each the Department case or identification number and the county in which the subject matter or activity is located; (b) a statement of when and how 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 all disputed issues of material fact. If there are none, the petition must so indicate; (e) a statement of facts that the petitioner contends warrant reversal or modification of the Department action; (f) a concise statement of the ultimate facts alleged, as well as the rules and statutes which entitle the petitioner to relief; and (g) demand for relief (sought by the petitioner, stating precisely the action that the 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 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 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 on the petitions 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, F.S., is not available for this proceeding.

A party to this order has the right to seek judicial review of it under Section 120.68 of the Florida Statutes, by filing 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 must be filed within thirty days after this order is filed with the clerk of the Department.

The draft permit is available for public inspection during normal business hours, 8:00 am to 5:00 pm, Monday through Friday, except legal holidays, at the Florida Department of Environmental Protection, Southeast District office, 400 North Congress Avenue, West Palm Beach, Florida, 33401. Please contact Heidi Vandor, PG at (561) 681-6695, or Joseph May, PG at (561) 681-6691 of this office, for additional information or to obtain a copy of the draft permit.

Under the proposed permit, the applicant, City of Miramar, applied on January 24, 2005, to modify and test injection wells IW-1 and IW-2. The modification is an alternative design to the standard Class I injection well design for the installation of the injection tubing. For both injection wells, the alternative design consists of removing the existing 13.375-inch outside diameter (OD) injection tubing and installing a 10.75-inch FPI Red Box 1250 Fiberglass Reinforced Plastic (FRP) tubing having a 9.76-inch OD and 0.45-inch wall thickness. The new FRP tubing will be fully cemented inside the final casing to a depth of about 3039 feet below land surface (bls) for IW-1 and to 2997 feet bls for IW-2. The associated dual zone monitoring well, MW-1, will not be altered and has monitoring intervals at 1639 to 1735 feet bls and 1930 to 2005 feet bls. The base of the lowermost USDW is reported to be about 1790 feet bls. The final depth of the replacement tubing and the permitted flow rate under normal operating condition will be based on the results of field testing. The purpose of the injection wells is for the disposal of concentrate reject water from the membrane softening drinking water facility.





# Department of Environmental Protection

Jeb Bush  
Governor

Southeast District  
400 N. Congress Avenue, Suite 200  
West Palm Beach, Florida 33401

Colleen M. Castille  
Secretary

## ELECTRONIC CORRESPONDENCE

### NOTICE OF MODIFICATION TO PERMIT

Brij M. Garg, PE, DEE  
Public Works/Utilities Director  
City of Miramar  
13900 Pembroke Road  
Miramar, FL 33027-3489

BROWARD COUNTY  
UIC – Miramar West WTP

FILE: 153722-003-UC  
Modification to Injection Wells IW-1, IW-2

Dear Mr. Garg,

Enclosed is Permit Number 153722-003-UC, to modify FDEP Permit 125256-007-UO for City of Miramar, Miramar West Water Treatment Plant (WTP) located at 4100 S. Flamingo Road, Miramar, Broward County, Florida, issued pursuant to Section(s) 403.087, Florida Statutes and Florida Administrative Codes 62-4, 62-520, 62-522, 62-528, 62-550 and 62-660.. The modification is an alternative design to the standard Class 1 design for tubing installation consisting of removing the existing steel injection tubing with a fluid filled annulus, and installing a fully cemented FRP injection tubing, for injection wells IW and IW-2.

Any party to this Order (permit) has the right to seek judicial review of the permit pursuant to Section 120.68, Florida Statutes, by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, Mail Stop 35, 3900 Commonwealth Blvd., 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 30 days from the date this Notice is filed with the Clerk of the Department.

Should you have any questions, please contact Heidi Vandor, PG, or Joseph R. May, PG, of this office at (561) 681-6695 or (561) 681-6691, respectively.

Executed in West Palm Beach, Florida.

STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
**DRAFT**

\_\_\_\_\_  
Kevin R. Neal  
District Director  
Southeast District

KRN/LAH/JRM/hv

cc: Richard Deuerling, FDEP/TLH  
Steve Anderson, SFWMD/WPB  
Susan Bodman, MWH

Nancy Marsh, USEPA/ATL  
Heidi Vandor, FDEP/WPB  
Hong Guo, Miramar

Ron Reese, USGS/MIA  
Garth Hinkle

### CERTIFICATE OF SERVICE

This is to certify that this NOTICE OF MODIFICATION TO PERMIT and all copies were mailed before the close of business on \_\_\_\_\_ to the listed persons.

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to the §120.52, Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

\_\_\_\_\_  
Clerk

\_\_\_\_\_  
Date





# Department of Environmental Protection

Jeb Bush  
Governor

Southeast District  
400 N. Congress Avenue, Suite 200  
West Palm Beach, Florida 33401

Colleen M. Castille  
Secretary

**PERMITTEE:**

Brij M. Garg, PE, DEE  
Public Works/Utilities Director  
City of Miramar  
13900 Pembroke Road  
Miramar, FL 33027-3489

**PERMIT/CERTIFICATION NO:** 153722-003-UC

**DATE OF ISSUE:**

**EXPIRATION DATE:**

**COUNTY:** Palm Beach

**POSITION:** 26° 23' 30" N / 80° 12' 12" W

**PROJECT:** Modification to Injection Well IW-1, IW-2

This modification to permit is issued under the provisions of Chapter 403.087, Florida Statutes (F.S.), and Florida Administrative Code (F.A.C.) Rules 62-4, 62-520, 62-522, 62-528, 62-550, and 62-660. The above named permittee is hereby authorized to perform the work or construct the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

**TO MODIFY AND TEST:** Two Class I, industrial injection wells, IW-1 and IW-2. The modification is an alternative design to the standard Class I injection well design for the installation of the injection tubing. For both injection wells, the alternative design consists of replacing the existing 13.375-inch outside diameter (OD) injection tubing and installing a 10.75-inch FPI Red Box 1250 Fiberglass Reinforced - Plastic (FRP) tubing having a 9.76-inch OD and 0.45-inch wall thickness. The new FRP tubing will be fully cemented inside the final casing to a depth of about 3039 feet below land surface (bls) for IW-1 and to 2997 feet bls for IW-2. The associated dual zone monitoring well, MW-1, will not be altered and has monitoring intervals at 1639 to 1735 feet bls and 1930 to 2005 feet bls. The base of the lowermost USDW is reported to be about 1790 feet bls. The final depth of the replacement tubing and the permitted flow rate under normal operating condition will be based on the results of field testing. The purpose of the injection wells is for the disposal of concentrate reject water from the membrane softening drinking water facility.

The Department approves the modifications herein to FDEP Permit 125256-007-UO under FDEP Permit 153722-003-UC.

**IN ACCORDANCE WITH:** Application to Modify Class I Injection Well received January 24, 2005; Request for Information (RFI) dated February 24, 2005; Response to RFI received March 2, 2005; RFI dated March 4, 2005; Response to RFI received March 11, 2005; publication of the Notice of Draft Modification to Permit in Sun Sentinel newspaper on April 17, 2005; and in consideration of public comment received as a result of the public meeting held on May 24, 2005 at 10:00 am.

**LOCATED AT:** 4100 S. Flamingo Road, Miramar, Broward County, Florida

**TO SERVE:** Miramar West WTP Service Area

**SUBJECT TO:** General Conditions 1-24 and Specific Conditions 1-11.

### GENERAL CONDITIONS:

The following General Conditions are referenced in Florida Administrative Code Rule 62-528.307.

- 1) The terms, conditions, requirements, limitations and restrictions set forth in this permit are "permit conditions" and are binding and enforceable pursuant to Section 403.141, F.S.
  - 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 may constitute grounds for revocation and enforcement action.
  - 3) As provided in subsection 403.087(7), F.S., the issuance of this permit does not convey any vested rights or exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor infringement of federal, state, or local laws or regulations. This permit is not a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in this permit.
  - 4) This permit conveys no title to land, 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.
  - 5) 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.
  - 6) The permittee shall 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, or are required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.
  - 7) The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at reasonable times, access to the premises where the permitted activity is located or conducted to:
    - a) Have access to and copy any records that must be kept under conditions of this permit;
    - b) Inspect the facility, equipment, practices, or operations regulated or required under this permit; and
    - c) Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.
- Reasonable time will depend on the nature of the concern being investigated.
- 8) If, for any reason, 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 provide the Department with the following information:
    - a) A description of and cause of noncompliance; and
    - b) 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.

- 9) 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 where such use is proscribed by Sections 403.111 and 403.73, F.S. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.
- 10) The permittee 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.
- 11) This permit is transferable only upon Department approval in accordance with rules 62-4.120 and 62-528.350, F.A.C. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.
- 12) This permit or a copy thereof shall be kept at the work site of the permitted activity.
- 13) The permittee shall comply with the following;
  - a) Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records shall be extended automatically unless the Department determines that the records are no longer required.
  - b) The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.
  - c) Records of monitoring information shall include:
    - i) the date, exact place, and time of sampling or measurements;
    - ii) the person responsible for performing the sampling or measurements;
    - iii) the dates analyses were performed;
    - iv) the person responsible for performing the analyses;
    - v) the analytical techniques or methods used;
    - vi) the results of such analyses.
  - d) The permittee shall furnish to the Department, within the time requested in writing, any information which the Department requests to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit.
  - e) If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.
- 14) All applications, reports, or information required by the Department shall be certified as being true, accurate, and complete.

- 15) Reports of compliance or noncompliance with, or any progress reports on, requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each scheduled date.
- 16) Any permit noncompliance constitutes a violation of the Safe Drinking Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.
- 17) 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.
- 18) The permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this permit.
- 19) This permit may be modified, revoked and reissued, or terminated for cause, as provided in 40 CFR Sections 144.39(a), 144.40(a), and 144.41 (1998). The filing of a request by the permittee for a permit modification, revocation or reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.
- 20) The permittee shall retain all records of all monitoring information concerning the nature and composition of injected fluid until five years after completion of any plugging and abandonment procedures specified under Rule 62-528.435, F.A.C. The permittee shall deliver the records to the Department office that issued the permit at the conclusion of the retention period unless the permittee elects to continue retention of the records.
- 21) 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 certification required in Rule 62-528.340(4), F.A.C.
- 22) The permittee shall notify the Department as soon as possible of any planned physical alterations or additions to the permitted facility. In addition, prior approval is required for activities described in Rule 62-528.410(1)(h), F.A.C.
- 23) The permittee shall give advance notice to the Department of any planned changes in the permitted facility or injection activity which may result in noncompliance with permit requirements.
- 24) The permittee shall report any noncompliance which may endanger health or the environment including:
  - a) Any monitoring or other information which indicates that any contaminant may cause an endangerment to an underground source of drinking water; or
  - b) Any noncompliance with a permit condition or malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water.

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 times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.



## SPECIFIC CONDITIONS

### 1. General Requirements

- a. This modification permit is to construct and test modifications to the Miramar West WTP Class I injection wells, IW-1 and IW-2, under existing operating permit number 125256-007-UO. All specific conditions of the existing permit will prevail except as modified herein. The modification is an alternative design that consists of removing the existing steel tubing and fluid filled annulus, and installing a fully cemented-in injection tubing. This permit does not authorize the construction or testing of any other well or wells associated with the Miramar West WTP injection well system. The work herein, on each injection well, must be completed within six months of the date of permit modification issuance.
- b. Injection well IW-1 will be modified first. When injection well IW-1 has been approved for operation by the Department, the modification of IW-2 will commence.
- c. Approval of this modification to permit is for the injection of membrane softening concentrate reject water from potable water treatment facilities at the Miramar West WTP only. A separate approval process will be required prior to the injection of any other fluid into the well and, if approved, may require additional monitoring and/or interim mechanical integrity.
- d. Four surficial aquifer monitoring wells, identified as Pad Monitor Wells (PMWs), are located at the corners of the injection well drilling pads and identified by location number and pad location, i.e. NW, NE, SW, and SE. The four PMWs shall be sampled and analyzed prior to the onset of injection well modification efforts. Initial analyses shall be submitted prior to the initiation of work for Department approval. The samples shall be analyzed for chlorides (mg/L), specific conductance ( $\mu\text{mho/cm}$ ), temperature, total dissolved solids (TDS) and water level (relative to NAVD 1988). These monitor wells are to be retained in service, sampled weekly for the above parameters during the injection well modification and testing phases of the project, and quarterly once normal operations are resumed, unless approved by the Department for proper plugging and abandonment. A summary sheet from the FDEP Southeast District is attached for your use when reporting the above information. If located in a traffic area the well head(s) must be protected by a traffic bearing enclosure and cover. The cover(s) must lock and be specifically marked to identify the well and its purpose.
- e. Signatories
  - 1) 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.
  - 2) In accordance with Rule 62-528.340(4), F.A.C., all reports shall contain the following certification:

"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."

## 2. Construction and Testing Requirements

- a. The measurement points for drilling and logging operations shall be surveyed and referenced to NAVD 1988 prior to the onset of well construction modification activities for the injection well.
- b. The Department shall be notified within 48 hours after work has commenced.
- c. 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 stockpiled additive materials to prevent surface and/or groundwater contamination.
  - 2) Properly secure drilling equipment and rig(s) to prevent damage to well(s) and on-site treatment process equipment.
- d. Waters spilled during construction or testing of the injection well system shall be contained and properly disposed.
- e. Department approval is required prior to the following stages of construction and testing:
  - 1) Project start-up date
  - 2) Final tubing seat (the installation and cementing) in the injection well
  - 3) Mechanical integrity testing. Minor deviations (if any) from the mechanical integrity test plans (that were submitted with the application for modification to permit) shall be included in the request to perform the mechanical integrity testing.
  - 4) Short-term injection test
  - 5) Resumed operational testing
- f. The geophysical logging program shall at a minimum include:
  - 1) After the removal of the existing (steel) tubing:
    - Caliper log
    - Video survey (from 100 ft above the uppermost existing liner hanger packer to the bottom of the casing)
    - Internal integrity pressure test
  - 2) After the installation of the tubing and prior to cementing the annulus:
    - Background cement bond log
  - 3) After the cementing-in of the tubing:
    - Cement bond log
    - Mechanical Integrity Testing, including video survey (of entire well from the top of the tubing to the bottom of the borehole), pressure test, temperature survey and radioactive survey test (RTS)
  - 4) Temperature logs shall be run after each stage of cementing on the tubing to identify the top of the cement.



- g. Mechanical integrity of the injection wells shall be determined pursuant to Rules 62-528.300(6)(b)2. and 62-528.300(6)(c), F.A.C.
- 1) The pressure test for the tubing shall be accepted if tested at a high enough pressure such that the well operating pressures will never exceed 66% of the test pressure. A test tolerance of not greater than  $\pm 5\%$  in total must be certified by the engineer of record.
  - 2) Verification of pressure gauge calibration performed within the last six months must be provided to the Department representative at the time of the test and in the certified test report.
  - 3) An interim pressure test to demonstrate internal mechanical integrity shall be required midway between the standard 5-year mechanical integrity tests. This pressure test shall be conducted for a minimum of one-hour at a minimum pressure of 1.5 times the permitted injection pressure with no more than a 5 percent change in pressure allowed over the duration of the test.
- h. The Department shall be notified at least 72 hours prior to all testing for mechanical integrity.
- i. All testing for mechanical integrity must be initiated during normal business hours, Monday through Friday.
- j. UIC-TAC meetings are scheduled on the 2<sup>nd</sup> and 4<sup>th</sup> Tuesday of each month subject to a five working day prior notice and timely receipt of critical data by all UIC-TAC members and the USEPA, Region IV, Atlanta. Emergency meetings may be arranged when justified to avoid undue construction delays.
3. Quality Assurance/Quality Control Requirements
- a. Pursuant to Rule 62-528.440(5)(b), F.A.C., the Professional Engineer(s) of Record shall certify all documents related to the completion of the Class I injection well system as a disposal facility.
  - b. The Department shall be notified immediately of any change of the Engineer(s) of Record.
  - c. In accordance with Section 492, Florida Statutes, all documents prepared for the hydrogeological evaluation of the injection well system shall be signed and sealed by a Florida Licensed Professional Geologist or qualified Florida Licensed Professional Engineer.
  - d. Continuous on-site supervision by qualified personnel (engineer or geologist) is required during all testing, geophysical logging, tubing installation, cementing operations and mechanical integrity testing.
4. Reporting Requirements
- a. All reports and surveys required by this permit shall be submitted concurrently to all members of the UIC-TAC and the USEPA, Region IV, Atlanta. The distribution shall consist of representatives of the following agencies:
    - Department of Environmental Protection, West Palm Beach and Tallahassee
    - United States Geological Survey (USGS), Miami
    - South Florida Water Management District (SFWMD), West Palm Beach
    - Broward County Department of Planning and Environmental Protection (BCDPEP), Ft. Lauderdale.
    - USEPA, Region IV, Atlanta.

- b. A construction schedule shall be submitted to the Department, all members of the UIC-TAC and the EPA, prior to site preparation for the injection well system.
- c. The Department and other applicable agencies must be notified of any unusual or abnormal events occurring during construction, and in the event the Permittee is temporarily unable to comply with the provisions of the permit (e.g., on-site spills, artesian flows, large volume circulation losses, equipment damage due to: fire, wind and drilling difficulties, etc.). 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 5 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 times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.
- d. The permittee shall report any noncompliance which may endanger health or the environment, including:
  - 1) Any monitoring or other information which indicates that any contaminant may cause an endangerment to a USDW; or
  - 2) Any noncompliance with a permit condition or malfunction of the injection system which may cause fluid migration into or between USDWs.

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 noncompliance and its cause, the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

- e. Weekly progress reports shall be submitted during the modifications to IW-1 and IW-2. These reports shall be submitted no later than the seventh day immediately following the period of record, and shall include at a minimum the following information:
  - 1) A cover letter summary of the daily engineer report, driller's log and a projection for activities in the next reporting period.
  - 2) Daily engineers report and driller's/work log with detailed descriptions of all construction progress, cementing, testing, logging, and tubing installation activities.
  - 3) Geophysical logs and water quality test results.
  - 4) Interpretations shall be included with all test results and logs submitted under Items 2) and 3) above.
  - 5) Detailed description of any unusual construction-related events that occur during the reporting period.
  - 6) Weekly water quality analysis and water levels for the four pad monitor wells.
  - 7) A certified evaluation of all logging and test results must be submitted with test data.
  - 8) Details of cementing operations, including the number of cementing stages, and the following information for each stage of cementing: cement slurry composition, specific gravity, pumping rate, volume of cement pumped, theoretical fill depth, and actual tag depth. From both the physical tag and the geophysical logs, a percent fill shall be calculated. An explanation of any deviation between actual versus theoretical fill shall be provided. For each casing, laboratory analysis of dry cement composition of a sample taken during the neat cement stage emplaced at the base of the tubing.



- f. The request to install the tubing shall include the following items, after steel tubing removal and subsequent investigative work:
- 1) Planned tubing depth
  - 2) If field efforts and investigative work lead to the conclusion that the existing liner hanger packers should be left in the injection well, the relevant results of field efforts and investigative work (forming the basis for this conclusion) shall be submitted.
- g. The injection test request shall contain the following justifications:
- 1) Evaluation of the cementing completed between the casing and FRP tubing for possible voids in the cement, and the potential for fluid movement behind the casing, including the following items (with interpretation):
    - a) Cement bond logs (prior to as well as following the cementing of the tubing)
    - b) Temperature logs ~~performed after each cementing stage~~
    - c) Theoretical versus actual cement calculations
  - 2) Mechanical integrity test results, with interpretation and certification of mechanical integrity, (including a copy of all logs and the final video survey)
  - 3) Planned injection procedures
  - 4) All weekly progress report information must be current (received at the Department).
- h. An interpretation of all test results and geophysical logs must be submitted with all submittals.
- i. Prior to authorization of normal operations, a final report must be submitted for each injection well within 90 days of injection test completion. This report shall be submitted for UIC-TAC and USEPA review and must be approved by the Department before Department approval is given for normal operations under the existing operating permit. The final report shall include, as a minimum, the following:
- 1) Geophysical logs with interpretations
  - 2) A copy of the video survey of the injection well with interpretation
  - 3) Certification of mechanical integrity and interpreted test data
  - 4) Results of the short term injection test with interpretation of the data. The injection well shall first be tested for integrity of construction, and shall be followed by a short term injection test of such duration to allow for the prediction of operating pressure. The test results shall include a calculation or determination of fracture pressure of the injection formation [per Rule 62-528.410(6)(b)3., F.A.C.]. The injection test shall be conducted for a minimum of twelve hours at a rate no less than the maximum rate at which the well is to be permitted. Pressure/water level data from the injection zone and both monitor zones shall be recorded continuously for at least 24 hours before the test and at least twelve hours following the test. The following data shall be recorded, analyzed, and reported for the duration of the injection test, i.e., all data should encompass the entire background, injection and recovery periods:
    - injection flow rate (MGD)
    - injection pressure (psig)
    - wellhead pressure with no flow (shut-in pressure in psig)

- monitor well pressures (upper and lower zones of MW-1)
  - tidal data
  - barometric pressure
- 5) A description of the actual injection procedure including the anticipated maximum pressure and flow rate at which the well will be operated under normal and emergency conditions.
  - 6) Certification of completion of well construction.
  - 7) Factory certificates (inspection certificates or mill test reports) for all tubing.
  - 8) Record "as-built" engineering drawings including all modifications to: well construction, subsurface and surface piping and equipment, and appurtenances, certified by the Engineer of Record.
  - 9) Calibration certificates for all new or replaced pressure gauges and flow meters.
  - 10) Draft operation and maintenance manual, revised to reflect all modifications to the injection wells.
5. Resumption of Normal Operation under existing FDEP permit 125256-007-UO
- a. A resumption of operational testing of this Class I injection well system shall not commence without written authorization from the Department.
  - b. A qualified representative of the Engineer of Record shall be present for the start-up operations.
  - c. The Department shall be notified in writing of the date of commencement of normal operations.
  - d. Interim Mechanical Integrity: the permittee shall demonstrate Interim Mechanical Integrity (IMIT) at least once every two and one half years from the date of the last complete mechanical integrity test. A plan describing the IMIT procedures shall be submitted for Department approval at least 180 days prior to the due date.
6. Surface Equipment
- a. The integrity of the monitor zone sampling systems shall be maintained at all times. Sampling lines shall be clearly and unambiguously identified by monitoring zone at the point at which samples are drawn. All reasonable and prudent precautions shall be taken to ensure that samples are properly identified by monitor zone and that samples obtained are representative of those zones. Sampling lines and equipment shall be kept free of contamination with independent discharges and no interconnections with any other lines.
  - b. Spillage onto the injection well pad during construction activities, and any waters spilled during mechanical integrity testing, other maintenance, testing or repairs to the system shall be contained by an impermeable wall around the edge of the pad and directed to a sump which in turn discharges to the pumping station wet well or via other approved means to the injection well system.
  - c. The injection well construction pad with impermeable perimeter retaining wall shall be maintained and retained in service for the life of the injection well. The injection and monitor well pad(s) are not, unless specific approval is obtained from the Department, to be used for storage of any material or equipment at any time. Any alteration or removal of these features must be with prior written Department approval.



- d. The four surficial aquifer monitor wells installed at the corners of the injection well pad shall be secured, maintained, and retained in service. Any alteration or removal of these features must be with prior written Department approval.
7. Emergency Disposal
- a. All applicable federal, state, and local permits shall be in place to allow for any alternate discharges due to emergency or planned outage conditions.
- b. In the event of an emergency and/or discharge, or other abnormal event where the Permittee is temporarily unable to comply with any of the conditions of this permit due to breakdown of equipment, power outages, destruction by hazard or fire, wind, or by other cause, the Department shall be notified in person or by telephone within 24 hours of the incident. A written report describing the incident shall also be submitted to the Department within five days of the start of the incident. The written report shall contain a complete description of the emergency and/or discharge, a discussion of its cause(s), and if it has been corrected, the anticipated time the discharge is to continue, the steps being taken to reduce, eliminate, and prevent recurrence of the event, and all other information deemed necessary by the Department.
- c. The emergency disposal method consists of injection wells IW-1 and IW-2, with each well serving as back-up for the other in the event of failure or emergency. The injection well system does not have emergency storage facilities for the concentrate reject. In the event of catastrophic failure, if both wells are out of service, the Miramar West WTP will not be operated.
- d. Any proposed changes in emergency disposal methods shall be submitted for UIC-TAC and USEPA review and Department approval prior to implementation.

Issued this \_\_\_\_\_ day of \_\_\_\_\_, 2005

STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

**DRAFT**

\_\_\_\_\_  
Kevin R. Neal  
District Director  
Southeast District

**OPERATING PERMIT**

**125256-007-UO**

**Issued on September 16, 2004**

**Expires on September 15, 2009**





# Department of Environmental Protection

Jeb Bush  
Governor

Southeast District  
400 N. Congress Ave. - Suite 200  
West Palm Beach, Florida 33401

Colleen M. Castille  
Secretary

## ELECTRONIC CORRESPONDENCE September 16, 2004 NOTICE OF PERMIT

Brig M. Garg, PE, DEE  
Director of Public Utilities,  
City of Miramar  
13900 Pembroke Road  
Miramar, FL 33027

BROWARD COUNTY  
UIC - City of Miramar West WTP  
FILE: 125256-007-UO

Dear Mr. Garg:

Enclosed is Permit Number 125256-007-UO, to operate the City of Miramar West Water Treatment Plant Class I Injection Wells IW-1 and IW-2, with one associated dual zone monitoring well, MW-1, issued pursuant to Section(s) 403.087, Florida Statutes and Florida Administrative Codes 62-4, 62-520, 62-522, 62-528, 62-550 and 62-660. The system is located at the City of Miramar West Water Treatment Plant.

Any party to this Order (permit) has the right to seek judicial review of the permit pursuant to Section 120.68, Florida Statutes, by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, Mail Stop 35, 3900 Commonwealth Blvd., 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 30 days from the date this Notice is filed with the Clerk of the Department.

Should you have any questions, please contact Heidi Vandor, P.G., or Joseph R. May, P.G., of this office at (561) 681-6695 or (561) 681-6691, respectively.

Executed in West Palm Beach, Florida.

Executed in the City of West Palm Beach, Florida.

STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

*Kevin R. Neal*  
Kevin R. Neal  
District Director  
Southeast District

*9/16/04*  
Date

KRN/LAH/HV  
Copies furnished to:

Richard Deuerling, FDEP/TLH  
Steve Anderson, SFWMD/WPB  
Susan Bodmann, MWH

Nancy Marsh, USEPA/ATL  
Garth Hinckle, BCDPEP

Ron Reese, USGS/MIA  
Heidi Vandor, FDEP/WPB

### CERTIFICATE OF SERVICE

This is to certify that this NOTICE OF PERMIT and all copies were mailed before the close of business on 9/16/04 to the listed persons.

9/16/04  
Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to the §120.52, Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

*[Signature]*  
Clerk

9/16/04  
Date



# Department of Environmental Protection

Jeb Bush  
Governor

Southeast District  
400 N. Congress Ave. – Suite 200  
West Palm Beach, Florida 33401

Colleen M. Castille  
Secretary

PERMITTEE:  
Brij M. Garg, PE, DEE  
Director of Public Utilities  
City of Miramar  
13900 Pembroke Road  
Miramar, FL 33027

PERMIT/CERTIFICATION NUMBER: 125256-007-UO  
DATE OF ISSUANCE: September 16, 2004  
EXPIRATION DATE: September 15, 2009  
COUNTY: Broward  
POSITION: 25° 58' 00" N / 80° 19' 00" W  
PROJECT: City of Miramar West Water Treatment  
Plant (WTP)

PROJECT: Operation Permit for Class I Injection Wells IW-1, IW-2, and associated monitor well MW-1

This permit is issued under the provisions of Chapter 403.087, Florida Statutes, and Florida Administrative Code (F.A.C.) Rules 62-4, 62-520, 62-522, 62-528, 62-550 and 62-660. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

TO OPERATE: Two Class I injection wells, IW-1 and IW-2, for the injection of up to 2.08 million gallons per day (MGD) (peak hour flow), for each well, of non-hazardous membrane softening concentrate from the City of Miramar West WTP. The total permitted capacity of the injection well system is 2.08 MGD, with one well acting as back up for the other well. IW-1 consists of a 16-inch outside diameter (OD) injection casing to a depth of 3095 feet below land surface (bls) with a 13.375-inch OD steel tubing and packer assembly with a fluid filled annular space, to a depth of 3049 feet bls. IW-2 consists of a 16-inch outside diameter (OD) injection casing to a depth of 3046 feet bls with a 13.375-inch OD steel tubing and packer assembly with a fluid filled annular space, to a depth of 3007 feet bls. The injection interval of IW-1 and IW-2 is in the open hole interval in the "Boulder Zone" in the lower Oldsmar Formation; the IW-1 injection interval is between 3095 feet and the total depth of the well at 3179 feet bls; and the IW-2 injection interval is between 3046 feet bls and the total depth of the well at 3508 feet bls. The confinement of the injection zone from overlying underground source of drinking water (USDW) aquifers and fluid movement adjacent to the wellbore of the injection well are monitored by the associated dual zone monitoring well, MW-1. The upper monitoring interval is 1639 to 1735 feet bls and is designed to monitor within the USDW. The lower monitoring interval is 1930 to 2005 feet bls for the purpose of monitoring below the lowermost USDW.

IN ACCORDANCE WITH: Application to Operate a Class I Injection Well System received January 24, 2002; Request for Information (RFI) dated February 20, 2002; Response to RFI received April 1, 2002; RFI dated April 30, 2002; Response to RFI received May 30, 2002; RFI dated July 2, 2002; Response to RFI received July 12, 2002 and April 8, 2004; approval of certification of financial responsibility on April 8, 2004; publication of the Notice of Draft Permit in the Sun Sentinel newspaper on April 25, 2004; in consideration of receipt of public comment received as a result of a public meeting held on June 1, 2004; and publication of the Notice of Intent to Issue Permit in the Sun Sentinel newspaper on July 25, 2004.

LOCATED AT: City of Miramar West Water Treatment Plant, 4100 S. Flamingo Road, Miramar, Broward County, Florida.

TO SERVE: The City of Miramar West WTP Service Area.

SUBJECT TO: General Conditions 1-24 and Specific Conditions 1-7.



### GENERAL CONDITIONS

The following **General Conditions** are referenced in Florida Administrative Code Rule 62-528.307.

1. The terms, conditions, requirements, limitations and restrictions set forth in this permit are "permit conditions" and are binding and enforceable pursuant to Section 403.141, F.S.
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 may constitute grounds for revocation and enforcement action.
3. As provided in Subsection 403.087(7), F.S., the issuance of this permit does not convey any vested rights or exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor infringement of federal, state, or local laws or regulations. This permit is not a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in this permit.
4. This permit conveys no title to land, 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.
5. 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.
6. The permittee shall 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, or are required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.
7. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at reasonable times, access to the premises where the permitted activity is located or conducted to:
  - a. Have access to and copy any records that must be kept under conditions of this permit;
  - b. Inspect the facility, equipment, practices, or operations regulated or required under this permit; and
  - c. Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.Reasonable time will depend on the nature of the concern being investigated.
8. If, for any reason, 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 provide the Department with the following information:
  - a. A description of and cause of noncompliance; and
  - b. 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.

9. 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 where such use is proscribed by Sections 403.111 and 403.73, F.S. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.
10. The permittee 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.
11. This permit is transferable only upon Department approval in accordance with Rules 62-4.120 and 62-528.350, F.A.C. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.
12. This permit or a copy thereof shall be kept at the work site of the permitted activity.
13. The permittee shall comply with the following:
  - a. Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records shall be extended automatically unless the Department determines that the records are no longer required.
  - b. The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.
  - c. Records of monitoring information shall include:
    - 1) the date, exact place, and time of sampling or measurements;
    - 2) the person responsible for performing the sampling or measurements;
    - 3) the dates analyses were performed;
    - 4) the person responsible for performing the analyses;
    - 5) the analytical techniques or methods used
    - 6) the results of such analyses
  - d. The permittee shall furnish to the Department, within the time requested in writing, any information which the Department requests to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit.
  - e. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.
14. All applications, reports, or information required by the Department shall be certified as being true, accurate, and complete.
15. Reports of compliance or noncompliance with, or any progress reports on, requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each scheduled date.



PERMITTEE:  
Brig M. Garg, PE, DEE, Director of Public Utilities  
City of Miramar  
Page 4 of 11

COUNTY: Broward  
PERMIT/CERTIFICATION NUMBER: 125256-007-UO  
DATE OF ISSUANCE: September 16, 2004  
EXPIRATION DATE: September 15, 2009

16. Any permit noncompliance constitutes a violation of the Safe Drinking Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.
17. 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.
18. The permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this permit.
19. This permit may be modified, revoked and reissued, or terminated for cause, as provided in 40 C.F.R. Sections 144.39(a), 144.40(a), and 144.41 (1998). The filing of a request by the permittee for a permit modification, revocation or reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.
20. The permittee shall retain all records of all monitoring information concerning the nature and composition of injected fluid until five years after completion of any plugging and abandonment procedures specified under Rule 62-528.435, F.A.C. The permittee shall deliver the records to the Department office that issued the permit at the conclusion of the retention period unless the permittee elects to continue retention of the records.
21. 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 certification required in Rule 62-528.340(4), F.A.C.
22. The permittee shall notify the Department as soon as possible of any planned physical alterations or additions to the permitted facility. In addition, prior approval is required for activities described in Rule 62-528.410(1)(h).
23. The permittee shall give advance notice to the Department of any planned changes in the permitted facility or injection activity which may result in noncompliance with permit requirements.
24. The permittee shall report any noncompliance which may endanger health or the environment including:
  - a. Any monitoring or other information which indicates that any contaminant may cause an endangerment to an underground source of drinking water; or
  - b. Any noncompliance with a permit condition or malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water.

All 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 times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

### **SPECIFIC CONDITIONS**

1. General Requirements
  - a. In accordance with Rules 62-4.090(1) and 62-528.455(3)(a), F.A.C., the permittee shall submit an application for permit renewal at least sixty days prior to expiration of this permit.
  - b. 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.
  - c. The permittee shall notify the Department and obtain approval prior to any physical alterations or additions to the injection or monitoring well, including removal of the well head.
2. Operating Requirements
  - a. The pressure at the wellhead shall be monitored and controlled at all times to ensure the maximum pressure does not exceed 100 pounds per square inch (psi), i.e., 66 percent of the mechanical integrity test pressure of 152.5 psi for each of IW-1 and IW-2, which is the tested pressure on the final casing and injection tubing.
  - b. The flow to the injection well at the wellhead shall be monitored and controlled at all times to ensure the maximum fluid velocity down the well does not exceed a peak hourly flow rate of 2.08 million gallons per day (MGD) during normal operation for each injection well.
  - c. Pursuant to Rule 62-528.425(1)(b), F.A.C., the injection well system shall be monitored by continuous indicating, recording and totalizing devices to monitor effluent flow rate and volume, and continuous indicating and recording devices to monitor injection pressure and monitoring zone pressure (or water level, as appropriate; all zones). All indicating, recording and totalizing devices associated with the injection well system shall be maintained in good operating condition and calibrated annually at a minimum. Laboratory equipment, methods, and quality control will follow United States Environmental Protection Agency (USEPA) guidelines as expressed in Standard Methods for the Examination of Water and Wastewater. The pressure gauges, flow meter, and chart records shall be calibrated using standard engineering methods.
  - d. The flow from the monitoring zones during well evacuation and sampling shall not be discharged to surface waters or aquifers containing an Underground Source of Drinking Water (USDW).
  - e. No underground injection is allowed that causes or allows movement of fluid into a USDW.
  - f. Only non-hazardous membrane softening concentrate reject water from potable water treatment facilities at the City of Miramar West WTP and purge water from the on-site monitoring wells (associated with the injection well system at the City of Miramar West WTP) may be discharged into this well.
  - g. The wastewater stream shall be non-hazardous in nature at all times, as defined in 40-CFR, Part 261 and as adopted in Chapter 62-730, F.A.C.
3. Testing and Reporting Requirements
  - a. Any failure of the Class I injection well monitoring and recording equipment for a period of more than 48 hours shall be reported to the Department within 24 hours. A written report describing the incident shall also be submitted to the Department within five days of the start of the event.



The written report shall contain a complete description of the occurrence, a discussion of its cause(s), and the steps being taken to reduce, eliminate, and prevent recurrence of the event, and all other information deemed necessary by the Department.

- b. The permittee shall report any noncompliance which may endanger health or the environment, including:
- 1) Any monitoring or other information which indicates that any contaminant may cause an endangerment to a USDW; or
  - 2) Any noncompliance with a permit condition or malfunction of the injection system which may cause fluid migration into or between USDWs.

All information shall be provided orally within 24 hours from the time that the permittee becomes aware of the circumstances. A written submission shall also be provided within five days of the time that 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 times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

- c. The injection system shall be monitored in accordance with Rules 62-528.425(1)(g) and 62-528.430(2), F.A.C. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The following injection well performance and monitoring zone data shall be collected and reported to the Department in Monthly Operating Reports (MORs) as indicated below.

- 1) Injection well performance:
  - a) Physical characteristics of the injection well:

Flow rate parameters:

- average daily flow rate to injection well (MGD)
- daily maximum sustained (15 minutes minimum) flow rate to injection well (MGD)
- daily minimum sustained (15 minutes minimum) flow rate to injection well (MGD)
- monthly average of the daily flow rates to injection well (MGD)
- monthly maximum (peak hour) flow rate to injection well (MGD)
- monthly minimum flow rate to injection well (MGD)

Volumetric parameters:

- total daily flow volume to injection well (MG)
- total monthly flow volume to the injection well (MG)
- monthly average of the daily flow volumes to injection well (MG)
- monthly maximum of the daily flow volumes to injection well (MG)
- monthly minimum of the daily flow volumes to injection well (MG)

Wellhead pressure parameters:

- daily average injection pressure at injection well (psig)
- daily maximum sustained (15 minutes minimum) injection pressure at well (psig)
- daily minimum sustained (15 minutes minimum) injection pressure at well (psig)
- monthly average injection pressure at injection well (psig)
- monthly maximum sustained injection pressure at injection well (psig)
- monthly minimum sustained injection pressure at injection well (psig)
- monthly wellhead pressure with no flow (shut-in pressure, psig)

Annular pressure parameters at the injection well:

- daily average annular pressure (psig)
- daily maximum sustained (15 minutes minimum) annular pressure (psig)
- daily minimum sustained (15 minutes minimum) annular pressure (psig)
- monthly average annular pressure (psig)
- monthly maximum sustained annular pressure (psig)
- monthly minimum sustained annular pressure (psig)
- daily and monthly pressure added or removed (psig)
- daily and monthly volume of water added or removed (gallons)

Additional parameters:

- monthly wellhead pressure with no flow (shut-in pressure, psig)

- b) Chemical characteristics of the wastewater stream sampled from the active wet well:

Monthly sampling:

- residue, total filterable (total dissolved solids, TDS) (mg/L)
- chloride (mg/L)
- specific conductance (temperature compensated,  $\mu\text{mho/cm}$  or  $\mu\text{S/cm}$ )
- temperature ( $^{\circ}\text{C}$ )
- total suspended solids (TSS) (mg/L)
- nitrogen, ammonia, total as N (ammonia) (mg/L)
- nitrogen, total Kjeldahl as N (TKN) (mg/L)
- nitrogen, nitrate, total as N (nitrate) (mg/L)
- phosphorous, total as P (mg/L)
- pH (standard units)
- sulfate, total as  $\text{SO}_4$  (mg/L)

Quarterly sampling:

- gross alpha ( $\rho\text{Ci/L}$ )
- radium 226 ( $\rho\text{Ci/L}$ )
- radium 228 ( $\rho\text{Ci/L}$ )

The MORs shall indicate monthly averages for all parameters sampled daily.

- 2) Monitoring well performance:

- a) Physical characteristics - upper and lower monitoring zones potentiometric surface or water table height relative to the National American Vertical Datum (NAVD) of 1988 (feet of head) or pressure (psig) referenced to NAVD 1988:

- daily maximum pressure or water level (as appropriate)
- daily minimum pressure or water level (as appropriate)
- daily average pressure or water level (as appropriate)
- monthly maximum pressure or water level (as appropriate)
- monthly minimum pressure or water level (as appropriate)
- monthly average pressure or water level (as appropriate)

- b) Chemical characteristics of the upper and lower monitoring zones:

Monthly sampling:

- residue, total filterable (total dissolved solids, TDS) (mg/L)
- chloride (mg/L)



- specific conductance (temperature compensated,  $\mu\text{mho/cm}$  or  $\mu\text{S/cm}$ )
- temperature ( $^{\circ}\text{C}$ )
- nitrogen, ammonia, total as N (ammonia) (mg/L)
- nitrogen, total Kjeldahl as N (TKN) (mg/L)
- nitrogen, nitrate, total as N (nitrate) (mg/L)
- phosphorous, total as P (mg/L)
- pH (standard units)
- sulfate, total as  $\text{SO}_4$  (mg/L)

Quarterly sampling:

- gross alpha ( $\rho\text{Ci/L}$ )
- radium 226 ( $\rho\text{Ci/L}$ )
- radium 228 ( $\rho\text{Ci/L}$ )

- d. A minimum of three well volumes of fluid shall be evacuated from the monitoring systems prior to sampling for the chemical parameters listed above. A State-certified laboratory shall analyze all samples. Sufficient purging shall have occurred when either of the following have occurred:
- 1) pH, specific conductivity and temperature when sampled, upon purging the third or subsequent well volume, each vary less than 5% from that sampled upon purging the previous well volume; or
  - 2) upon purging the fifth well volume
- e. All samples must be collected and analyzed in accordance with the quality assurance/quality control (QA/QC) requirements of Rule 62-160, F.A.C.
- f. A controlled monthly injectivity test (rate/pressure) shall be conducted in accordance with Rule 62-528.430(2)(d), F.A.C. This test shall be conducted at a rate that approaches the maximum design flow, but which can be repeated on a monthly basis. The injectivity test results shall be reported to the Department in the MORs. The following data shall be recorded and reported:

Parameters pertinent to flow rate:

- injection flow rate as measured from flowmeter (MGD)
- initial totalizer reading (gallons)
- final totalizer reading (gallons)
- time (minutes) from initial to final totalizer readings

Pressure parameters:

- static injection pressure fall-off
- wellhead injection pressure fall-off, (psig) every 30 seconds until again static (psig)
- final pressure upon test cessation, approximately 10 to 15 minutes (psig)
- wellhead pressure with no flow (shut-in pressure in psig)
- monitoring zone pressures (psig)

Specific injectivity shall be reported in gpm/psig

All readings shall be taken after a minimum five minute period of stabilized flow.

Pursuant to Rule 62-528.430(2)(d), F.A.C., as part of the specific injectivity test, the well shall be shut-in for a period of time necessary to conduct a valid observation of pressure fall-off.

- g. The four permanent surficial aquifer monitoring wells, located at the corners of the injection well pad and identified as Pad Monitoring Wells (PMWs), shall be sampled and analyzed for: chlorides (mg/L), specific conductance ( $\mu\text{mho/cm}$  or  $\mu\text{S/cm}$ ), temperature, total dissolved solids (TDS) and water level (relative to NAVD 1988). Additionally, these monitoring wells shall be

- sampled 48 hours prior to any maintenance, testing (including mechanical integrity testing) or repairs to the system that represent an increased potential for accidental discharge to the surficial aquifer. The results of these analyses shall be submitted to the Department within 30 days of the completion of the activity. The PMWs shall be identified by location number and pad location (e.g., NW, NE, SW, and SE). A summary sheet from the FDEP Southeast District is attached for your use when reporting the above information. Covers that must lock and be specifically marked to identify the well and its purpose must protect the wells. Alternatively, the City may submit a request to the Department for cessation of sampling followed by capping, or plugging and abandonment of these wells.
- h. All injection well data submissions, including MORs, shall be clearly identified on each page with: facility name, I.D. Number, permit number, operator's name, license number, daytime phone number, date of sampling/recording and type of data. Monitoring zones shall be identified by well number and depth interval. The lead plant operator or higher official shall sign and date each submittal.
- i. The permittee shall submit monthly to the Department the results of all injection well and monitoring well data required by this permit (MORs) no later than the last day of the month immediately following the month of record. The results shall be sent to the Department of Environmental Protection's Southeast District Office (FDEP, UIC Section, 400 N. Congress Ave., Suite 200, West Palm Beach, FL 33401). A copy of this report shall also be sent to the Department of Environmental Protection, Underground Injection Control Program, MS 3530, 2600 Blair Stone Road, Tallahassee, FL 32399-2400.
- j. Pursuant to Rules 62-528.425(1)(a) and 62-528.450(2)(f)3., F.A.C., a wastewater stream analysis (24-hour composite sample) for primary and secondary drinking water standards (Chapter 62-550, F.A.C.) and minimum criteria, see attached list, shall be submitted annually (sampled in February and submitted on or before April 30). VOC parameters and biological parameters shall be sampled either in-situ or grab.
- k. The permittee shall demonstrate mechanical integrity pursuant to Rules 62-528.300(6)(b)2., 62-528.300(6)(c), and 62-528.425(1)(d), F.A.C. at least once every five years during the life of the injection well. In the event operational or other data indicate a possible loss of integrity in the injection well, the mechanical integrity and other testing may be required at less than a five year interval. The mechanical integrity testing program shall include: TV survey, pressure test, temperature log, and radioactive tracer survey (RTS). All mechanical integrity tests shall be run and completed prior to **December 14, 2004, for both IW-1 and IW-2**. A plan describing the mechanical integrity procedures shall be submitted to the Department's Southeast District and Tallahassee offices for approval at least 180 days prior to the pressure test date noted above. Pursuant to Rule 62-528.430(2)(b)2.a., F.A.C., the final report for the demonstration of mechanical integrity for the injection well shall be submitted within three months of the completion date for mechanical integrity testing. The final report shall address all tests noted above (and include procedures followed, interpretations and results), and shall include a tabular presentation/graphical evaluation of monitoring well data over the previous five year period.
- l. The Department shall be notified at least 72 hours prior to all testing for mechanical integrity on the injection well.
- m. All testing for mechanical integrity on the injection wells shall be initiated during normal business hours, Monday through Friday, except legal holidays.
- n. Mechanical Integrity
- 1) The permittee shall maintain the mechanical integrity of the wells at all times.



- 2) If the Department determines that the injection wells lack mechanical integrity, written notice shall be given to the permittee.
- 3) Unless the Department requires immediate cessation of injection, within 48 hours of receiving written notice that the well lacks mechanical integrity, the permittee shall cease injection into the well unless the Department allows continued injection pursuant to (4) below.
- 4) The Department may allow the permittee to continue operation of a well that lacks mechanical integrity if the permittee demonstrates that fluid movement into or between USDWs is not occurring.

#### 4. Surface Equipment

- a. The integrity of the monitoring zone sampling systems shall be maintained at all times. Sampling lines shall be clearly and unambiguously identified by monitoring zone at the point at which samples are drawn. All reasonable and prudent precautions shall be taken to ensure that samples are properly identified by monitoring zone and that samples obtained are representative of those zones. Sampling lines and equipment shall be kept free of contamination with independent discharges and no interconnections with any other lines.
- b. The surface equipment for the injection well system shall maintain compliance with Chapter 62-528.450(2)(j), F.A.C. for water hammer control, screening, access for logging and testing, and reliability and flexibility in the event of damage to the well and effluent piping. A regular program of exercising the valves integral to the well head shall be instituted. At a minimum, all valves integral to the well head shall be exercised during the regularly scheduled monthly injectivity testing.
- c. The injection well and monitoring well surface equipment and piping shall be kept free of corrosion at all times.
- d. Spillage onto the injection well pad during construction activities, and any waters spilled during mechanical integrity testing, other maintenance, testing or repairs to the system shall be contained on the pad and directed to a sump which in turn discharges to the pumping station wet well or via other approved means to the injection well system.
- e. The injection well construction pad with impermeable perimeter retaining wall shall be maintained and retained in service for the life of the injection well. The injection and monitoring well pad(s) are not, unless specific approval is obtained from the Department, to be used for storage of any material or equipment at any time.

#### 5. Financial Responsibility

- a. The permittee shall maintain the resources necessary to close, plug and abandon the injection and associated monitoring wells, at all times [Rule 62-528.435(9), F.A.C.].
- b. The permittee shall review annually the plugging and abandonment cost estimates. An increase of ten (10) percent or more over the cost estimate upon which financial responsibility is based shall require the permittee to submit documentation to obtain an updated Certificate of Demonstration of Financial Responsibility.
- c. In the event the mechanism used to demonstrate financial responsibility should become invalid for any reason, the permittee shall notify the Department of Environmental Protection in writing within fourteen 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.

6. Emergency Disposal

- a. All applicable federal, state, and local permits shall be in place to allow for any alternate discharges due to emergency or planned outage conditions.
- b. The emergency disposal method consists of injection wells IW-1 and IW-2, with each well serving as back-up for the other in the event of failure or emergency. The injection well system does not have emergency storage facilities for the concentrate. In the event of catastrophic failure, if both wells are out of service, the Miramar West WTP will not be operated.
- c. Any proposed changes in emergency disposal methods shall be submitted for Departmental and USEPA review for approval prior to implementation.
- d. Abnormal Events
  - 1) In the event the permittee is temporarily unable to comply with any of the conditions of a permit due to breakdown of equipment, power outages, destruction by hazard of fire, wind, or by other cause, the permittee of the facility shall notify the Department. Notification shall be made in person, by telephone, or by telegraph within 24 hours of breakdown or malfunction to the Department.
  - 2) A written report of any noncompliance referenced in Specific Condition 6.d. above shall be submitted to the Department within five days after its 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. Signatories and Certification Requirements

- a. 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.
- b. In accordance with Rule 62-528.340(4), F.A.C., all reports shall contain the following certification:

"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."

Issued this 16th day of September, 2004

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Kevin R. Neal  
Kevin R. Neal  
District Director  
Southeast District

9/16/04  
Date

9/16/04  
KRN/LAH/SM/HV



**SOUTHEAST DISTRICT UIC SECTION  
SURFICIAL AQUIFER MONITORING WELL (SAMW) REPORT**

FACILITY NAME \_\_\_\_\_  
REPORT MONTH/YR. \_\_\_\_\_

OPERATOR NAME \_\_\_\_\_ LICENSE # \_\_\_\_\_

INJECTION WELL # \_\_\_\_\_ PERMIT # \_\_\_\_\_

SAMPLING DATE \_\_\_\_\_ TIME \_\_\_\_\_

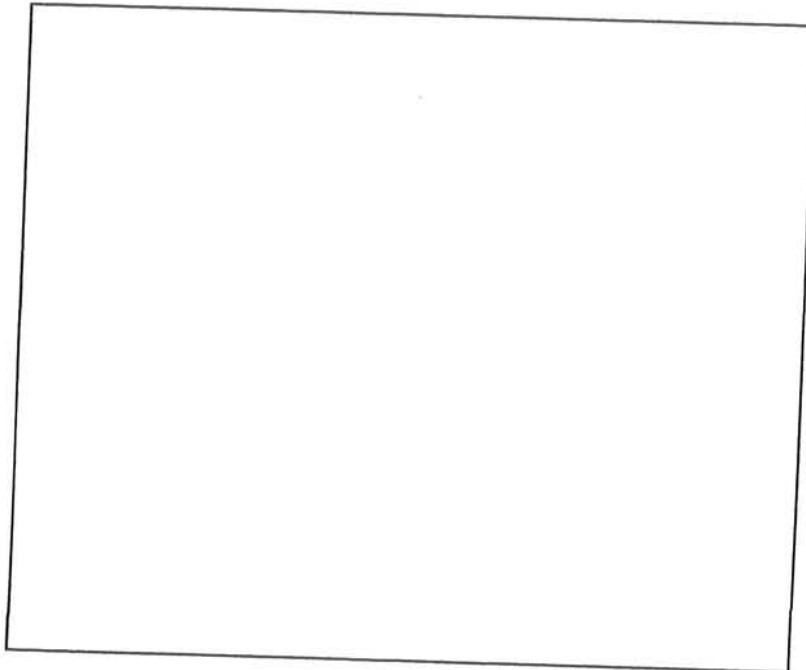
|                             | SAMW #1   | SAMW #2   | SAMW #3   | SAMW #4   |
|-----------------------------|-----------|-----------|-----------|-----------|
| LOCATION                    | NE CORNER | NW CORNER | SE CORNER | SW CORNER |
| ELEVATION OF TOC* (NAVD)    |           |           |           |           |
| DEPTH TO WATER (TOC*)       |           |           |           |           |
| WATER LEVEL (NAVD)          |           |           |           |           |
| CHLORIDE (mg/L)             |           |           |           |           |
| CONDUCTIVITY(μmhos/cm)      |           |           |           |           |
| TOTAL DISOLV. SOLIDS (mg/L) |           |           |           |           |
| TEMPERATURE (° C)           |           |           |           |           |

\* TOC: indicates the "top of the casing" of the Surficial Aquifer Monitoring Well

ANALYZED BY \_\_\_\_\_ SAMPLED BY \_\_\_\_\_

PHONE # \_\_\_\_\_ TITLE \_\_\_\_\_

**SITE PLAN OF SAMW LOCATIONS**



# PRIMARY & SECONDARY DRINKING WATER STANDARDS & MINIMUM CRITERIA

Updated May 6, 2002

Page 1 of 3

## PRIMARY DRINKING WATER STANDARDS

### PARAMETER

Alachlor (Polychlorinated Biphenyl or PCB)  
Aldicarb  
Aldicarb sulfoxide  
Aldicarb sulfone  
Aroclors (Polychlorinated Biphenyls or PCBs)  
Alpha, Gross  
Antimony  
Arsenic  
Atrazine  
Barium  
Benzene  
Benzo(a)pyrene  
Beryllium  
Bis(2-ethylhexyl) adipate (Di(2-ethylhexyl) adipate)  
Bis(2-ethylhexyl) phthalate (Di(2-ethylhexyl) phthalate)  
Cadmium  
Carbofuran  
Carbon Tetrachloride (Tetrachloromethane)  
Chlordane  
Chlorobenzene (Monochlorobenzene)  
Chloroethylene (Vinyl Chloride)  
Chromium  
Coliforms, Total  
Cyanide  
2,4-D (2,4-Dichlorophenoxyacetic acid)  
Dalapon (2,2-Dichloropropionic acid)  
Dibromochloropropane (DBCP)  
1,2-Dibromoethane (EDB, Ethylene Dibromide)  
1,2-Dichlorobenzene (o-Dichlorobenzene)  
1,4-Dichlorobenzene (p-Dichlorobenzene or Para Dichlorobenzene)  
1,2-Dichloroethane (Ethylene dichloride)  
1,1-Dichloroethylene (Vinylidene chloride)  
1,2-Dichloroethylene (cis-1,2-Dichloroethylene or trans-1,2-Dichloroethylene)  
cis-1,2-Dichloroethylene (1,2-Dichloroethylene)  
trans-1,2-Dichloroethylene (1,2-Dichloroethylene)  
Dichloromethane (Methylene chloride)  
1,2-Dichloropropane  
Di(2-ethylhexyl) adipate (Bis(2-ethylhexyl) adipate)  
Di(2-ethylhexyl) phthalate (Bis(2-ethylhexyl) phthalate)  
Dinoseb  
Diquat  
EDB (Ethylene dibromide, 1,2-Dibromoethane)  
Endothall  
Endrin  
Ethylbenzene  
Ethylene dichloride (1,2-Dichloroethane)  
Fluoride  
Glyphosate (Roundup)  
Gross Alpha  
Heptachlor  
Heptachlor Epoxide  
Hexachlorobenzene (HCB)  
gamma-Hexachlorocyclohexane (Lindane)  
Hexachlorocyclopentadiene  
Lead



# PRIMARY & SECONDARY DRINKING WATER STANDARDS & MINIMUM CRITERIA

Updated May 6, 2002

Page 2 of 3

## PRIMARY DRINKING WATER STANDARDS, CONT'D

### PARAMETER

Lindane (gamma-Hexachlorocyclohexane)  
Mercury  
Methoxychlor  
Methylene chloride (Dichloromethane)  
Monochlorobenzene (Chlorobenzene)  
Nickel  
Nitrate (as N)  
Nitrite (as N)  
Total Nitrate + Nitrite (as N)  
Oxamyl  
p-Dichlorobenzene or Para Dichlorobenzene (1,4-Dichlorobenzene)  
Pentachlorophenol  
Perchloroethylene (Tetrachloroethylene)  
Picloram  
Polychlorinated biphenyl (PCB or Aroclors)  
Radium  
Roundup (Glyphosate)  
Selenium  
Silver  
Silvex (2,4,5-TP)  
Simazine  
Sodium  
Styrene (Vinyl benzene)  
Tetrachloroethylene (Perchloroethylene)  
Tetrachloromethane (Carbon Tetrachloride)  
Thallium  
Toluene  
Toxaphene  
2,4,5-TP (Silvex)  
1,2,4-Trichlorobenzene  
1,1,1-Trichloroethane  
1,1,2-Trichloroethane  
Trichloroethylene (Trichloroethene, TCE)  
Trihalomethanes, Total  
Vinyl Chloride (Chloroethylene)  
Xylenes (total)

## SECONDARY DRINKING WATER STANDARDS

### PARAMETER

Aluminum  
Chloride  
Color  
Copper  
Ethylbenzene  
Fluoride  
Foaming Agents (MBAS)  
Iron  
Manganese  
Odor  
pH  
Silver  
Sulfate  
Toluene  
Total Dissolved Solids (TDS)  
Xylenes  
Zinc

# PRIMARY & SECONDARY DRINKING WATER STANDARDS & MINIMUM CRITERIA

Updated May 6, 2002

Page 3 of 3

## MUNICIPAL WASTEWATER MINIMUM CRITERIA GROUND WATER MONITORING PARAMETERS

### INORGANICS

Ammonia  
Nitrogen (organic)  
Total Kjeldahl Nitrogen  
Total Phosphorus (phosphate)

### VOLATILE ORGANICS

Chloroethane  
Chloroform  
para-Dichlorobenzene (1,4 Dichlorobenzene)  
1,2-Dichloroethylene (cis-1,2-Dichloroethylene or trans-1,2-Dichloroethylene)

### BASE/NEUTRAL ORGANICS

Anthracene  
Butylbenzylphthalate  
Dimethylphthalate  
Naphthalene  
Phenanthrene

### PESTICIDES AND PCBs

Aldrin  
Dieldrin

### ACID EXTRACTABLES

2-chlorophenol  
Phenol  
2,4,6-trichlorophenol

### OTHER

Specific Conductance  
Biological Oxygen Demand  
Chemical Oxygen Demand  
Temperature